

FMD-91

# Failure Mode/Mechanism Distributions

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REPORT DOCUME			Form Approved OMB No. 0704-0188
Public reporting burden for this collection of information is estimal sources, gathering and maintaining the data needed, and completi aspect of this collection of information, including suggestions for Reports, 1215 Jefferson David Highway, Suite 1204, Arlington, V/ Washington, DC 20503).	ng and reviewing the collection of inform: reducing this burden, to Washington He	ation. Send comm adquarters Servic	ents regarding this burden estimate or any other ces, Directorate for Information Operations and
1. AGENCY USE ONLY (Leave Blank)	2. REPORT DATE	3. REPOR	T TYPE AND DATES COVERED
	September 1991		
4. TITLE AND SIJBTITLE		5. FU	NDING NUMBERS
Failure Mode/Mechanism Distribu	itions		65802S
6. AUTHOR(S)	. <u></u>		
Gregory Chandler, William K. Dens	on, Michael J. Rossi, Ri	chard Wan	ner
7. PERFORMING ORGANIZATION NAME(S) AND Reliability Analysis Center	ADDRESS(ES)		RFORMING ORGANIZATION PORT NUMBER
201 Mill Street Rome, NY 13440-8200			FMD-91
9. SPONSORING/MONITORING AGENCY NAME( DLA/DTIC	S) AND ADDRESS(ES)		ONSORING/MONITORING AGENCY PORT NUMBER
Cameron Station Alexandria, VA 22314-6145	F3	0602-91-C-0002	
11. SUPPLEMENTARY NOTES: Hard copies availa (Price: \$100.00 U.S., \$120.00 Non-U.S.).	ble from the Reliability Analysis	Center, 201 Mi	ll Street, Rome, NY 13440-8200.
12a. DISTRIBUTION/AVAILABILITY STATEMENT		12b. C	DISTRIBUTION CODE
Approved for public release; distribution unlimite or DTIC.	Und	classified	
13. ABSTRACT (Maximum 200 words)		<b>I</b>	
The intent of this document is to present fa FMEAs and FMECAs when used in conjunction along with RACs Nonelectronic Parts Reliability standard set of distributions to be used in the electronic, mechanical and electromechanical parts	on with accepted reliability p Data (NPRD). The intent of t reliability engineering indus	prediction technese distribut stry. The sc	hniques such as MIL-HDBK-217 tions is that they form a basis for a ope of this publication covers all
14. SUBJECT TERMS		15.	NUMBER OF PAGES
electronic parts me	ure mode distributions chanical parts ure modes		320
17. SECURITY CLASSSIFICATION 18. SECURITY CLASSIFIC			PRICE CODE LIMITATION OF ABSTRACT
NSN 7540-01-280-5500			Standard Form 298 (Rev. 2-89) Prescribed by ANSI Std. Z349-18 298-102

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#### PREFACE

This document contains failure distribution data on a variety of electrical, mechanical, electromechanical and microwave parts and assemblies. This data was compiled from failure analysis reports, DoD maintenance data and published materials dealing with failure distributions. FMD-91 has been developed to assist in performance of reliability analyses such as Failure Mode, Effects and Criticality Analysis (FMECA).

This is the first document dealing exclusively with failure distributions published by the RAC. RAC plans to periodically update this book as new information is compiled. If RAC users maintain databases containing failure distributions or know of additional sources which present failure mode distributions, please contact the RAC technical inquiry hotline at (315) 337-9933.

The authors would like to express their sincere appreciation to those who contributed their time and effort to the preparation of this publication including Debbie Canning, Jill Race, Shirley Thomson, William Crowell, Jeanne Crowell and Pam Meus. Valuable technical assistance and direction was also provided by David Coit, Anthony Pettinato, Preston MacDiarmid and Steve Pemberton.

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FIGURE 2-3 CRITICALITY MATRIX

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# SECTION 1 INTRODUCTION

# FMD-91 Introduction

# 1.0 BACKGROUND AND INTRODUCTION

A knowledge of part failure trends are necessary to successfully perform many reliability analysis techniques such as a Failure Mode, and Effects Analysis (FMEA). Quantification of the relative probability of occurrence for each potential failure mode or failure mode distribution, for a given part type is essential for the performance of a Failure Mode, Effects and Criticality Analysis (FMECA).

The intent of this document is to present failure distributions on parts and assemblies to be used in support of reliability analyses such as FMEAs and FMECAs. Data contained in this publication can be used to apportion an item's failure rate into modal elements by multiplying the failure rate by the percentage attributable to specific failure modes. The intent of these distributions is to provide a baseline set of probabilities to be used in the reliability engineering industry. These distributions will evolve as additional information is made available to the RAC.

The scope of this publication covers all electronic, mechanical and electromechanical parts or assemblies on which the RAC has collected failure mode data.

This document is organized into the following sections:

- Section 1: Provides background on data collection, defines the data contained in Section 3, and presents a discussion allowing the user to accurately interpret the data.
- Section 2: Presents a Users Guide to FMECA and explains how data contained in this document can support FMECAs.
- Section 3: Presents the Failure Distribution Summary/Data Listings.
- Section 4: Describes Data Sources used in this publication.
- Part Index: The Part Index provides a comprehensive cross-reference to the data contained in Section 3. Each part category has been indexed on all pertinent words contained in the part description.

### 1.1 DATA COLLECTION

The data contained in this publication was collected from a variety of sources. All sources used are briefly described in Section 4. These sources can be grouped into the following major categories:

- (1) <u>Published Information</u>. To aid in the RAC's data collection activities in support of this effort, a literature search was conducted which identified published sources presenting failure modes or failure mode distributions. Such sources are from periodicals, technical reports, and data compendiums.
- (2) <u>Maintenance Data</u>. There are several government sponsored databases that were used in support of this publication. In these databases, a repair technician will typically record information regarding the cause of failure at the time the maintenance action was performed. The primary disadvantage of this data type is that the failure mode/mechanism can not be confirmed. Data of this type was only included when a reasonable degree of credibility existed in the source.
- (3) <u>Failure Analysis Reports</u>. The RAC continually collects and analyzes failure mode/mechanism data from failure analysis activities. This data source is considered the most desirable because both the number of failures and the failure mode/mechanism can be confirmed.

The majority of information used in this document is from previously published reports. Maintenance data was the next most predominant followed by failure analysis reports. If the user would like to gain a more thorough understanding of the data sources used in this publication, Section 4 briefly summarizes all sources used. One particular problem in deriving the failure distributions in this document was the manner in which several data sources were merged together to yield a single distribution. Initial data analysis and summarization efforts included the use of various weighting schemes to rank the data in accordance with a combination of both the quality and quantity of data. While this methodology has merit, it was decided that individual data sources be weighted equally. The reasons for this approach are as follows:

- 1) A minimum degree of data quality and confidence must have been present in the data, otherwise it was discarded from the database. RAC only included that data for which there existed a reasonable degree of credibility. Therefore all data in this document meets a minimum level of confidence.
- 2) Many of the data sources exhibiting large quantities of part failures were deemed less credible than data sources with low numbers of part failures.

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3) An adequate quantitative weighting scheme could not be developed. Quantity of failed parts could not be used because sources with large quantities of parts would overwhelm the data to the point that other sources would have no influence in the final distribution. Quantity of parts also could not be used for the reason cited in item #2 above.

# 1.2 DATA DEFINITIONS

The following discussion defines the variables contained in the data section (Section 3) and presents information allowing the user to better understand and interpret the data.

Section 3.0 of this publication contains failure distribution summaries. Figure 1-1 shows an example of "Diode, Rectifier" as shown in Section 3. The fields presented in this section are as follows:

- Part Description (Part Desc.)
- Failure Mode/Mechanism (Failure Mode/Mech)
- Normalized Distribution (Norm Dist.)
- Failure Distribution (Fail. Dist.)
- Number of Data Sources (Data Source(s))
- Failure Mode Details (Details)

Each one of these items is defined and discussed further in the following paragraphs to give a better understanding of how the data was categorized and summarized.

1-4	Introduction	FMD-91
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Part Fallure Desc. Mode/Mech	Norm Dist.	Fall Dist.	Data Source(s)/Details
Diode,Rectifier Shorted	54.94	50.0	Sources:4 Short (24994-000,20.0%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:6) (25000-000,Qty:7) (25000-000,Qty:9), 1K ohm short (reverse) (25001-000,Qty:1), Hard Short (1 ohm short (reverse) (25001-000,Qty:1), Hard Short (1 ohm) (25001-000,Qty:1), Short-Overstress (10722-000,Qty:2)
Drift	31.94	29.1	Parameter Drift-General (25000-000,Qty:8) (25000-000,Qty:13) (25000-000,Qty:14), Parameter Drift-Insulation Res. (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:1), Parameter Drift-Delta Ir (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:5) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:7) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:8) (25000-000,Qty:7) (25000-000,Qty:1) (25000-000,Qty:8) (25000-000,Qty:7) (25000-000,Qty:1) (25000-000,Qty:28) (25000-000,Qty:7), Parameter Drift-Delta R (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:6), Drift (24994-000,40.0%)
Opened	9.5%	8.75	Open (24994-060,20.0%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2), Open-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:10) (25000-000,Qty:25), Open-Open Junction (25000-000,Qty:2)
Corroded	2.34	2.10	Corrosion (25000-000,Qty:4) (25000-000,Qty:10) (25000-000,Qty:24)
Intermittent Operation	0.6%	0.54	Intermittent (25000-000,Qty:1) (25000-000,Qty:3), Intermittent-Noise (25000-000,Qty:6)
Seal Failure	0.44	0.4%	Leakage Seal (25000-000,Qty:1) (25000-000,Qty:3), Seal Leak (25000-000,Qty:3)
Mechanical Damage	0.44	0.34	Mechanical Damage (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3)
Induced		8.3%	Severely Degraded (10722-000,Qty:1)
Unknown		0.5%	Unknown (25000-000, Qtv: 3) (25000-000, Qtv: 6)

FIGURE 1-1: Data Format

#### PART DESCRIPTION

Data contained herein have been extracted from one or more individual data source. In cases where more than one source was utilized, the data was combined into a single listing of failure modes for each part type. The manner in which this combining occurred is presented in Section 1.4 "Data Summary Example." Since there can be several sources combined to derive a single distribution, the manner in which parts are described must be consistent between sources. Since these descriptions, as they are collected by the RAC, can vary significantly for a given part type, they were sometimes modified to insure commonality in part descriptions between sources so that data could be combined on similar part types in a consistent manner. Part descriptions were only changed when necessary to keep the intent and meaning of the original data source. To obtain failure distributions for generic families of part types, special merges were performed on selected part types. For example, the summary for "Bearings" is a merge of all bearing data, regardless of specific type (i.e., ball, roller, sleeve). These summaries are contained within the data section and are denoted with the word ("Summary") next to the part description. For these entries, only the failure description and normalized failure distribution are presented since all data used in these summaries is presented below the summary level.

### FAILURE MODE/MECHANISM

The Failure Mode/Mechanism field presents the categorized failure modes or mechanisms. For the purposes of this publication, a failure mode is defined as the observable consequence of failure where the failure mechanism is defined as the physical process which causes the failure. This field represents the failure modes as they were categorized by the RAC from the detailed failure description (presented in the Details field). During this classification process, the RAC reviewed all failure modes and mechanisms for a given part type and structured a generic list representative of all data sources.

### NORMALIZED DISTRIBUTION

The Normalized Distribution is the Failure Distribution field (discussed in the next section) excluding the categories "Other" "Unknown" and "Induced." These percentages are included in the Failure Distribution field. (The category "Other" is defined and further discussed in the "Data Summary Example" section.)

Additionally, for some part types it may be preferable to normalize out the wearout failure causes when deriving modal failure rates for the performance of FMECAs. This is especially important if the source of failure rate data used is MIL-HDBK-217 since the failure rates derived from that document are typically representative of non-wearout type failures.

## FAILURE DISTRIBUTION

The Failure Distribution Field represents a summary of the distribution of all categorized failure modes and mechanisms from all data sources for a particular part type. This distribution is representative of all categorized failure types, including "Other," "Unknown," and "Induced." This distribution was derived in the following manner:

- 1) Sources with known quantities of parts failing in a particular manner were converted to a percentage.
- 2) These percentages were combined with the other sources which had failure distributions reported by percentage alone.

As an example, consider the following illustration in TABLE 1-1.

TABLE 1-1. Example of Combining Data				
	Source 1	Source 2	Source 3	
Failure 1	60%	20%	Qty: 12	
Failure 2	30%	60%	Qty: 4	
Failure 3	10%	20%	Qty: 2	

**TABLE 1-1:** Example of Combining Data

In this hypothetical example, Sources 1 and 2 reported the failure distribution in percentages while Source 3 reported a quantity of failed parts. To illustrate the combining procedure, Source 3 was converted into percentages. The percentage associated with each failure type was then summed for all three sources and the totals divided by the number of data sources which in this case was three. Numbers may have been rounded to insure that the distribution added to 100%. Table 1-2 illustrates this.

	Source 1	Source 2	Source 3	<u>Sum</u>	Merged Failure Distribution
Failure 1	60%	20%	67%	147	49%
Failure 2	30%	60%	22%	112	37%
Failure 3	10%	20%	11%	41	14%

**TABLE 1-2:** Failure Distribution Results

Where the term "NR" appears in this field, a failure event has been identified by the source but no percentage or quantity was given.

# DATA SOURCES

This field represents the total number of data sources used in deriving the failure distribution. Each data source is briefly described in Section 4 of this report. Each source is uniquely identified with a five digit number followed by a three digit number (i.e., 24417-000). This number represents the RACs library file number.

# FAILURE MODE DETAILS

The details field presents the detailed failure descriptions exactly as they were reported to RAC from each data source. This data is mapped to a failure mode/mechanism which was categorized by RAC engineers. Each detailed failure description is followed by the source code and quantity (or percentage) of devices failing in that manner. Each RAC categorized failure mode/mechanism can have many detailed entries from many data sources.

The detailed data is presented to give the user an understanding of the failures as they were reported, and to present the actual quantity or percentage of each specific failure by source.

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#### 1.3 DATA INTERPRETATION

### 1.3.1 HANDLING INDUCED FAILURES

Many of the data sources used to derive failure classifications were from field maintenance activities. As a result, many non-inherent or induced failures are included in the data. Maintenance data were identified and classified based on type failure classifications. Maintenance records with a Type HOW MAL code equal to 1 were initially classified as inherent failures while Type 2 codes were considered induced. In the context of this data, induced failures are considered to be non-inherent failures resulting from part misapplication, overstress, etc. RAC then reviewed this data to assure failure classifications were logical. The two failure distributions presented in this document are the Normalized Distribution (Norm Dist.) and Failure Distribution (Fail Dist.). The Normalized Distribution value excludes non-inherent failures while the Failure Distribution value includes all reported failure data. This allows the FMD-91 user to observe the failure distributions for each circumstance. Maintenance records which contained replacement of non-failed parts were discarded from the database.

#### 1.3.2 HANDLING SOURCE REPORTING INCONSISTENCIES

The RAC has collected failure mode and mechanism information from approximately 50 different sources, each with its own unique way of presenting this information. In some cases, failure modes of assemblies were presented as constituent part failures of the assembly that has failed. In other cases, the actual failure mode of the assembly was presented. There are cases in which the failure mode classification may appear to be inconsistent since there may be two sources of data for a particular part, one presenting constituent part failure modes and the other actual failure modes of the assembly. However, in cases where the failure modes listed are a combination of consequences of failure and of constituent part failure, the user can customize this data to his particular needs by converting one to the other. An example of this situation is "Transformers" in which case one failure mode listed may be "Shorted" whereas another may be "Insulation" failure. "Short" is an observable mode of failure and the "Insulation" is the site or constituent component of failure. In this case, the user can discard the "Insulation" failure mode and re-normalize the distribution or, if there is enough confidence that the "Insulation" failure resulted in a "Short", the two percentages can be combined under

"Short". In any case, this would have to be accomplished based on a knowledge of the physical properties of the part/assembly and its related reliability issues. The RAC has attempted to make these listings consistent where possible, however in some cases these two different types of failure modes are presented to allow the user flexibility in tailoring the distributions to his particular needs.

Additionally, some failure modes presented may be redundant. For example, one failure mode may lead to another failure mode (ex. for Actuators, Corrosion can lead to Sticking/Binding). Also, there may be failure modes with the same meaning (ex. Shorted/No Operation). In general, the RAC has reported data as it was reported by the original data source. If the user wishes to merge these failure modes, it can be accomplished by simply combining the percentages as described below.

#### 1.3.3 HANDLING VARIOUS LEVELS OF FAILURE REPORTING DETAIL

Some items may have failures listed that are not applicable to their generic category but rather are applicable to the specific part from which the data was collected. For this reason the user is cautioned to use the "Summary" data entries judiciously. If it is known that a failure mode is not applicable for a particular part, the data can be re-normalized by excluding the percentage associated with that failure mode.

There are a number of cases where failure modes listed are a subset of another failure mode listed. As an example, consider a bipolar transistor. "Open" may be one failure mode listed while "B-E Open," "Emitter Open," and "C-E Open" may be others. "Open" is listed simply because a significant amount of data did not identify the particular open junction or terminal site. The user has several options to address this situation if a consistent set of failure modes is desired. First, if the detailed open site is required, the percentage listed under "Open" can be applied proportionally to the more specific failure mechanisms. If that level of detail is not required, the user can add the percentages due to the specific failure modes to the generic "Open" category so that only a single "Open" category exists. A third option would be to derive a single "Open" category by adding the percentages of all "Opens" regardless of the "Open" site and apply that percentage in equal portions over all possible "Open" sites, even though all sites may not be listed herein. In this manner, all possible failure modes are accounted for.

# 1.3.4 <u>RE-NORMALIZING TO REMOVE FAILURE MECHANISMS</u>

Both failure mode and failure mechanism combinations may be presented for a particular part type. Therefore, a given failure distribution may contain a mixture of modes and mechanisms. In cases where the failure mode resulting from a specific failure mechanism is clear, the mechanism was categorized accordingly. In cases where the resulting mode is not known, the mechanism is kept separate and included with the modes. In these cases, the user is cautioned to interpret the data accurately. If a true failure mode distribution (not mode and mechanism) is needed in support of an FMECA, then the unwanted entries in the distribution, such as failure mechanisms, can be eliminated by deleting those entries and re-normalizing the distribution. Section 2.6.2.2 provides an example of how to re-normalize data in this publication to accommodate effective FMECA usage. RAC has provided a normalized set of failure mode distributions for use in a FMECA in Section 2.8. These numbers were derived subjectively from the data contained in Section 3 for commonly used part types using engineering judgment.

# 1.3.5 COMBINING DISTRIBUTIONS

Combining data in the manner previously described results in "average" failure mode distributions. While these distributions are intended to be used as baseline values, actual distributions can vary significantly as a function of many variables. Some of these variables include:

- Device maturity
- Time during the life cycle (early life, wearout periods)
- Application Environment
- Device Quality
- Manufacturing Process

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### .3.6 EVALUATING SINGLE SOURCE DISTRIBUTIONS

In many cases, there is only one source of data for a particular part. For these, the resulting distribution is entirely dependent on a single data source and may not adequately represent industry averages. Although there is limited data to quantify an accurate average failure distribution, the data should identify the predominant failure trends for that part type.

#### 1.3.7 EVALUATING APPLICATION SPECIFIC DISTRIBUTIONS

It should be noted that all failure distributions listed will not be applicable to all situations. This is because the data comprising these distributions was collected from a variety of component types, quality levels and environments. Therefore, the summary distributions represent observed averages and the actual distributions will vary depending on specific conditions. Also, failure distributions presented are entirely dependent upon the specific use conditions of the part/assembly. In these cases the failure mechanisms are often induced and are not inherent failure mechanisms for the device. In these instances, the failure distributions may have limited applicability to the "generic" family of part/assembly types and are presented to illustrate how such devices have failed in the past.

Wearout failures can occur in the entire population, and therefore can represent a very high percentage of all failures. Since the time period relative to the life cycle of the part over which this data was collected is not known and because failure distributions can change over time, the distributions presented herein represent an average over some typical usage time interval.

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# 1.4 DATA SUMMARY EXAMPLE

As an example to illustrate the manner in which the data was summarized and combined, consider the entry for Fixed Capacitors shown in Figure 1-2.

Part Desc.	Failure Mode/Mach	Norm Diat.	Fail Dist.	Data Source (s) /Details
	tor, fixed orted	48.94	48.65	Sources:5 Short-Dielectric strength (25000-000,Qty:1), Short (2499-000,80.0%) (24990-000,99.0%) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:17) (25027-000,Qty:1), Short-Ruptured/Cracked Dielectric (25016-000,NR)
Op	aned	28.54	28.44	Open (24990-000,1.0%) (24990-000,20.0%) (25000-000,Qty:6) (25000-000,Qty:9), Open-Defective Termination (25016-000,NR), Open-Insufficient Lead To Element Attach-Internal (10722-000,Qty:1)
Dr	itt	21.9	21.84	Parameter Drift-Intermittent (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:6), Parameter Drift-Pover Factor (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:5) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:2), Parameter Drift-Insulation Kesiatance (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:2) (25000-000,Qty:6) (25000-000,Qty:4) (25000-000,Qty:2) (25000-000,Qty:6) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:5) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:5) (25000-000,Qty:72)
Co	rroded	0.74	0.74	Corrosion (25000-000,Qty:14)
Se	al Failure	<0.1%	<0.14	Seal Leakage (25000-000, Gty:1)
In	duced		0.34	Mechanical Damage (25000-000,Qty:6)
Un	known		0.25	Unknown (25000-000, Qty: 3)
Oti	her Change in Capac.		0.05 NR	Reduced Capacitance-Ruptured/Cracked Dielectric (25016-000,NR), Delamination, Reduced Capacitance-Impared Seal (25016-000,NR)
	High Disipation Factor		NR	High Dissipation Factor-Defective Termination (25016-000,NR)
	Seal/Gasket Failure		NR	Low Insulation Resistance-Impared Seal (25016-000, NR)

FIGURE 1-2: Fixed Capacitor Failure Distribution

In this case there were five (5) individual sources which contained failure information on Fixed Capacitors. This data is representative only of sources which did not contain a further breakdown of specific Capacitor type. If a more specific description was available, it would be presented at a level with a more detailed description of the part type. The "Details" field describes the actual failure description as was supplied to the RAC. The first entry lists "Short-Dielectric Strength (25000 - 000, Qty: 1)". This indicates that source 25000-000 (described in Section 4) contains one part that failed "Short" due to the Dielectric Strength. The term "Shorted" under Failure Mode/Mech is the term the RAC assigned to the general category of failure description after reviewing all reported failures. In this case, "Shorted," "Opened" and "Drift" were determined by the RAC to be the predominant generic failure categories for Fixed Capacitors. All the quantitative data contained in the details column was then used to derive the failure distribution (Fail Dist.) using the methodology previously described.

#### Introduction

The normalized failure distribution was then calculated by determining the predominant inherent failure classifications of the part. This was accomplished first by ignoring the data associated with the unknown and induced categories. The next step in this process was to discard all failure occurrences below a given percentage while insuring that no more than seven inherent failure classes appear under the normalized percentage. For example, if by ignoring failure classes occurring less than 1% of the time, less than seven (7) remain, 1% is used as the cut-off above which failures were included in the normalized percentage. If seven or more remain, the cut-off percentage was increased in increments of 1% until seven or less remained. The number seven was selected because consideration of greater than seven failure modes is impractical to perform FMECAs. If seven or less failure classes exist initially, then all were included. Failures that are below the cut-off percentage are listed under the generic category "Other." The cut-off percentage is listed next to the term "Other." Finally, by ignoring the "Induced," "Unknown," and "Other" failure entries, the normalized distribution can be derived. The normalized failure distribution was then calculated (following the previously described procedure) using only the reduced set of failure classes. In this example, "Shorted," "Opened," "Drift," "Corroded," and "Seal Failure" comprise the normalized failure distribution.

If the user requires more detail than is provided in the normalized distribution, the detailed failure distribution and specific source details can be consulted.

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# SECTION 2 FMECA USER GUIDE

#### FMD-91

#### 2.0 INTRODUCTION

This section Provides information on conducting a Failure Mode, Effects and Criticality Analysis (FMECA) and illustrates how failure mode distributions presented in this document (FMD-91) could be used when performing an FMECA. This section was compiled primarily from the various MIL Standards governing FMECA. Every attempt has been made to simplify the wording of these standards to better support users performing an FMECA. Data tables at the end of this section have been derived from Section 3 summary tables to include only failure mode data. While the section 3 summary tables contain all the failure data contained in the RACs databases, much of it is not applicable to a FMECA. RAC engineers have re-normalized a number of part type distributions to remove failure mechanism data and combine similar failure descriptions to provide an example set of failure distributions specifically for FMECA. This procedure was performed with the goal to provide FMECA analysts with a list of widely used component and assembly failure mode distributions. However, additional data may be derived for components not contained in these summary tables or the example data contained in the summary tables may be re-computed by following the normalization procedure outlined in Sections 1.3.4 and 2.6.2.2.

#### 2.1 FAILURE MODE, EFFECTS AND CRITICALITY ANALYSIS (FMECA) OVERVIEW

#### 2.1.1 FAILURE MODE EFFECTS ANALYSIS (FMEA)

The FMEA is an analysis procedure by which each potential failure mode in a system is analyzed to determine the results or effects thereof on the system and to classify each potential failure mode according to its severity. The initial FMEA should be done early in the conceptual phase when design criteria, mission requirements, and preliminary designs are being developed to evaluate the design approach and to compare the benefits of competing design configurations.

The FMEA will provide quick visibility of the most obvious failure modes and identify potential single failure points, some of which can be eliminated with minimal design effort. As the mission and design definitions become more refined, the FMEA can be expanded to successively more detailed levels. When changes are made in system design to remove or reduce the impact of the identified failure modes, the FMEA must be repeated for the redesigned portions to ensure that all predictable failure modes in the new design are considered. The analysis approach to be used for the FMEA will generally be dictated by variations in design complexity and the available data. There are two primary approaches for accomplishing an FMEA.

<u>Functional Approach</u> - recognizes that every item or combination of items is designed to perform a number of functions that can be classified as outputs. <u>Hardware Approach</u> - lists individual hardware items and analyzes their possible failure modes.

For complex systems, a combination of the functional and hardware approaches may be considered. The FMEA may be performed as a hardware analysis, a functional analysis, or a combination analysis and is ideally initiated at the part, circuit or functional level and proceeds through increasing indenture levels until the FMEA for the system is complete.

#### 2.1.2 CRITICALITY ANALYSIS (CA)

The CA is an analysis procedure for associating failure probabilities with each failure mode. Since the CA supplements the FMEA and is dependent upon information developed in that analysis, it should not be attempted without first completing the FMEA. The CA is probably most valuable for maintenance and logistic support oriented analyses since failure modes which have a high probability of occurrence (high criticality numbers) require investigation to identify changes which will reduce the potential impact on the maintenance and logistic support requirements for the system.

The analysis approach to be used for the CA will generally be dictated by the availability of specific configuration data and failure rate data. There are two approaches for accomplishing the CA. One is the qualitative approach which is appropriate only when failure rate data are not available. The preferred method is the quantitative approach which is utilized where failure rate data have been derived.

#### 2.2 FMECA APPLICATION

A FMEA and CA when performed concurrently are referred to as a FMECA. The FMECA, if applied properly, can be one of the most beneficial and productive tasks in a well-structured reliability program. Since individual failure modes are listed and

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evaluated in an orderly, organized fashion, the FMECA serves to verify design integrity, identify and quantify undesirable failure modes and document reliability risks.

Results of a FMECA can be used to provide the rationale for changes in operating procedures, maintenance strategies, and design to remove undesirable failure modes. Although the FMECA is an essential reliability task, it is a concurrent engineering tool which should be used to supplement and support other engineering tasks by identifying areas in which effort should be concentrated.

FMECA results not only provide design guidance, but can be used advantageously during maintenance planning analysis, logistics support analysis, survivability and vulnerability assessments, safety and hazards analysis, and for fault detection and isolation design. This coincident use of the FMECA must be considered by program management during FMECA planning and every effort made to prevent duplication of analyses by the various program elements which utilize FMECA results.

### 2.3 FMECA DESCRIPTION

An FMECA is a powerful tool to optimize the performance/life-cycle cost tradeoffs between mission reliability and basic reliability at the black box or subsystem level, where these tradeoffs are most appropriately analyzed and evaluated. Potential design weaknesses are determined by using functional block diagrams, reliability block diagrams, engineering schematics, and mission rules (mission functions, operational modes, environmental profiles, and times) to systematically identify the likely modes of failure, the possible effects of each failure (which may be different for each life/mission profile phase), and the criticality of each effect on safety, readiness, mission success, demand for maintenance/logistics support, or some other outcome of significance. A reliability criticality number may be assigned to each failure mode usually based on failure effect, severity and probability of occurrence. These numbers are sometimes used to establish corrective action priorities, but because of the subjective judgement required to establish them, they should be used only as indicators of relative priorities. The FMECA can also be used to confirm that new failure modes have not been introduced in transforming schematics into production drawings.

The initial FMECA should be done early in the conceptual phase, and because limited design definition may be available, only the more obvious failure modes may be identified. This can help identify many of the single failure points, some of which can be eliminated by simple design changes. As greater mission and design definitions are developed in the validation and full scale development phases, the analysis can be expanded to successively-more-detailed levels and ultimately to the part level.

The usefulness of the FMECA is dependent on the skill of the analyst, the available data, and the information the analyst provides as a result of the analysis. The FMECA format is tailorable and additional pertinent information such as, failure indication, anticipated environment under which the failure may be expected to occur, time available for operational corrective action, and the corrective action required could be included. The amount of detail and type of information supplied is a function of mission criticality. In general, engineering manpower should be focused on those potential failures which imperil the crew or preclude mission completion. FMECA results may suggest areas where the judicious use of redundancy can significantly improve mission reliability without unacceptable impact on basic reliability, and where other analyses such as electronic parts tolerance or sensitivity analyses be performed, or other provisions such as environmental protections be considered. Additionally, FMECA results can be used to provide rationale for operating procedures used to ameliorate undesirable failure modes and document residual risks.

# 2.4 FMEA ANALYSIS PROCESS

The following discrete steps should be completed when performing an FMEA.

• <u>Define The System To Be Analyzed.</u> A complete system definition which includes identification of internal and interface functions, expected performance at all indenture levels, system restraints, and failure definitions must be provided to the analyst. Functional narratives of the system should include descriptions of each mission in terms of system functions which are utilized during each mission, mission phase, and operational mode. Narratives should describe the service use profile, expected mission times and equipment utilization and the functions and outputs of each item.

- <u>Construct Block Diagrams</u>. Functional and reliability block diagrams which illustrate the operation, interrelationships, and interdependencies of functional entities should be obtained or constructed for each item configuration involved in the use of the system. All system interfaces should be indicated. A uniform numbering system to trace hierarchy by functional system breakdown order is necessary and will provide rapid traceability and tracking through all levels of indenture.
  - Identify Potential Item and Interface Failure Modes. Define the effect of item and interface failure modes on the immediate item, system, and mission to be performed. All predictable failure modes for each indenture level analyzed should be identified and described. FMD-91 presents typical failure mode distributions for components and assemblies which have been derived from numerous data sources. Potential failure modes are determined by examination of item outputs identified in applicable block diagrams and schematics. Failure modes at the functional level shall be postulated on the basis of the stated requirements in the system definition narrative and the failure definitions included in the ground rules. The most probable causes associated with the postulated failure mode need be identified and described. If the failure mode has more than one cause, all probable independent causes for each failure mode should be identified and described. The analyst should also consider failure causes within adjacent indenture levels. For example, failure causes at the third indenture level should be considered when conducting a second indenture level analysis. Where a system function shown on the block diagram drawing is performed by a single replaceable module, a separate FMEA could be performed on the internal functions of the module, viewing the module as a system. The level of detail included in the FMEA is a function of the system complexity. A statement of work or contract requirement will typically define this level of detail. To assure that a complete analysis is performed, each failure mode and output function should be examined in relation to the following typical failure conditions:
    - (a) Premature operation
    - (b) Failure to operate at a prescribed time
    - (c) Intermittent operation
    - (d) Failure to cease operation at a prescribed time
    - (e) Loss of output or failure during operation
    - (f) Degraded output or operational capability
    - (g) Other unique failure conditions based upon system characteristics and operational requirements or constraints.

The FMEA Worksheet in Figure 2-1 is commonly used when performing an FMEA.

	NURE LEVEL RENCE DRAW		FAILURE MODE AND EFFECTS ANALYSIS         DATE         SHEET       OF         COMPILED BY         APPROVED BY								
		·······			· · · · · · · · · · · · · · · · · · ·	FAILURE EFFECTS					
id Number	ITEM/FUNCTIONAL IDENTIFICATION (NOMENCLATURE)	ENTIFICATION MOEBS AND OBERATIONAL		LOCAL EPPBCTS	NBXT HIGHER LEVEL	END BFFECTS	PAILURE COMPEN- SEVERITY CLA DETACTION SATING METHOD PROVISIONS		SEVERITY CLASS	REMARKS	

FIGURE 2-1: FMEA Worksheet Format

# 2.5 ANALYZING FAILURE EFFECTS

## 2.5.1 <u>OVERVIEW</u>

When the above three steps have been considered, the consequences of each potential failure on item operation, function, or status can now be identified evaluated and recorded. Failure effects focus on the specific block diagram element which is affected by the failure under consideration. The failure under consideration may impact several indenture levels in addition to the one under investigation. Therefore, "local", "next higher level", and "end" effects need to be evaluated. When determining failure effects, mission objectives, maintenance requirements, and personnel and system safety should be considered.

Local or Primary Effects - Local effects concentrate specifically on the impact an assumed failure mode has on the operation and function of the item in the indenture level under consideration. The consequences of each postulated failure affecting the item shall be described along with any second-order effects which result. The purpose of defining local effects is to provide a basis for evaluating compensating provisions and for recommending corrective actions. It is possible for the "local" effect to be the failure mode itself.

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<u>Next Higher Level or Secondary Effects</u> - Next higher level effects concentrate on the impact an assumed failure has on the operation and function of the items in the next higher indenture level above the indenture level under consideration. The consequences of each postulated failure affecting the next higher indenture level shall be described. If analyzing a resistor on a circuit board, the effect that the failed resistor has on the cards function would be described at this level.

<u>End or System Effects</u> - End effects evaluate and define the total effect an assumed failure has on the operation, function, or status of the uppermost system. The end effect described may be the result of a multiple failure. For example, failure of a safety device may result in a catastrophic end effect only in the event that both the prime function goes beyond the limit for which the safety device is set and the safety device fails.

<u>Failure Classification</u> - Each failure mode should be evaluated in terms of the worst potential consequences which may result. A code will be assigned describing the worst possible incidence of this failure. This code is the severity classification code. Severity classifications are assigned to provide a qualitative measure of the worst potential consequences resulting from design error or item failure. A severity classification is assigned to each identified failure mode and each item analyzed in accordance with he loss statement below. Where it may not be possible to identify an item or a failure mode according to the loss statements in the four categories below, similar loss statements based upon loss of system inputs or outputs can be developed and included in the FMEA. Severity classification categories which are consistent with various military standards are defined as follows:

- **Category I** Catastrophic A failure which may cause death or weapon system loss.
- Category II Critical A failure which may cause severe injury, major property damage, or major system damage which will result in mission loss.
- Category III Marginal A failure which may cause minor injury, minor property damage, or minor system damage which will result in delay or loss of availability or mission degradation.
- Category IV Minor A failure not serious enough to cause injury, property damage, or system damage, but which will result in unscheduled maintenance or repair.

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#### 2.5.2 <u>METHODS</u>

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After determining the item failure effects and severity class, the analyst should turn his focus from simply identifying problem areas to resolving them. To do this he should recommend ways to simplify the maintenance of failed items or identify system work-arounds to compensate for failures. The FMEA analyst should identify failure detection, isolation and compensation methods for each identified failure mode.

- <u>Failure Detection Method</u> Describe the methods by which occurrence of a failure mode is detected by the operator or maintenance personnel. The failure detection means, such as visual or audible warning devices, automatic sensing devices, sensing instrumentation, other unique indications, or none, should also be identified here.
- <u>Failure Isolation Method</u> Describe the most direct procedure that allows an operator or maintenance personnel to isolate the failure. An operator will know only the initial symptoms until further specific action is taken, such as performing a more detailed built-in-test (BIT). The failure being considered in the analysis may be of lesser importance or likelihood than another failure that could produce the same symptoms but must still be considered. Fault isolation procedures require a specific action or series of actions by an operator, followed by a check or cross reference either to instruments, control devices, circuit breakers, or combinations thereof. This procedure is followed until a satisfactory course of action is determined.
- <u>Failure Compensation Method</u> Identify corrective design or other actions required to eliminate the failure or control the risk. This step is required to record the true behavior of the item in the presence of a failure. The analyst should describe design compensating provisions that will: (1) nullify the effects of a failure, (2) control or deactivate system items to halt generation or propagation of failure effects, or (3) activate backup or standby items or systems. Design compensating provisions can include redundant items that allow continued and safe operation, safety or relief devices such as monitoring or alarm provisions which permit effective operation or limit damage and alternative modes of operation such as backup or standby items or systems.

Compensating provisions which require operator action to circumvent or mitigate the effect of the postulated failure shall be described. The compensating provision that best satisfies the indication observed by an operator when the failure occurs shall be determined. This may require the investigation of an interface system to determine the most correct operator action. The consequences of any probable incorrect action by the

operator in response to an abnormal indication should be considered and the effects recorded along with the following:

- (1) Identify effects of corrective actions or other system attributes, such as requirements for logistics support.
- (2) Document the analysis and summarize the problems which could not be corrected by design and identify the special controls which are necessary to reduce the failure risk.

# 2.5.3 <u>APPROACH</u>

Variations in design complexity and available data will generally dictate the analysis approach to be used. There are two primary approaches for accomplishing an FMEA. One is the hardware approach which lists individual hardware items and analyzes their possible failure modes. The other is the functional approach which recognizes that every item is designed to perform a number of functions that can be classified as outputs. The outputs are listed and their failure modes analyzed. For complex systems, a combination of the functional and hardware approaches may be considered. The FMEA may be performed as a hardware analysis, a functional analysis, or a combination analysis and is ideally initiated at the part, assembly or functional level and proceeds through increasing indenture levels until the FMEA for the system is complete.

- <u>Functional FMEA Approach</u> The functional approach is normally used when hardware items cannot be uniquely identified. Each identified failure mode is assigned a severity classification which can be utilized during design iterations to establish priorities for corrective actions. The functional FMEA should commence after the design process has delivered a functional block diagram of the system but has not yet identified a specific hardware implementation. It is the first FMEA to be performed and should be updated throughout the design iteration process or as corrective actions are implemented.
- <u>Hardware FMEA Approach</u> The hardware approach is normally used when hardware items can be uniquely identified from schematics, drawings, and other engineering and design data. The hardware approach is normally utilized in a part level up fashion. Each identified failure mode is assigned a severity classification which will be utilized during design to establish priorities for corrective actions. The hardware FMEA should commence after the design process has delivered a schematic diagram with all system items or parts defined.

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This is usually the final FMEA for the design but should be updated whenever design changes or corrective actions occur. This includes changes that occur following system deployment.

#### 2.6 RANKING CRITICALITY

#### 2.6.1 <u>OVERVIEW</u>

The purpose of the Criticality Analysis (CA) is to rank each potential failure mode identified by the FMEA according to the combined influence of severity classification and its probability of occurrence based upon the best available data. The CA is an analysis procedure whereby a relative measure of the significance of the effect of a failure mode on the successful operation of a system can be obtained. It is completed after the local, next higher level and end effects of a failure have been determined by the FMEA. The combined analysis is called Failure Mode, Effects and Criticality Analysis (FMECA).

#### 2.6.2 <u>CA ANALYSIS APPROACH</u>

The analysis approach to be used for the CA will generally be dictated by the availability of specific configuration data and failure rate data. There are two approaches for accomplishing the CA. The qualitative approach is appropriate when specific failure rate data are not available. The failure probability levels, when used, should be modified as the system design evolves. As parts configuration data and failure rate data become available, criticality numbers should be calculated and incorporated in the analysis. This is referred to as the quantitative approach and is used when failure rate data becomes available.

#### 2.6.2.1 OUALITATIVE APPROACH

Failure modes identified in the FMEA are assessed in terms of probability of occurrence levels, when specific parts configuration or failure rate data are not available. Individual failure mode probabilities of occurrence are grouped into distinct, logically defined levels, which establish the qualitative failure probability level for entry into the appropriate CA worksheet (Figure 2-2) column. Probability of occurrence levels are very subjective and may require indepth knowledge of the system to make an educated judgement. A good set of guidelines are defined as follows: <u>Level A - Frequent.</u> A high probability of occurrence during the item operating time interval. High probability may be defined as a single failure mode probability greater than 0.20 of the overall probability of failure during the item operating time.

<u>Level B - Reasonably probable</u>. A moderate probability of occurrence during the item operating time interval. Probable may be defined as a single failure mode probability of occurrence which is more than 0.10 but less than 0.20 of the overall probability of failure during the item operating time.

<u>Level C - Occasional.</u> An occasional probability of occurrence during item operating time interval. Occasional probability may be defined as a single failure mode probability of occurrence which is more than 0.01 but less than 0.10 of the overall probability of failure during the item operating time.

<u>Level D - Remote</u>. An unlikely probability of occurrence during item operating time interval. Remote probability may be defined as a single failure mode probability of occurrence which is more than 0.001 but less than 0.01 of the overall probability of failure during the item operating time.

<u>Level E - Extremely Unlikely</u>. A failure whose probability of occurrence is essentially zero during the item operating time interval. Extremely unlikely may be defined as a single failure mode probability of occurrence which is less than 0.001 of the overall probability of failure during the item operating time.

## 2.6.2.2 **OUANTITATIVE APPROACH**

Failure modes identified in the FMEA are assessed and ranked in terms of a criticality number which is computed using failure rate and probability of occurrence data. The failure rate data source used for the quantitative approach to CA should be the same as that used during the reliability prediction. If a reliability prediction was not required or a failure rate data source has not been specified, failure rates may be derived from MIL-HDBK-217, NPRD-91 or some alternative reliability data source. The calculation of a criticality number or assignment of a probability of occurrence level and its documentation are accomplished by completing a CA worksheet. An example of a CA worksheet format is shown in Figure 2-2.

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CRITICALITY ANALYSIS													
SYSTEM							OF						
D NJMBER	ITEM/FUNCTIONAL IDENTIFICATION (NOMENCLATURE)	PUNCTION	Failune Modes and Causre	MISSION PHASE/ OPERATIONAL MODE	SEVERITY CLASS	FAILURE PROBABILITY FAILURE RATE DATA SOURCE	FAILURE EFFECT PROBABELITY (\$)	FAILURE MODE RATIO (@)	FAILURE RATE ( <sup>ک</sup> p)	OP TIME (1)	FAILURE MODE CRIT# C <sub>ED</sub> = Βαλ <sub>ρ</sub> ι	חדפאת אדער אי ר <sub>ד</sub> = ד (7 <sub>ש</sub> )	REMARK

FIGURE 2-2: Criticality Analysis Worksheet

The following describe the data elements necessary to perform either a qualitative or quantitative criticality analysis:

<u>Failure Probability/Failure Rate Data Source</u> - When a qualitative CA is performed, failure modes are assessed in terms of probability of occurrence, the failure probability of occurrence level must be shown in this column. When failure rate data are available, a quantitative CA can be performed and criticality numbers may be calculated. In this case, the data source of the failure rates used in each calculation shall be listed in this column. When a failure probability is listed, the remaining columns are not required and the next step will be the construction of a criticality matrix (Figure 2-3).

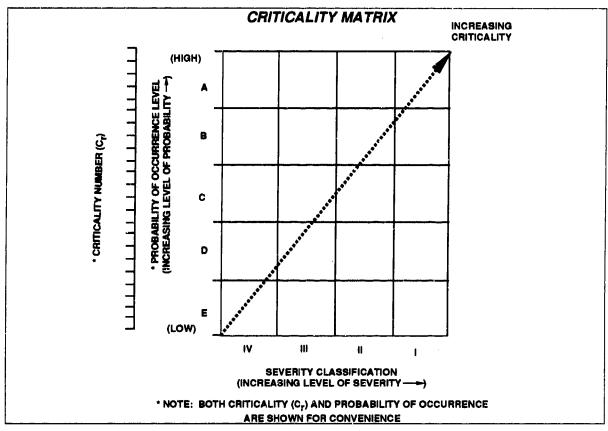


FIGURE 2-3: Criticality Matrix

<u>Failure Effect Probability ( $\beta$ )</u>. The  $\beta$  values are the conditional probability that the failure effect will result in the identified criticality classification, given that the failure mode occurs. The  $\beta$  values represent the analyst's judgment as to the conditional probability the loss will occur and should be quantified in general accordance with the values in TABLE 2-1.

TABLE 2-1: Typical Fallure Effect Probabilities (p)		
FAILURE EFFECT	β VALUE	
Actual Loss	1.00	
Probable Loss	> 0.10 to < 1.00	
Possible Loss	> 0 to 0.10	
No Effect	0	

Failure mode ratio ( $\alpha$ ) - The fraction of the part failure rate ( $\lambda_p$ ) related to the particular failure mode under consideration shall be evaluated by the analyst and recorded here. The failure mode ratio is the probability expressed as a decimal fraction that the part or item will fail in the identified mode. FMD-91 provides

these probabilities for many component and assembly types. If all potential failure modes of a particular part or item are listed, the sum of the  $\alpha$  values for that part or item will equal one. Individual failure mode multipliers may be derived from failure rate source data, from test and operational data or from FMD-91. If failure mode data are not available, the  $\alpha$  values shall represent the analyst's judgement based upon an analysis of the item's functions.

To illustrate the manner in which data contained in this document can be used to derive failure mode distributions, consider a hypothetical circuit utilizing the following part types:

IC Digital, SSI/MSI IC Digital, Memory, EAPROM

FMECA's require a distribution of only failure modes and not failure mechanisms/special cause failure types. Since many distributions contained in this document include failure mechanisms and special cause failure types, modification of existing distributions is required before useful FMECA distributions can be established. The process for re-normalizing FMD-91 failure distributions for application to FMECA is as follows:

- Determine which failure descriptions are detectable external to the item under analysis.
- Ignore all failure probabilities associated with items not meeting the criteria above.
- Equally distribute the ignored failure probabilities among the remaining FMECA applicable failure modes.

This procedure results in normalized failure mode distributions which total 100%. In a criticality analysis, it is important to have probabilities which total 100% because failure rate is an important weighting factor. To exclude portions of an item's failure rate would reduce that item's impact in the criticality rankings. Table 2-2 illustrates this process for the part types shown above (as listed in Section 3). Failure mode distributions applicable to FMECA's were derived using this process and are presented in Section 2.8.

Part Type	Distribution from	Application to	FMECA
Failure Mode/Mech	Section 3	<b>FMECA's</b>	Distribution
IC Digital, SSI/MSI			
(Page 3-113)			
Output Stuck High	38.4	X	55.6
Open	18.7	X	27.1
Drift	13.2		
Shorted	12.0	X	17.3
Electrical Overstress	7.7		
Cracked/Fractured	7.4		
Erroneous Output	2.5		
IC Digital, Memory, EAROM			
(Page 3-110)			
Contaminated	62.5		
Output Stuck Low	12.5	X	50.0
Improper Memory Patterns	12.5	X	50.0
High Leakage Current	12.5		

**TABLE 2-2: Re-normalizing FMD-91 Distributions** 

Integrated circuits are used in this example since they are one of the part types that have many entries of failure mechanisms mixed with failure modes.

<u>Part failure rate  $(\lambda p)$ </u> - The part failure rate  $(\lambda p)$  from the appropriate reliability prediction or failure rate data source such as NPRD-91 shall be listed.

<u>Operating time (t)</u> - The operating time in hours or the number of operating cycles of the item per mission shall be derived from the system definition and listed on the worksheet.

<u>Failure mode criticality number  $(C_m)$ </u> - The value of the failure mode criticality number  $(C_m)$  is calculated and listed on the worksheet.  $(C_m)$  is the portion of an items criticality number due to the single failure mode under investigation for a particular severity classification. For each particular failure mode severity classification, the  $(C_m)$  is calculated with the following formula:

$$C_m = \beta \alpha \lambda_p t$$

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where:

- $C_m$  = Criticality number for failure mode.
- $\beta$  = Conditional probability of mission loss.
- $\alpha$  = Failure mode ratio from FMD-91.
- $\lambda_p$  = Part failure rate from MIL-HDBK-217 or NPPD-91.
- t = Duration of applicable mission phase usually expressed in hours or number of operating cycles.

<u>Item criticality numbers (Cr)</u> - The second criticality number calculation is for the item under analysis. Item criticality numbers (Cr) for each system item under investigation is calculated and listed on the worksheet. An item may be considered a component, circuit card, assembly or function depending on the detail of analysis or level of indenture which the FMECA is being performed. For a particular severity classification and mission phase, the (Cr) for an item is the sum of the failure mode criticality numbers, (Cm), under the severity classification and may also be calculated using the following formula:

$$C_r = \sum_{n=1}^{j} (\beta \alpha \lambda_p t)_n$$
  $n = 1, 2, 3, ... j$   $or \quad C_r = \sum_{n=1}^{j} (C_m)_n$ 

where:

Cr = Criticality number for the item. n = The failure modes in the items that fall under a particular severity classification.

j = Last failure mode in the item under the severity classification.

# 2.6.3 CRITICALITY MATRIX

The criticality matrix provides a means of identifying and comparing each failure mode to all other failure modes with respect to severity. The matrix is constructed by inserting item or failure mode identification numbers in matrix locations representing the severity classification category and either the probability of occurrence level or the criticality number ( $C_r$ ) for the item's failure modes. The resulting matrix display shows the distribution of criticality of item failure modes and provides a tool for assigning corrective action priorities. As shown in Figure 2-3, the further along the diagonal line from the origin the failure mode is recorded, the greater the criticality and the more urgent the need for implementing corrective action. The example criticality matrix in Figure 2-3 illustrates how either the criticality number ( $C_r$ ) or probability of occurrence level can be used for the vertical axis.

## 2.7 SUMMARY

The FMEA is an essential design evaluation procedure which should not be limited to the phase traditionally thought of as the design phase. The initial FMEA should be done early in the conceptual phase when design criteria, mission requirements, and conceptual designs are being developed to evaluate the design approach and to compare the benefits of competing design configurations. The FMEA will provide quick visibility of the more obvious failure modes and identify potential single failure points, some of which can be eliminated with minimal design effort. As the mission and design definitions become more refined, the FMEA can be expanded to successively more detailed levels. When changes are made in system design to remove or reduce the impact of the identified failure modes, the FMEA should be repeated for the redesigned portions to ensure that all predictable failure modes in the new design are considered.

The CA is a procedure for associating failure probabilities with each failure mode. Since the CA supplements the FMEA and is dependent upon information developed in that analysis, it should not be performed without the FMEA. The CA is valuable in maintenance and logistics support analyses since failure modes which have high criticality numbers require investigation to identify changes which will reduce the potential impact on maintenance and logistic support requirements for the system. Since the criticality numbers are established subjectively, they should be used judiciously as indicators of relative priorities.

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# 2.8 NORMALIZED FAILURE MODE DISTRIBUTIONS FOR FMECA

		Failure Mode
Device Type	Failure Mode	Probability ( $\alpha$ )
Accumulator	Leaking	.47
	Seized	.23
1	Worn	.20
	Contaminated	.10
Actuator	Spurious Position Change	.36
	Binding	.27
	Leaking	.22
	Seized	.15
Adapter	Physical Damage	.33
	Out of Adjustment	.33
	Leaking	.33
Alarm	False Indication	.48
	Failure to Operate on Demand	.29
	Spurious Operation	.18
1	Degraded Ålarm	.05
Antenna	No Transmission	.54
	Signal Leakage	.21
	Spurious Transmission	.25
Battery, Lithium	Degraded Output	.78
	Startup Delay	.14
	Short	.06
	Open	.02
Battery, Lead Acid	Degraded Output	.70
-	Short	.20
	Intermittent Output	.10
Battery, Rechargeable, Ni-Cd	Degraded Output	.72
	No Output	.28
Bearing	Binding/Sticking	.50
0	Excessive Play	.43
	Contaminated	.07
Belt	Excessive Wear	.75
	Broken	.25
Blower Assembly	Bearing Failure	.45
,	Sensor Failure	.16
	Blade Erosion	.15
	Out of Balance	.10
	Short Circuit	.07
	Switch Failure	.07

Table 2.8 represents RAC's interpretation of the data contained in Section 3.0 of this report. It is recommended that the reader understand the assumptions used to derive these probabilities prior to applying them in a FMECA. Users may perform their own normalization procedure of Section 3.0 data.

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		Failure Mode
Device Type	Failure Mode	Probability (α)
Brake	Excessive Wear	.56
	Leaking	.23
	Scored	.11
	Corroded	.05
	Loose	.05
Bushing	Excessive Wear	.85
	Loose	.11
	Cracked	.04
Cable	Short	.45
	Excessive Wear	.36
	Open	.19
Capacitor, Aluminum,	Short	.53
Electrolytic, Foil	Open	.35
	Electrolyte Leak	.10
	Decrease in Capacitance	.02
Capacitor, Ceramic	Short	.49
	Change in Value	.29
	Open	.22
Capacitor, Mica/Glass	Short	.72
	Change in Value	.15
	Open	.13
Capacitor, Paper	Short	.63
	Open	.37
Capacitor, Plastic	Open	.42
	Short	.40
	Change in Value	.18
Capacitor, Tantalum	Short	.57
	Open	.32
	Change in Value	.11
Capacitor, Tantalum,	Short	.69
Electrolytic	Open	.17
	Change in Value	.14
Capacitor, Variable, Piston	Change in Value	.60
	Short	.30
	Open	.10
Chopper	Contact Failure	.48
	Short	.25
	Open	.25
Charles 1	Coil Failure	.02
Circuit Preaker	Opens Without Stimuli	.51
	Does Not Open	.49
Clutch	Binding/Sticking	.56
	Slippage	.24
	No Movement	.20

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Device Type	Failure Mode	Failure Mode
	Tunuic Would	<b>Probability</b> ( $\alpha$ )
Coil	Short	.42
	Open	.42
	Change in Value	.16
Computer System	Hardware Failure	.57
	Software Failure	.43
Connector/Connection	Open	.61
	Poor Contact/Intermittent	.23
	Short	.16
Controller, Electromechanical	Erroneous Output	.75
	Loss of Control	.25
Counter Assembly	Inaccurate Count	.91
	Seized	.09
Crystal, Quartz	Open	.89
	No Oscillation	.11
Diode, General	Short	.49
	Open	.36
	Parameter Change	.15
Diode, Rectifier	Short	.51
	Open	.29
	Parameter Change	.20
Diode, SCR	Short	.98
	Open	.02
Diode, Smali Signal	Parameter Change	.58
	Open	.24
	Short	.18
Diode, Thyristor	Failed Off	.45
	Short	.40
	Open	.10
	Failed On	.05
Diode, Triac	Failed Off	.90
	Failed On	.10
Diode, Zener, Voltage	Parameter Change	.69
Reference	Open	.18
	Short	.13
Diode, Zener, Voltage	Open	.45
Regulator	Parameter Change	.35
	Short	.20
Electric Motor, AC	Winding Failure	.31
	Bearing Failure	.28
	Fails to Run, After Start	.23
	Fails to Start	.18

Table 2.8 represents RAC's interpretation of the data contained in Section 3.0 of this report. It is recommended that the reader understand the assumptions used to derive these probabilities prior to applying them in a FMECA. Users may perform their own normalization procedure of Section 3.0 data.

FMD-91

Device Type	Failure Mode	Failure Mode
		<b>Probability</b> (α)
Fitting	Leaking	.90
	Contaminated	.05
	Scored	.05
Fuse	Fails to Open	.49
	Slow to Open	.43
	Premature Open	.08
Gasket/Seal	Leaking	1.00
Gear	Excessive Wear	.54
	Binding/Sticking	.46
Generator	Degraded Output	.60
	No Output	.22
	Fails to Run, After Start	.09
	Loss of Control	.09
Hybrid Device	Open Circuit	.51
	Degraded Output	.26
	Short Circuit	.17
	No Output	.06
Injector	Corroded	.87
	Deformed	.08
	Cracked/Fractured	.05
Inner Tube	Leaking	1.00
Keyboard Assembly	Spring Failure	.32
	Contact Failure	.30
	Connection Failure	.30
	Lock-up	.08
Lamp/Light	No Illumination	.67
	Loss of Illumination	.33
Liquid Crystal Display	Dim Rows	.39
	Blank Display	.22
	Flickering Rows	.20
	Missing Elements	.19
Mechanical Filter	Leaking	.67
	Clogged	.33
Meter	Faulty Indication	.51
	Unable to Adjust	.23
	Open	.14
	No Indication	.12
Microcircuit, Digital, Bipolar	Output Stuck High	.28
	Output Stuck Low	.28
	Input Open	.22
	Output Open	.22

Table 2.8 represents RAC's interpretation of the data contained in Section 3.0 of this report. It is recommended that the reader understand the assumptions used to derive these probabilities prior to applying them in a FMECA. Users may perform their own normalization procedure of Section 3.0 data.

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	T	Failure Mode
Device Type	Failure Mode	Probability (α)
Microcircuit, Digital, MOS	Input Open	.36
	Output Open	.36
	Supply Open	.12
	Output Stuck Low	.09
	Output Stuck High	.08
Microcircuit, Interface	Output Stuck Low	.58
	Output Open	.16
	Input Open	.16
	Supply Open	.10
Microcircuit, Linear	Improper Output	.77
	No Output	.23
Microcircuit, Memory,	Slow Transfer of Data	.79
Bipolar	Data Bit Loss	.21
Microcircuit, Memory, MOS	Data Bit Loss	.34
	Short	.26
	Open	.23
	Slow Transfer of Data	.17
Microwave Amplifier	No Output	.90
	Limited Voltage Gain	.10
Microwave Antenna	No Transmission	1.00
Microwave Attenuator	Attenuation Increase	.90
	Insertion Loss	.10
Microwave Connector	High Insertion Loss	.80
	Open	.20
Microwave Detector	Power Loss	.90
	No Output	.10
Microwave, Diode	Open	.60
	Parameter Change	.28
	Short	.12
Microwave Filter	Center Frequency Drift	.80
	No Output	.20
Microwave Mixer	Power Decrease	.90
	Loss of Intermediate Frequency	.10
Microwave Modulator	Power Loss	.90
	No Output	.10
Microwave Oscillator	No Output	.80
	Untuned Frequency	.10
	Reduced Power	.10
Microwave VCO	No Output	.80
	Untuned Frequency	.15
	Reduced Power	.05

Table 2.8 represents RAC's interpretation of the data contained in Section 3.0 of this report. It is recommended that the reader understand the assumptions used to derive these probabilities prior to applying them in a FMECA. Users may perform their own normalization procedure of Section 3.0 data.

		Failure Mode	
Device Type	Failure Mode	Probability (α)	
Microwave YIG	No Output	.80	
	Untuned Frequency	.15	
	Reduced Power	.05	
Microwave Phase Shifter	Incorrect Output	.90	
	No Output	.10	
Microwave Polarizer	Change in Polarization	1.00	
Optoelectronic LED	Open	.70	
	Short	.30	
Optoelectronic Sensor	Short	.50	
•	Open	.50	
Pneumatic Actuator	Spurious Closing	.54	
	Spurious Opening	.46	
Power Supply	No Output	.52	
	Incorrect Output	.48	
Printed Wiring Assembly	Open	.76	
, , , , , , , , , , , , , , , , , , ,	Short	.24	
Pump, Centrifugal	No Output	.67	
<b>r</b> ,	Degraded Output	.33	
Pump, Hydraulic	Leaking	.82	
<b>F</b> , <b>J</b>	Improper Flow	.12	
	No Flow	.06	
Regulator	Stuck Closed	.23	
8	Stuck Open	.23	
	No Output	.22	
	Leaking	.22	
	Insufficient Output	.10	
Relay	Fails to Trip	.55	
5	Spurious Trip	.26	
	Short	.19	
Resistor, Composition	Parameter Change	.66	
	Open	.31	
	Short	.03	
Resistor, Fixed	Open	.84	
	Parameter Change	.11	
	Short	.05	
Resistor, Fixed, Film	Open	.59	
· · ·	Parameter Change	.36	
	Short	.05	
Resistor, Fixed, Wirewound	Open	.65	
	Parameter Change	.26	
	Short	.09	
Resistor, Network	Open	.92	
·····	Short	.08	

Table 2.8 represents RAC's interpretation of the data contained in Section 3.0 of this report. It is recommended that the reader understand the assumptions used to derive these probabilities prior to applying them in a FMECA. Users may perform their own normalization procedure of Section 3.0 data.

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Device Type	Failure Mode	Failure Mode Probability (a)
Deviates The subjects	0	
Resistor, Thermistor	Open Deserved Change	.63
	Parameter Change	.22
	Short	.15
Resistor, Variable	Open	.53
	Erratic Output	.40
	Short	.07
Rotary Switch	Improper Output	.53
	Contact Failure	.47
Screw	Loose	.67
	Excessive Wear	.33
Sensor	Erratic Output	.59
	Short	.20
	Open	.12
	No Output	.10
Software	Design Changes	.46
	Design Errors	.41
	User Error	.07
	Documentation Error	.06
Solenoid	Short	.52
	Slow Movement	.43
	Open	.05
Switch, Push-button	Open	.60
	Sticking	.33
	Short	.07
Switch, Thermal	Parameter Change	.63
	Open	.27
	No Control	.08
	Short	.02
Switch, Toggle	Open	.65
	Sticking	.19
	Short	.16
Synchro	Winding Failure	.45
	Bearing Failure	.33
	Brush Failure	.22
Tire	Leaking	.76
	Excessive Wear	.24
Transducer, Sensor	Out of Tolerance	.68
	False Response	.00
	Open	.12
	Short	.05

Table 2.8 represents RAC's interpretation of the data contained in Section 3.0 of this report. It is recommended that the reader understand the assumptions used to derive these probabilities prior to applying them in a FMECA. Users may perform their own normalization procedure of Section 3.0 data.

		Failure Mode
Device Type	Failure Mode	Probability (α)
Transformer	Open	.42
	Short	.42
	Parameter Change	.16
Transistor, Bipolar	Short	.73
	Open	.27
Transistor, FET	Short	.51
	Output Low	.22
	Parameter Change	.17
	Open	.05
	Output High	.05
Transistor, GaAs FET	Open	.61
	Short	.26
	Parameter Change	.13
Transistor, R.F.	Parameter Change	.50
	Short	.40
	Open	.10
Tube, Electron	Change in Parameter	.53
	Open	.25
	Unstable Output	.15
	Short	.07
Tube, Traveling Wave	Reduced Output Power	.71
	High Helix Current	.11
	Gun Failure	.09
	Open Helix	.09
Valve, Hydraulic	Leaking	.77
-	Stuck Closed	.12
	Stuck Open	.11
Valve, Pneumatic	Leaking	.28
	Stuck Open	.20
	Stuck Closed	.20
	Spurious Opening	.16
	Spurious Closing	.16
Valve, Relief	Premature Open	.77
·	Leaking	.23

Table 2.8 represents RAC's interpretation of the data contained in Section 3.0 of this report. It is recommended that the reader understand the assumptions used to derive these probabilities prior to applying them in a FMECA. Users may perform their own normalization procedure of Section 3.0 data.

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The following list indicates how RAC derived the normalized failure mode distributions for FMECA presented in 2.8 by using the detailed data from Section 3.0. In some instances several failure mechanism descriptions from the Section 3.0 tables were combined and classified in terms of their most likely failure mode. For example, cracked/fractured and broken would be merged and classified as leaking for a liquid storage device like an accumulator. Also, certain failure descriptors which were deemed not applicable to a failure mode distribution were deleted and not considered at all. When items were deleted, the failure distributions from section 3.0 no longer add up to 100%. In these instances, the total percentage of remaining failure distribution used to compile the normalized failure mode distributions, depicted in this section, are indicated along with a description of the failures which were deleted. Also shown is the page number corresponding to the detailed failure distribution from section 3.0. The format for this list is part type, summary (if derived from a summary record), page number from section 3.0, percent remaining following deletions and deviations or assumptions used to derive the FMECA distribution:

Accumulator, (Summary), 3-1, 100%, Cracked/Fractured, Broken and leaking merged.

Actuator, (Summary), 3-2, 84.5%, Spurious position change and drift merged and aged/deteriorated and shorted deleted (not applicable to device).

Adapter, 3-4 100%, Seal/Gasket failure classified as leaking and broken classified as physical damage.

Alarm, (Summary), 3-4, 100%, No operation and fails to operate on demand merged and intermitteni operation classified as spurious operation.

Antenna, 3-7, 91%, Broken and cracked/fractured merged and classified as no transmission. Intermittent operation and bent/dented/warped merged and classified as spurious transmission. Binding/sticking deleted.

Battery, Lithium, 3-10, 95%, Deleted leaking (not characteristic of normal failure).

Battery, Lead-Acid, 3-10, 90.9%, Deleted Cracked/Fractured (abuse related).

Battery, Ni-Cd, 3-10, 100%, No Change.

Bearing, (Summary), 3-11, 79.1%, Loss of lubrication merged into binding/sticking. Worn merged into excessive play. Out of adjustment and leaking deleted.

Belt, 3-15, 100%, No Change.

Blower Assembly, 3-15, 71.4%, Deleted Mechanical Failure.

Brake, 3-19, 70%, Deleted broken and out of adjustment (too generic).

Bushing, (Summary), 3-23, 90.7%, Merged worn with aged/deteriorated and classified as excessive wear. Merged excessive play into loose. Merged broken with cracked/fractured. Deleted out of adjustment.

Cable, 3-25, 100%, Merged cracked/fractured, worn, broken, and chaffed into excessive wear. Merged arcing/sparking into shorted.

Capacitor, Aluminum, Electrolytic, Foil, 3-29, 100%, No change.

Capacitor, Ceramic, 3-30, 94.5%, Drift classified as change in value. Contaminated (failure mechanism) and leaking deleted.

Capacitor, Mica/Glass, 3-31, 100%, Change in capacitance merged into change in value.

Capacitor, paper, 3-32, 100%, No change.

Capacitor, plastic, 3-33, 100%, Drift classified as change in value. Intermittent operation deleted.

Capacitor Tantalum, Electrolytic, (Summary) 3-34, 95.4%, Merge loss of capacitance and drift into change in value. Merge high leakage current into shorted. Delete intermittent operation.

Capacitor, Variable, Piston, 3-34, 100%, No change.

Chopper, 3-37, 100%, No change.

Circuit Breaker, 3-37, 53.8%, Delete degraded operation, cracked/fractured, broken and mechanical failure (abuse related).

Clutch, (Summary), 3-41, 86.2%, Merge worn, bearing failure and binding/sticking. Merge loss of torque and slipping and classify as slippage. Delete degraded output.

Coil, (Summary), 3-42, 90.8%, Merge insulation failure with short. Delete lead damage and wire failure (too generic).

Computer System, 3-45, 100%, No change.

Connector, (Summary), 3-45, 55.1%, Delete mechanical failure, mechanical damage, broken and insertion loss.

Controller, Electromechanical, 3-50, 100%, No change.

Counter Assembly, 3-51, 100%, Merge binding/sticking, slipping, excessive play, out of adjustment and out of synch and classify as inaccurate count.

Crystal, Quartz, 3-56, 100%, No change.

Diode, General, (Summary), 3-57, 82.0%, Delete Mechanical failure, intermittent operation, burned/charred and lead damage.

Diode, Rectifier, (Summary), 3-59, 91.2%, Delete diode failure, electrical overstress and corroded.

Diode, SCR, 3-61, 100%, No change.

Diode, Small Signal, (Summary), 3-61, 83.6%, Deleted intermittent operation, seal failure, change in resistance and cracked/fractured (not characteristic of normal failure).

Diode, Thyristor, (Summary), 3-62, 100%, No change

Diode, Triac, 3-62, 100%, No change.

Diode, Zener, Voltage, Reference, 3-63, 97.5%, Drift classified as parameter change. Intermittent operation and mechanical damage deleted.

Diode, Zener, Voltage, Regulator, 3-64, 100%, Drift classified as parameter change.

Electrical Motor, AC, (Summary), 3-67, 77.4%, Deleted mechanical failure and electrical failure (too generic).

Fitting, 3-77, 100%, Merged cracked/fractured, broken and aged/deteriorated into leaking.

Fuse, 3-78, 60.3%, Deleted blown fuse, opened, loss of power and mechanical failure.

Gasket/Seal, 3-80, 100%, Merge all failures listed into leaking.

Gear, 3-81, 96.4%, Merge worn, stripped and broken and classify as excessive wear. Merge jammed/stuck into binding/sticking. Delete displaced and noisy.

Generator, (Summary), 3-85, 82.8%, Merge drift into degraded operation. Delete shorted and worn.

Hybrid, 3-100, 91.5%, Delete broken. Merge improper output and degraded operation into degraded output.

Injector, 3-119, 100%, No change.

Inner Tube, 3-119, 100%, Merge all failures listed into leaking.

Keyboard, 3-121, 74.1%, Merge wiring & connection failure into connection failure. Delete mechanical failure.

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Lamp, 3-121, 92.3%, Merge lamp failure, opened and no output and classify as no illumination. Merge worn into loss of illumination. Delete burned/charred (external cause) and broken.

Liquid Crystal Display, 3-132, 84.8%, Merge zebra strip and missing rows and classify as missing elements. Classify IC failures as blank display. Delete manufacturing defects.

Mechanical Filter, (Summary), 3-133, 80.1%, Merge improper flow into clogged. Delete loss of control.

Meter, 3-134, 86.2%, Merge spurious/false operation and drift and classify as faulty indication. Delete broken.

Microcircuit, Digital, Bipolar, 3-107, 100%, No change.

Microcircuit, Digital, MOS, 3-109, 100%, No change.

Microcircuit, Interface, 3-115, 100%, Microcircuit Interface equals IC, linear, line driver.

Microcircuit, Linear, 3-114, 98.2%, Merge drift with degraded operation and classify as improper output. Merge opened and shorted into no output. Delete mechanical failure.

Microcircuit, Memory, Bipolar, 3-107, 100%, Degraded operation classified as slow transfer of data.

Microcircuit, Memory, MOS, 3-110, 94.4%, Delete mechanical failure. Degraded operation classified as slow transfer of data.

Microwave, Amplifier, 3-6, 100%, Drift classified as limited voltage gain.

Microwave, Antenna, 3-7, 100%, Connection failure classified as no transmission.

Microwave, Attenuator, 3-8, 50%, Delete overheated.

Microwave, Connector, 3-49, 100%, No changes.

Microwave, Detector, 3-57, 100%, Diode failure broken into constituent failure elements.

Microwave, Diode, (Summary), 3-58, 83.3%, Delete intermittent operation.

Microwave, Filter, 3-66, 100%, No changes.

Microwave, Mixer, 3-138, 100%, Diode failure broken into constituent failure elements.

Microwave, Modulator, 3-138, 100%, No changes.

Microwave, Oscillator, 3-143, 100%, No changes.

Microwave, VCO, 3-143, 100%, No changes.

Microwave, YIG, 3-144, 100%, No changes

Microwave, Phase Shifter, 3-138, 100%, No output broken into constituent failure elements.

Microwave, Polarizer, 3-138, 100%, No changes.

Optoelectronic, LED, 3-143, 100%, No changes.

Optoelectronic, Sensor, 3-143, 100%, No changes.

Pneumatic, Actuator, (Summary), 3-151, 100%, No changes.

Power Supply, (Summary), 3-154, 49.1%, Delete fails to transfer, distribution system malfunction, generation system malfunction and connector failure. Merge degraded operation and incorrect voltage and classify as incorrect output.

Printed Wiring Assembly, 3-156, 73.7%, Merge open plated through hole into opened. Delete IC, Resistor, Semiconductor and Capacitor failures.

Pump, Centrifugal, (Summary), 3-159, 100%, Merge fails during operation and fails to start and classify as no output.

Pump, Hydraulic, (Summary), 3-163, 89.8%, Merge cracked/fractured into leaking. Merge out of spec. into improper flow. Delete noisy and intermittent operation. Classify no operation as no flow.

Relay, (Summary), 3-168 100%, Classify intermittent operation as spurious trip. Merge contact failure, high contact resistance and fails to close and classify as fails to trip.

Regulator, 3-167, 92%, Delete incorrect voltage.

Resistor, Fixed, 3-176, 92.2%, Delete broken and mechanical failure. Classify change in resistance as parameter change.

Resistor, Composition, 3-178, 72.3%, Delete moisture intrusion (failure mechanism), broken and lead defects. Classify drift as parameter change.

Resistor, Fixed, Film, 3-178, 87.9%, Delete film imperfections, substrate defects (failure mechanism) and lead damage. Classify drift as parameter change.

Resistor, Fixed, Wirewound, 3-179, 77.2%, Delete wire failure, corroded (failure mechanism), mechanical failure and lead defects. Classify drift as parameter change.

Resistor, Network, 3-180, 81.9%, Delete broken and intermittent operation.

Resistor, Thermistor, 3-181, 85.1%, Delete moisture intrusion (failure mechanism), mechanical failure and non-uniform resistance material. Classify drift as parameter change.

Resistor, Variable, (Summary), 3-181, 96%, Merge spurious/false operation, high contact resistance, intermittent operation and drift and classify as erratic output. Delete mechanical failure.

Rotary Switch, 3-186, 100%, No change.

Screw, 3-187, 100%, No change.

Sensor, (Summary), 3-193, 92.4%, Merge degraded output and intermitent operation and classify as erratic output. Delete mechanical failure.

Software, 3-205, 100%, No change.

Solenoid, 3-205, 100%, Merge binding/sticking and spring failure and classify as slow movement.

Switch, Pushbutton, 3-219, 100%, Classify contaminated as sticking.

Switch, Thermal, 3-221, 72.8%, Delete mechanical failure. Merge degraded operation and drift and classify as parameter change. Merge no output and loss of control and classify as no control.

Switch, Toggle, 3-221, 52.5%, Delete mechanical failure and intermittent operation. Merge contact failure into opened. Merge spring failure into sticking.

Synchro, 3-222, 100%, No change.

Tire, (Summary), 3-227, 92.1%, Delete broken, stripped and loose. Merge cut/scarred/punctured into leaking. Merge aged/deteriorated into worn.

Transducer, Sensor, (Summary), 3-229, 88.3%, Delete burned/charred (caused externally). Merge out of adjustment and out of spec. into out of tolerance. Merge spurious/false operation and intermittent operation into false response.

Transformer, (Summary), 3-231 89.7%, Merge degraded output and drift and classify as parameter change.

Transistor, Bipolar, (Summary), 3-247, 100%, Merge base-emitter shorted and collector-emitter shorted into shorted. Merge emitter opened into opened.

Transistor, FET, (Summary), 3-248, 100%, Merge gate-source shorted into shorted.

Transistor, GaAs FET, 3-250, 92%, Delete VT extraction.

Transistor, R.F., 3-251 100%, No change.

Tube, Electron, 3-253, 87.8%, Delete noisy, contaminated and leaking.

Tube, Traveling Wave, 3-253, 91.5%, Delete mechanical failure, noise/oscillations and poor focus.

Valve, Hydraulic, (Summary), 3-258, 100%, Merge closed into stuck closed. Merge opened into stuck open.

Valve, Pneumatic, (Summary), 3-263, 77.9%, Delete broken.

Valve, Relief, (Summary), 3-267, 75.3%, Delete drift, mechanical failure and open-close (not logical).

# SECTION 3 FAILURE DISTRIBUTION SUMMARIES

Part Desc	Failure Mode/Mach	Norm Dist,	Fail Dist.	Dat: Source (s) /Details
	* stator			Source v:1
	: chanical Failure	71.2%	71.2%	Mechanical (24992-060,71.4%)
i	Electrical Failure	26.89	28.8%	Electrical (24992-000,28.9%)
	- Smeter Leaking	51.7%	50.5%	Sources:1 Leaking (20609-000,Qty:1,426)
	Out of Spec.			Out of Tolerance (20609-000,Qty:1,060)
	Binding/Sticking			Sticking (20609-000, Qty: 266)
:	Spurious/False Operation			Erratic (20609-000, Qty:4)
Ţ	Unknown		2.3%	Unknown (20609-000,Qty:66)
l S V H	mulator (Summary) Leaking Seized Worn Broken Contaminated Cracked/Fractured	33.3% 23.0% 20.3% 9.7% 9.3% 4.3%		
	m:lator Leaking	28.3%	22.3%	Sources:1 Leaking (20609-000,Qty:78)
5	Seized	.25.0%	19.7%	Seized (20609-000,Qty:69)
Ŵ	Norn	22.1%	17.4%	Worn Out (20609-000, Qty:61)
E	Broken	10.5%	8.3ŧ	Broken (20609-000,Qty:29)
С	Contaminated	10.1%	8.0%	Contaminated (20609-000,Qty:28)
С	Cracked/Fractured	4.0%	3.1%	Cracked/Fractured (20609-000,Qty:11)
U	Jnknown		21.18	Unknown (20609-000,Qty:74)
	nulator,Hydraulic zaking	75 <b>.9%</b>		Sources:1 Leaking (20609-000,Qty:22)
с	Cracked/Fractured	6.9%	6.1%	Crassed/Frantured (20609-000,Qty:2)
N	lo Operation	6.9%	6.1%	No Operation (20609-000,Qty:2)
в	Breach	3.4%	3.0%	Breach (20609-000,Qty:1)
0	Dut of Spec.	3.4%	3.0%	Out Of Specification (20609-000,Qty:1)
_				

Stuck Closed 3.4% ? P Suck Closed (20509-000,Qty:1)

Unknown

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----- 12.10 Unknown (20609-000, Qty:4)

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	Failure Distribution Su			FMD-9
art: Fa esc. Mo	lilure de/Mech	Norm Dist.	Fail Dist.	Data Source(d)/Details
ctuator	(Summary)			
aindi	ng/Scicking	22.4%		
Seal/	Gasket Failure	18.5%		
Spuri	ous Position Change	17.9%		
Seize		12.9%		
Drift		12.9%		
Aged Short	Deteriorated	10.38 5.28		
ctuator				Sources:4
	Deteriorated	50.8%	35 <b>.6</b> ŧ	Requires Overhaul (19542-000,6.7%), Deteriorated/Aged - Seized (25103-000,Qty:1)
Spuri	ous Position Change	33.30	23.3%	Catastrophic-Spurious Position Change (18175-000,70.0%)
Canle	Failure	6.4%	4.5%	Cable Insulation Frayed (19542-000,6.7%), Cable Sleeve Needs Fixing (19542-000,6.7%)
Swite	h Failure	3.2%	2.2%	Thermal Switch Found to be Defective (19542-000,6.7%)
Out c	f Adjustment	3.2%	2.2%	Requires Adjustment of TM (19542-000,6.7%)
Menha	nical Failure	3.2%		Beariny & Brake Rusted (19542-000,6.7%)
Induc	9 <b>0</b>		16.7%	<pre>Improper Configuration Should be -2 (19542-000,6.7%), Improper Connector Installed (19542-000,6.7%), Safety Wire Bracket Broken (19542-000,0.7%), Degraded - Premature Or Delayed Actuation (18175-000,30.0%)</pre>
Unkno	พก		13.3%	Unknown (19542-000, 40.0%)
Other		*	6.0	
	duced Our.put		NR	Reduction in Output Force or Stroke (25036-000, NR)
	mmea/Stuck		NR	Jamming-Contamination (25036-000,NR)
NO	Output	,	NR	No Output-Contamination (25036-000,NR)
ctuator,	Assembly			Sources:1
Bindi	ng/Sticking	100.0%	100 <b>.0%</b>	Corroded-Binding/Sticking (25101-000,Qty:1), Birding/Sticking (25101-000,Qty:1)
	Downstream Pressure ous Position Change	100.0%	70.0%	Sources:1 Catastrophic-Spurious Fosition Change (18175-000,70.0%)
Indoc	ed		30.0%	Degraded - Premature Or Delayed Actuation (18175-000,30.0%)
	External Pressure ous Position Change	100.0%	70.0%	Sources:] Catastrophic-Spurious Position Change (18175-000,70.0%)

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FMD-91			Failure Distribution Summaries 3-3
Part Failure	Norm Fa:	il	Data
Desc. Mode/Mech	Dist. Dis	st.	Source(s)/Details
Actuator, Fluid Head			Sources:1
Spurious Position Change	100.01 70	0.0%	Catastrophic-Spurious Position Change (18175-000,70.0%)
Induced	3(	0.35	Degraded - Promature Or Delayed Actuation (18175-000,30.0%)
Actuator, Gravity			Sources:1
Spurious Position Change	100.0% 70	0.0%	Gatastrophic-Spurious Position Change (18175-000,70.0%)
Induced	30	¢.0ŧ	Degraded - Premature Or Delayed Actuation (18175-000,30.0%)
Actuator, Piston, Cylinder			Sources:1

Seal/Gasket Failure	79.5%	1.7% Leaks and Seal Failure (24996-000,66.0%)
Body/Head Joint Failure	10.8%	9.8% Failure of Body/Head Joint (24996-000,9.0%)
Piston Rod Failure	6.0%	5.4% Failure and Piston Rod (24996-000,5.0%)
Cylinder Body Failure	3.6%	3.3% Failure of Cylinder Body (24996-000,3.0%)
Unknown		9.8% Unknown (24996-000,9.0%)

Actuator,Solenoid Binding/Sticking	Sources:1 40.0% 20.0% Binding (20609-000,Qty:2)	
Shorted	40.0% 20.0% Short (20609-000,Qty:2)	
Burned/Charred	20.0% 10.0% Eurned (20609-000,Qty:1)	
Unknown	50.0% Unknown (20609-000,Qty:1) (20609-000,Qty:4)	

Actuator, Temp Regulator Spurious Position Change	100.0%	Sources:1 65.0% Catastrophic-Spurious Position Change (18175-000,65.0%)
Induced		35.0% Degraded - Premature Or Delayed Actuation (18175-000,35.0%)

Actuator, Transmit Force Seized	50.0%	Sources:1 50.0% Stopped (24992-000,50.0%)
Drift	50.0%	50.0% Drift (24992-000,50.0%)

Accuator,Upstream Pressure Spurious Position Change	100.08	Sources:1 70.0% Catastrophic-Spurious Position Change (18175-000,70.0%)
Induced		30.0% Degraded - Premature O: Delayed Actuation (18175-000,30.0%)

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art Failure	Norm	Fail	Data
esc. Mode/Mech	Dist.	Dist.	Source(s)/Details
dapter Out of Adjustment	33,34	25.0%	Sources:1 Out Of Adjustment - Inop/Unserviceable (25101-000,Qty:1)
Seal/Gasket Failure	33,3%	25.0%	Seals Worn - Loose (25101-000,Qty:1)
Broken	33.3%	25.0%	Broken/Damaged (25101-000,Qty:1)
Induced		25.0%	Overtorqued - Leaking Nitrogen (25101-000,Qty:1)
dapter,Fire Control Out of Adjustment	50.0%	42.9%	Sources:1 Out Of Adjustment - Out Of Synch (25101-000,Qty:1), Out Of Adjustment - Inaccurate (25101-000,Qty:2)
Worn	16.7%	14.3%	Worn - Inaccurate (25101-000,Qty:1)
Loose	16.7%	14.3%	Vibration - Loose (25101-000,Qty:1)
Broken	16.7%	14.3%	Broken/Damaged (25101-000,Qty:1)
Unknown		14.3%	Unknown (25101-000,Qty:1)
dapter,Kit Out of Adjustment	90.9%	90.9%	Sources:1 Out Of Adjustment - Inaccurate (25101-000,Qty:14), Out Of Adjustment - Found In TI/PMCS/Insp (25101-000,Qty:6)
Inaccurate	4.5%	4.5%	No Failure - Inaccurate (25101-000,Qty:1)
Loo <b>se</b>	4.5%	4.5%	Loose Nut(s) - Found In TI/PMCS/Insp (25101-000,Qty:1)
dapter,Trunnion Out of Synch.	63.6%	58.3%	Sources:1 Out Of Synch (25101-000,Qty:2) (25101-000,Qty:5)
Out of Adjustment	36.4%	33.3%	Out Of Adjustment - Inaccurate (25101-000,Qty:3), Out Of Adjustment (25101-000,Qty:1)
Unknown		8.3%	Unknown (25101-000,Qty:1)
larm (Summary) Spurious/False Operation Intermittent Operation No Operation Fails to Op. on Demand Degraded Operation	48.3% 18.0% 18.0% 10.5% 5.2%		
larm, Annunciator, Basic Spurious/False Operation	50.0%	50.0%	Sources:2 False Alarma (24996-000,40.0%) (24997-000,40.0%)
Intermittent Operation	25.0%	25.0%	Intermittent Operation (24996-000,20.0%) (24997-000,20.0%)
No Operation	25.0%	25.0%	Fails To Operate (24996-000,20.0%) (24997-000,20.0%)

art esc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	h, Annunciator, Module ails to Op. on Demand	52.31	15.0%	Sources:1 Catastrophic-Fails To Operate On Demand (18175-000,45.0%)
S	purious/False Operation	40.7%	11.7%	Catastrophic-Operates Spurious Cr False Response (18175-000,35.0%)
D	egraded Operation	7.0%	2.0%	Degraded (18175-000,3.0%) (18175-000,3.0%)
U	Inknown		68.7%	Unknown (18175-000,12.0%) (18175-000,97.0%) (18175-000,97.0%)
I	induced		2.78	Degraded-Operates At Low Intensity (18175-000,5.0%), Degraded-Erroneous Indication (18175-000,3.0%)
	Annunciator,Module,Isolating ails to Op. on Demand	70.0%	70.0%	Sources:1 Catastrophic-Fails To Operate On Demand (18175-000,70.0%)
s	purious/False Operation	30.0%	30.0%	Catastrophic-Operates Spurious Or False Response (18175-000,30.0%)
	, Annunciator, Module, Relay purious/False Operation	56.8%	46.0%	Sources:1 Catastrophic-Operates Spurious Or False Response (18175-000,46.0%)
F	ails to Op. on Demand	38.3%	31.0%	Catastrophic-Fails To Operate On Demand (18175-000,31.0%)
D	egraded Operation	4.9%	4.0%	Degraded (18175-000,4.0%)
U	nknown		19.0%	Unknown (18175-000,19.0%)
	,Annunciator,Module,Solid Stat purious/False Operation			Sources:1 Catastrophic-Operates Spurious Or False Response (18175-000,55.0%) (18175-000,55.0%)
D	egraded Operation	23.5%	22.0%	Degraded (18175-000,22.0%) (18175-000,22.0%)
F	ails to Op. on Demand	17 <b>.6</b> %	16.5%	Catastrophic-Fails To Operate On Demand (18175-000,16.0%) (18175-000,17.0%)
U	nknown		6.5%	Unknown (18175-000,6.0%) (18175-000,7.0%)
	,Annunciator,Multiple or Seque purious/False Operation	nce 50.0%		Sources:2 False Alarms (24996-000,40.0%) (24997-000,40.0%)
I	ntermittent Operation	25.0%	20.0%	Intermittent Operation (24996-000,20.0%) (24997-000,20.0%)
No	Operation	25.0%	20.0%	Failure to Operate (24996-000,20.0%) (24997-000,20.0%)
Ur	nknown		20.0%	Unknown (24996-000,20.0%) (24997-000,20.0%)

art esc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source (s) /Details
	Buzzer, Annunciator Module graded Operation	49.0%	49.0%	Sources:1 Degraded (18175-000,49.0%)
Fa	ils to Op. on Demand	29.0	29.0%	Catastrophic-Fails To Operate On Demand (18175-000,29.0%)
Sp	urious/False Operation	22.0%	22.0	Catastrophic-Operates Spurious Or False Response (18175-000,22.0%)
nplif	ler (Summary)			
	orted Output	50.0% 45.0%		
	ift	5.0%		
	ier,Microwave Output	90.0%	90.0%	Sources:1 Degraded transistor performance, no output (25015-000,90.0%)
Dr	ift	10.0%	10.0%	Passive component drift, limited voltage gain (25015-000,10.0%)
	ier,Wideband,GaAs FET orted	100.0%	100.0%	Sources:1 Short (25001-000,Qty:1)
	iator graded Operation	60.3%	25.3%	Sources:1 Degraded (18175-000,16.0%) (18175-000,20.0%) (18175-000,40.0%)
Fa	ils to Op. on Demand	23.0%	9.78	Catastrophic-Fails To Operate On Demand (18175-000,29.0%)
Sp	urious/False Operation	16.7%	7.0%	Catastrophic-Operates Spurious Or False Response (18175-000,21.0%)
Un	known		58.0%	Unknown (19175-000,4.0%) (18175-000,5.0%) (18175-000,10.0%) (18175-000,75.0%) (18175-000,80.0%)
	iator,Solid State urious/False Operation	50.0%	50.0%	Sources:1 Catastrophic-Operates Spurious Or False Response (18175-000,50.0%)
Fa	ils to Op. on Demand	33.0%	33.0%	Catastrophic-Fails To Operate On Demand (18175-000,33.0%)
Out	t of Spec.	17.0%	17.0%	Catastrophic-Out Of Limits (18175-000,17.0%)
	a (Summary)	20.04		
Bro	nnection Failure oken	39.3% 19.8%		
	aking acked/Fractured	17 8% 9.8%		
Ber Bir	acked/fractured nt/Dented/Warped nding/Sticking termittent Operation	9.8% 9.2% 5.5% 4.6%		

FMD-91				Failure Distribution Summaries 3-7		
art esc.	Failure Mode/Mach	Norm Dist.	Fail Dist,	Data Source(s)/Details		
		16.8%	Sources:4 Broken (20609-000,Qty:2) (25464-000,Qty:53)			
L	eaking	19.48	10.0%	Leaking Internal or External (25464-000,Qty:41)		
С	racked/Fractured	16.2%	8,34	Cracked/Fractured (20609-000,Qty:4), Cracked (25464-000,Qty:2)		
В	ent/Dented/Warped	15.24	7.8%	Distorted (20609-000,Qty:2), Bent (20609-000,Qty:2)		
В	inding/Sticking	9.0%	4.6%	Binding (20609-000,Qty:1), Binding Stuck or Jammed (25464-000,Qty:11)		
I	ntermittent Operation	7.61	3,9%	Intermittent (20609-000,Qty:2)		
U	nknown		37.3%	Unknown (19542-000,100.0%) (20609-000,Qty:2)		
o	ther (<\$7) Worn		11.2% 3.4%	Worn, Chaffed, Frayed, or Torn (25464-000,Qty:14)		
	Corroded		3.4%	Corroded Mild/Moderate (25464-000,Qty:14)		
	Out of Spec.		2.0%	Out Of Specification (20609-000,Qty:1)		
	Shorted		2.0%	Short (20609-000,Qty:1)		
	Loose		0.2%	Loose,Damaged,or Missing Har (25464-000,Qty:1)		
	High Volt. or Standing Wav	e	0.2%	High Voltage or Standing Wave (25464-000,Qty:1)		
	Hardware Failure		NR	Power Loss (Hardware) (24997-000,NR)		
	Output Distortion		NR	Pattern Distortion (24997-000,NR)		
	Transmission Loss		NR	Transmission Loss (Atmosphere) (24997-000,NR)		
	Feeder Failure		NR	Feeder Malfunction (24997-000,NR) (24997-000,NR)		
	Mechanical Failure		NR	Mechanical Malfunction-Pedestal (24997-000,NR)		
	Loss of Control		NR	Control Malfunction (24997-000,NR)		
	Radiation Element Failure		NR	Radiation Elements (24997-000,NR)		

 Antenna, Microwave
 Sources:1

 Connection Failure
 100.0% 100.0% Connection Deficency, No Transmission (25015-000,100.0%)

Ąrm, Link Loose	25.0%	Sources:1 16.7% Worn - Loose (25101-000,Qty:1)
Cracked/Fractured	25.0%	16.7% Cracked (25101-000,Qty:1)
Broken	25.0%	16.7% Out Of Adjustment - Broken/Damaged (25101-000,Qty:1)
Out of Adjustment	25.0%	16.7% No Failure - Out Of Adjustment (25101-000,Qty:1)
Induced		33.3% Caused By Other Failure-Cracked (25101-000,Qty:2)

Part	Failure	Norm	Fail	Data
QBC.				Source(s)/Details
rm, Re	coil Mochanism			Sources:1
Ou	t of Adjustment	60.9%	45.24	Out Of Adjustment - Fnd In TI/PMCS/INSP (25101-000,Qty:13), Out Of Adjustment - Out Of Synch (25101-000,Qty:1)
Ag	ed/Deteriorated	21.7%	16.14	Deterioration/Aged - Broken/Damaged (25101-000,Qty:5)
Br	oken	13,00	9.74	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2)
Cr	acked/Fractured	4,3	3.24	Cracked (25101-000, Qty:1)
In	ducəd		25.8%	Caused By Other Failure-Fnd In TI/PMCS/INSP (25101-000,Qty:2), Broken/Damaged (25101-000,Qty:3), Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Cracked (25101-000,Qty:2)
	ator, Fixed, Microwave erheated	50.0%	50.0%	Sources:1 Overheated (25015-000,Qty:1) (25015-000,Qty:27) (25015-000,10.0%) (25015-000,11.0%)
At	tenuation Increase	45.0%	45.0%	Attennation Increase (25015-000,90.0%)
In	sertion Loss	5.0%	5.0%	Insertion Loss (25015-000,10.0%)
	ator, Microwave duced		<0.1%	Sources:1 Burnout-Electrical Overstress (24417-001,NR)
Ot	her Machanical Overstress		100.0% NR	Mechanical Overstress (24417-001,NR)
	ator,Microwave,Voltage tenuation Increase		80.0%	Sources:1 Increased Attenuation (Resistive burn out) (25015-000,80.0%)
Di	ode Failure	20.0%	20.0%	Degraded Diode (25015-000,20.0%)
xəl	- 66- 1	<b>F</b> 0	40.00	Sources:2
	affed	58.3¥ 33.3¥		Chaffed (20609-000, Qty:7) Damaged (19542-000, 50.0%)
	chanical Damage	33.3% 8.3%		Damaged (19542-000, 50.0%) Distorted (20609-000, Qty:1)
	known	0.36		Unknown (19542-000,50.0%)
010	λει≪ ₩11		20.01	UNITO #11 (13935-000) 00,08/
Bir Out Bro Cor Bea	crew (Summary) nding/Sticking t of Adjustment oken rroded aring Failure nt/Dented/Warped	20.8% 20.8% 20.8% 16.7% 12.5% 4.2%		

e:

art Fa	ilure	Norm	Fail.	Data
esc. Mo	ode/Mech	Dist.	Dist.	Source(s)/Details
attery ( Induc	(continued) ced		4.0%	K-1 Miswired (19542-000,20.0%)
	r (<%7) Astable Operation		8.74 5.74	Unstable (24992-000,28.6%)
Oŗ	bened		2.0%	Catastrophic Open (24990-000,10.0%)
Co	ontaminated		1.0	Contamination (24992-000,4.8%)
attery,I Degra	lithium Ided Operation	74.0%	74.0	Sources:1 Degraded (20609-000,74.0%)
Start	up Delay	13.04	13.0%	Large Startup Delay (20609-000,13.0%)
Short	ed	6.0%	6.0%	Short (20609-000,6.0%)
Leaki	Ing	5.0%	5.04	Leaking (20609-000,5.0%)
Opene	ed	2.08	2.0%	Open (20609-000,2.0%)
	Non-Rechargeable,Lead A		43.84	Sources:1 Out of Specification (20609-000,Qty:7)
Short	ed	18.2%	12.5%	Short (20609-000,Qty:2)
Crack	ed/Fractured	9.1%	6.34	Cracked/Fractured (20609-000,Qty:1)
Inter	mittent Operation	9.14	6.3%	Intermittent (20609-000,Qty:1)
Unkno	own.		31.3%	Unknown (20609-000,Qty:5)
	echargeable,Ni-Cd ded Output	72.0%	72.0%	Sources:3 Degraded - Low Output Given Challenge (18175-000,NR) (18175-000,NR), Degraded - Low Output During Test (18175-000,71.0%) (18175-000,73.0%)
NO OL	tput	28.0%	28.0%	Degraded - No Output During Test (18175-000,27.0%) (18175-000,29.0%)
Unkno	wn		<0.1%	Unknown (18175-000,NR) (18175-000,NR)
Other Lo	ss of Volt.		0.0% NR	Loss of Voltage, End of Life (24996-000,NR) (24997-000,NR)
Sh	orted		NR	Internal Short (24996-000,NR) (24997-000,NR)
Op	ened		NR	Internal Open Circuits (24996-000,NR) (24997-000,NR)
Me	chanical Failure		NR	Mechanical Failure (24996-300,NR) (24997-000,NR)

MD-91			Failure Distribution Summaries 3
art Failure esc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
all Screw, Assembly Binding/Sticking	29.4%	16.1%	Sources:1 Binding/Sticking (25101-000,Qty:2), Part Struck/Damaged-Binding/Sticking (25101-000,Qty:1), Seized/Frozen (25101-000,Qty:1), Worn/Stripped-Binding/Sticking (25101-000,Qty:1)
Broken	23.54	12.91	Broken/Damaged (25101-000,Qty:1), Broken/Separated (25101-000,Qty:2), Broken/Separated-Broken/Damaged (25101-000,Qty:1)
Corroded	23.5%	12.9%	Corroded-Binding/Sticking (25101-000,Qty:4)
Bearing Failure	17.6%	9,7%	Bearing Failure-Seized (25101-000,Qty:1), Bearing Failure (25101-000,Qty:2)
Bent/Dented/Warped	5.9%	3.2*	Warped/Bent (25101-000,Qty:1)
Induced		29.0%	Abnormal Operation (25101-000,Qty:1), Lack Of Maintenance - Binding/Sticking (25101-000,Qty:2), Lack Of Lubrication - Binding/Sticking (25101-000,Qty:1), Lack Of Maintenance - Seized (25101-000,Qty:2), Lack Of Maintenance (25101-000,Qty:3)
Unknown		16.1%	Unknown (25101-000,Qty:1) (25101-000,Qty:4)
all Screw, Equipment Assembly Out of Adjustment	71.4%	41.7%	Sources:1 Out Of Adjustment (25101-000,Qty:5)
Creep	14.3%	8.3%	Creep (25101-000,Qty:1)
Broken	14.3%	8.3%	Accident-Broken/Damaged (25101-000,Qty:1)
Induced		25.0%	<pre>Improper Adjustment (25101-000,Qty:1), Lack Of Lubrication (25101-000,Qty:2)</pre>
Unknown		16.7%	Unknown (25101-000,Qty:2)
attery (Summary) Degraded Output Worn No Output Connector Failure Shorted Leaking	28.2% 23.0% 16.3% 13.8% 11.0% 7.7%		
attery Degraded Operation	22.9%	20.0%	Sources:5 Degraded (20609-000,Qty:5)
Worn	22.9%	20.0%	Wearout (24991-000,100.0%)
Connector Failure	13.7%	12.0%	Connector Panel Defective (19542-000,20.0%), Connector Pins Shorted (19542-000,20.0%), Connector Shorted (19542-000,20.0%)
No Output	13.1%	11.4%	No Output (24992-000,57.1%)
Degraded Output	11.5%	10.0%	Low Output (24990-000,50.0%)
Shorted	9.2%	8.0%	Shorted VR1-3 To Chassis (19542-000,20.0%), Catastrophic Short (24990-000,20.0%)
Leaking	6.8%	5.9%	Leak (24990-000,20.0%) (24992-000,9.5%)

	1			Failure Distribution Summaries 3
	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	,Storage raded Output	83.2%	8].5%	Sources:1 Degraded - Low Output Given Challenge (18175-000,1.0%) (28175-000,1.0%), Degraded - Low Output During Test (18175-000,80.0%) (18175-000,81.0%)
No (	Output	16.8%	16.5%	Degraded - No Output During Test (18175-000,16.0%) (18175-000,17.0%)
Unkr	nown		2.0è	Unknown (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%)
	,Storage,Lead Acid,F: raded Output		83.0%	Sources:1 Degraded - Low Output Given Challenge (18175-000,NR), Degraded - Low Output During Test (18175-000,83.0%)
No C	Output	17.0%	17.0%	Degraded - No Output During Test (18175-000,17.0%)
Unkr	nown	****	<0.1%	Unknown (18175-000,NR)
	Storage, Lead Acid, St raded Output			Sources:1 Degrad%d - Low Output Given Challenge (18175-000,3.0%) (18175-000,3.0%), Degraded - Low Output During Test (18175-000,5.0%) (18175-000,90.0%) (18175-000,90.0%)
No C	Dutput	2.6%	2.5%	Degraded - No Output During Test (18175-000,5.0%)
Unkr	nown		2.0%	Unknown (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%)
Bind Worn Leak Loss Cont Exce		30.3% 30.3% 17.4% 9.4% 5.5% 3.6% 3.5%		
aring Worn		45.1%		Sources:8 Blower Bearing Worn Out (19542-000,4.2%), Worn (24990-000,60.0%), Worn Out (20609-000,Qty:94), Metal Fatigue and Wear (24996-000,70.0%), Worn-Fnd In TI/PMSC/INSP (25101-000,Qty:1), Worn, Chaffed, Frayed, or Torn (25464-000,Qty:2)
Bind	ing/Sticking	16.9%		Binding (20609-000,Qty:21) (24990-000,40.0%) (24996-000,20.0%), Sticking (20609-000,Qty:9), Seized (20609-000,Qty:3), Jammed (20609-000,Qty:3), Seized/Frozen-Loose (25101-000,Qty:1)
Exce	ssive Play	11.0%	7.91	Excessive Play (19542-000,12.5%) (25101-000,Qty:1), Worn-Excessive Play (25101-000,Qty:1) (25101-000,Qty:1)
Loss	of Lubrication	10.7%		Lubrication Dried Out (19542-000,4.2%), Loss Or Deterioration Of Lubrication (24993-000,45.0%), Loss Of Lubrication (20609-000,Qty:16)
Loos	8	9.9%	7.18	Loose,Damaged,or Missing Har (25464-000,Qty:2)
Cont	aminated	6.3%	4.6%	Contamination (24993-000,30.0%), Pitted (20609-000,Qty:6)

-12 art	Failure Distribution S	Norm	Fail	Data
esc.		Dist.		Source(s)/Details
	g (continued) known		18.9%	Unknown (19542-000,4.2%) (19542-000,4.2%) (19542-000,4.2%) (19542-000,4.2%) (19542-000,45.8%) (20609-000,Qty:144) (24993-000,10.0%) (25101-000,Qty:1)
In	duced		1.34	Defective (19542-000,4.2%), Misalignment (24993-000,5.0%)
Ot.	her (<%4) Seized		7.7% 2.0%	Seized (25101-000,Qty:1)
	Aged/Deteriorated		1.8%	Requires Overhaul (19542-000,12.5%)
	Scored		1.4%	Scored (20609-000,Qty:8), Scoring (24996-000,7.0%)
	Corroded		1.1%	Corrosion (24993-000,5.0%) (24996-000,3.0%)
	Brinelling		0.7%	Brinelling (24993-000,5.0%)
	Excessive Vibration		0.3%	Vibrating (20609-000,Qty:6)
	Bent/Dented/Warped		0.2%	Dented (20609-000,Qty:3), Bent (20609-000,Qty:1)
	Clogged/Clogging		0.1%	Clogged (20609-000,Qty:3)
	Cracked/Fractured		<0.1%	Cracked/Fractured (20609-000,Qty:1)
	Creep		NR	Creeping/Spin-Improper Fit Between Bearing & Shaft (25036-000,NR)
	Scuffing		NR	Hard Lines or Scuffing (25036-000,NR)
	Spalling		NR	Spalling-Poor Lubrication (25036-000,NR), Spalling-Fatigue (25036-000,NR), Spalling-Wearout (25036-000,NR)
	g,Antifriction nding/Sticking	98.7%	98.7%	Sources:1 Binding Stuck or Jammed (25464-000,Qty:1,748)
Wo	rn	0.6%	0.6%	Worn, Chaffed, Frayed, or Torn (25464-000,Qty:10)
Br	oken	0.5%	0.5%	Broken (25464-000,Qty:9)
Le	aking	0.28	0.2%	Leaking Internal or External (25464-000,Qty:4)
	g,Ball nding/Sticking	22.2%	6.7%	Sources:1 Part Missing/Loose-Binding/Sticking (25101-000,Qty:1), Binding/Sticking (25101-000,Qty:1)
Co	rroded	22.2%	6.7%	Corroded-Noisy (25101-000,Qty:1) (25101-000,Qty:1)
Exe	cessive Play	11.1%	3.34	Worn-Excessive Play (25101-000,Qty:1)
Se	ized	11.1%	3.3%	Seized/Frozen-Inop Man Elevation (25101-000,Qty:1)
Wo:	rn	11.1%	3.3%	Worn-Fnd In TI/PMCS/INSP (25101-000,Qty:1)
Bea	aring Failure	11.1%	3.34	Bearing Failure-Noisy (25101-000,Qty:1)
Out	t of Adjustment	11.14	3.3%	Out Of Adjustment - Abnormal Operation (25101-000,Qty:1)
Ind	duced		60.0%	Lack Of Lubrication-Noisy (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Lack Of Lubrication-Handwheel Spin (25101-000,Qty:1), Improper Maintenance - Noisy (25101-000,Qty:1), Lack Of Lubrication-Inor Man Elevation (25101-000,Qty:1)

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FMD-91			Failure Distribution Summaries 3-
Part Failure Desc. Mcde/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
earing, Ball (continued)			
Induced (continued)			<pre>(25101-000,Qty:1), Lack Of Lubrication-Corroded (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Caused By Other Failure-Corroded (25101-000,Qty:1), Lack Of Maintenance - Noisy (25101-000,Qty:1) (25101-000,Qty:2), Lack Of Maintenance-Inop Man Elevation (25101-000,Qty:1), Lack Of Maintenance - Inop/Unserviceable (25101-000,Qty:1), Lack Of Maintenance - Inop Man Traverse (25101-000,Qty:1)</pre>
Unknown		10.0%	Unknown (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1)
earing,Roller	50 08	50.08	Sources:2 Leaking Liquid (23038-004,Qty:1)
Leaking			
Out of Adjustment	25.0%	25.0%	Out Of Adjustment-Excessive Play (25101-000,Qty:1)
Seized	25.0%	25.0%	Seized (25101-000,Qty:1)
earing,Roller,Taper Out of Adjustment	90.0%	78.3%	Sources:1 Out Of Adjustment (25101-000,Qty:3) (25101-000,Qty:15)
Worn	5.0%	4.3%	Worn-Abnormal Operation (25101-000,Qty:1)
Binding/Sticking	5.0%	4.3%	Binding/Sticking (25101-000,Qty:1)
Induced		13.0%	Abnormal Operation (25101-000,Qty:1), Lack Of Maintenance - Bearing Failure (25101-000,Qty:1), Lack Of Maintenance-Fnd In TI/PMCS/INSP (25101-000,Qty:1)
earing,Sleeve Worn	40.0%	31.6%	Sources:1 Worn Out (25101-000,Qty:4), Worn-Fnd In TI/PMSC/INSP
			(25101-000,Qty:2)
Excessive Play			Worn-Excessive Play (25101-000,Qty:4)
Broken	13.3%	10.5%	Broken/Damaged (25101-000, Qty:1), Shaft Broken-Binding/Sticking (25101-000, Qty:1)
Bushing Failure	6.7%	5.3%	Worn Bushing-Fnd In TI/PMSC/INSP (25101-000,Qty:1)
Seized	6.7%	5.3%	Unknown-Seized (25101-000,Qty:1)
Aged/Deteriorated	6.7%	5.3%	Deteriorated/Aged-Fnd In TI/PMSC/INSP (25101-000,Qty:1)
Induced		15.8%	<pre>Improper Maintenance-Inop Man Elevation (25101-000,Qty:1), Dropped-Fnd In TI/PMCS/INSP (25101-000,Qty:1), Fell Off Cr Lost-Missing (25101-000,Qty:1)</pre>
Unknown		5.3%	Unknown (25101-000, Qty:1)

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rt Failure	Norm	Fail	Data
esc. Mode/Mech	Dist.		
earing,Sleeve,Trunnion Bushing Failure	41.7%	27.8%	Sources:1 Worn Bushing - Out Of Synch (25101-000,Qty:2), Worn Bushing - Inop Man Elevation (25101-000,Qty:3)
Out of Synch.	25.0%	16.7%	Out Of Synch (25101-000,Qty:1) (25101-000,Qty:2)
Broken	16.7%	11.1%	Broken/Separated-Out Of Synch (25101-000,Qty:2)
Binding/Sticking	8.3%	5.6%	Gears Binding - Out Of Synch (25101-000,Qty:1)
Worn	8.3%	5.6%	Worn Out (25101-000,Qty:1)
Induced		33.3%	Lack Of Lubrication - Out Of Synch (25101-000,Qty:5), Lack Of Lubrication - Worn Out (25101-000,Qty:1)
ell, Annunciator Module Degraded Operation	49.0%	49.0%	Sources:) Degraded (18175-000,49.0%)
Fails to Op. on Demand	38.0%	38.0%	Catastrophic-Fails To Operate On Demand (18175-000,38.0%)
Spurious/False Operation	13.0%	13.0%	Catastrophic-Operates Spurious Or False Response (18175-000,13.0%)
ellows Cracked/Fractured	40.0%	25.0%	Sources:3 Cracked (19542-000,50.0%)
Aged/Deteriorated	30.0%	18.8%	Deteriorated/Aged-Cracked (25101-000,Qty:1), Deteriorated/Aged-Inop/Unserviceable (25101-000,Qty:2), Deteriorated/Aged-Broken/Damaged (25101-000,Qty:1), Deteriorated (25101-000,Qty:2)
Cut/Scarred/Punctured	20.0%	12.5%	Cut/Scarred (25101-000,Qty:4)
Burst/Ruptured	5.0%	3.1%	Breaking or Bursting (24996-000,NR), Part Struck/Damaged-Punctured (25101-000,Qty:1)
Broken	5.0%	3.1%	Broken/Damaged (25101-000,Qty:1)
Unknown		25.0%	Unknown (19542-000,50.0%)
Induced		12.5%	Item Abuse/Neglect-Cut/Scarred (25101-000,Qty:2), Part Struck/Damaged-Cut/Scarred (25101-000,Qty:2)
Other Leaking		0.0% NR	Leaks (24996-000,NR)
elt (Summary)	75 65		
Worn Bruken	75.0% 25.0%		

Node/Mech     Dist.     Dist.     Source(s)/Details       Selt     Sources:1       Worn     75.0%     30.0% Worn Out (19542-000,30.0%)       Broken     25.0%     10.0% Broken (19542-000,10.0%)       Induced      60.0% Due to Excessive Use (19542-000,60.0%)       Blower (Summary)      60.0% Due to Excessive Use (19542-000,60.0%)       Blower (Summary)      60.0% Due to Excessive Use (19542-000,60.0%)       Blower Summary)      60.0% Due to Excessive Use (19542-000,60.0%)       Blower Summary)      60.0% Due to Excessive Use (19542-000,60.0%)       Blower Summary)	FMD-91			Failure Distribution Summaries 3-15
Worn         75.04         30.04 Worn Out (19542-000, 30.04)           Broken         25.04         10.05 Broken (19542-000, 10.05)           Induced          60.05 Due to Excessive Use (19542-000, 50.04)           Bes ing Failure         23.06           Mechanica: 'allure         23.06           Surrocsid         6.04           Surrocsid         6.04           Surrocsid         6.04           Surrocsid         8.04           Bes ing Failure         7.34           Basting Failure         7.35           Diade Erosion         6.74           Out of Balance         3.13           Bearings Ids2-000, 5.33, Henelled Bearings (24417-000, NR) Bearing Failure (24956-000, NR), Use To Defective Bearings (19542-000, 5.33, Henelled Bearings (24417-000, NR), Define (24956-000, NR), Use To Defective Bearings (19542-000, 7.64), Other Wechanical Failure (24956-000, 7.64), Other Wechanical Failure (24956-000, 7.64), Other Wechanical Failure (24956-000, 7.64)           Sensor Failure         11.54         9.28 Defective Sensor (19542-000, 17.04)           Dut of Balance         7.35         5.94 Foundation Imbalance (24956-000, 11.74)           Storted         4.94         4.95 Excessive Current Has Shorted (19542-000, 2.64), Short (19542-000, 2.64), Switch Nat Korking (19542-000, 2.64), Short (19542-000, 2.64), Switch Nat Korking (19542-000, 2.64), Short (19542-000, 2.64), Switch Nat Korking	Part Failure Desc. Mode/Mech			
Induced       60.0% Due to Excessive Use (19542-000, 60.0%)         Bes ing Pe''ure       46.6%         Mechanica: 'ailure       23.6%         El'ottical Fallure       7.0%         Sensor Fallure       7.3%         Diade Erosion       6.7%         Out of Balance       4.6%         Shore Fallure       7.3%         Bearing Fal, ce       32.4%         Sourcest4       Bearings Loose (19542-000,5.3%), Noury Due To Defective Descrips (19542-000,5.3%), Noury Due To Defective 20596-000,7%), Bearing Falures (24996-000,7%)         Methanical Failure       28.3%         23.0% Wechanical Failures (24996-000,7%)         Sensor Failure       11.5%         Blade Erosion       10.6%         10.4%       5.9% Foundation Imbalance (24996-000,17.0%)         Out of Balance       7.3%         Switch Failure       4.9%         4.9%       4.0% Excessive Current Has Shorted (19542-000,2.6%), Short (19542-000,2.6%), Switch Not Morking (19542-000,2.6%), Switch Not Properise Niting (19542-000,2.6%), Switch Not Properise Niting (19542-000,2.6%), Switch Not Properise Niting (195	Belt Worn	75.0%	30.0%	
Nover (Summary) Bea ing Fa'lure 46.6% Mechanical Failure 23.6% Mechanical Failure 7.3% Diade Erosion 6.7% Out of Balance 4.6% Sensor Failure 7.3% Bearing Failure 7.3% Sensor Failur	Broken	25.0%	10.0%	Broken (19542-000,10.0%)
Besting Fallure       46.64         Mechanical 'Ailure       2.64         Sensor Failure       7.34         Didde Erosion       6.74         Out of Balance       4.64         Shorted       3.13         Blower, Fan Asser''y       Sources:4         Bearing Failure       3.14         Bearing Failure       3.14         Bearing Failure       32.45         Sources:4       Sources:4         Bearing Failure       22.45         Wechanical Failure       23.45         Bearing Failure       24997-000,NR), Bearing Failure (24996-000,RR), Rousing Breakage (24997-000,NR), Colored (24997-000,NR), Rousing Breakage (24996-000,38.34)         Mechanical Failure       28.54       23.04 Wechanical Failure (24996-000,18.44)         Blade Erosion       10.64       8.54       Blade Erosion (24996-000,17.64)         Out of Balance       7.34       5.94 Foundation Imbalance (24996-000,11.74)         Shorted       4.95       5.94 Foundation Imbalance (24996-000,2.64), Switch Is Loose (19542-000,2.64), Switch Is Loose (19542-000,2.64), Switch Not Working (19542-000,2.64)         Out of Balance       7.34       3.94 Defective Switch (19542-000,2.64), Switch Is Loose (19542-000,2.64)         Switch Pailure       4.94       3.94 Defective Switch (19542-000,2.64), Switch Is Loose (19542-000	Induced		60.0%	Due to Excessive Use (19542-000,60.0%)
Mechanical failure       23.68         Bill Failure       2.08         Sensor Failure       7.38         Diade Erosion       6.78         Out of Balance       4.68         Shorted       31.18         Bearing Failure       22.99         Bearing Failure       3242         Bearing Failure       3242         Bearing Failure       3242         Bearing Failure       3242         Mechanical Failure       3242         C4417-000,NR) Bearing Failure (24996-000,5.34), Brinelled Bearings (24417-000,NR) Bearing Failure (24996-000,RR) (24997-000,NR) (3542-000,2.64), Sort (19542-000,2.64), Sort (19542-000,2.64), Sort (19542-000,2.64), Sort (19542-000,2.64), Switch Is Loose (19542-000,2.64), Switch Not Preparatures (24417-000,NR)         Induced	Blower (Summary)	45 68		
Sensor Failure       7.38         Hade Erosion       6.78         Out of Balance       4.68         Shorted       3.19         Bearing Failure       324         Bearings Loose (19542-000, 5.38), Noisy Due To Defective Dearings (19542-000, 7.38), Noisy Due To Defective (24996-000, 7.68), Other Nechanical Failures (24996-000, 7.68), Other Nechanical Failure (24996-000, 7.68), Other Nechanical Failure (24996-000, 7.68), Other Nechanical Failure (24996-000, 7.68)         Mechanical Failure       10.58       9.28 Defective Sensor (19542-000, 18.44)         Blade Erosion       10.68       8.58 Blade Erosion (24996-000, 7.08)         Out of Balance       7.38       5.98 Foundation Imbalance (24996-000, 11.78)         Shorted       4.98       4.08 Excessive Current Has Shorted (19542-000, 2.68), Short (19542-000, 2.68), Switch Is Loose (19542-000, 2.68), Switch Not Norking (19542-000, 2.68), Switch Failure       4.94         Unknown	Mechanical ailure	23.68		
Dilade Ercelon       6.7%         Out of Balance       4.6%         Shorted       3.1%         Shorted       3.1%         Sources:4       Sources:4         Bearings Fail. re       32%         Sources:1       Sources:4         Bearings Fail. re       32%         Sources:1       Sources:4         Bearings Worn Out (19542-000,5.3%), No.xy Due To Defective Dearings (19542-000, S.3%), Excessive Vibrations 6         Dearings (19542-000, S.3%), Excessive Vibrations 6         Bearings Worn Out (19542-000, S.3%), No.xy Due To Defective Dearings (19472-000, NR)         Mechanical Failure       28.5%         Sensor Failure       11.5%         Dide Erosion       10.6%         Blade Erosion       10.6%         Out of Balance       7.3%         Shorted       4.9%         Switch Failure       4.9%         4.9%       4.0% Excessive Curient Has Shorted (19542-000, 2.6%), Switch Is Loose (19542-000, 2.6%), Switch Not Working (19542-000, 2.6%), Swit				
Shorted     3.1%       Blower,Fan Assem''y Bearing Falce     Sources:4       32%     25.9% Bearings Worn Out (19542-000,5.3%), No.ay Due To Defective Dearings (19542-000,5.3%), Brinelled Bearings (2497-000,NR) Bearing Failure (24996-000,NR) (24997-000,NR) Bearing Failures (24996-000,NR) (24997-000,NR) Bearing Failures (24996-000,NR), Housing Breakage (24996-000,7.6%), Other Mechanical Failure (24996-000,38.3%)       Sensor Failure     11.5%     9.2% Defective Sensor (19542-000,17.4%)       Blade Erosion     10.6%     8.5% Blade Erosion (24996-000,11.7%)       Out of Balance     7.3%     5.9% Foundation Imbalance (24996-000,2.6%), Short (19542-000,2.5%), Switch Nat Working (19542-000,2.6%), Short (19542-000,2.6%), Switch Nat Working (19542-000,2.6%), Short (19542-000,2.6%), Switch Nat Working (19542-000,2.6%), Unknown       Induced      6.6% Has Excessive Vibrations & Mount Is Loose (19542-000,2.6%), Reverse Wiring (19542-000,2.6%), Operation With One Phase Disconnected (2417-000, NR), Peraing Alpered Disconnected (2417-000, NR), Delanged (19542-000,2.6%), Motor Failure (2417-000, NR), Peraing Operation at Low Temperatures (2417-000, NR), Calego-000, NR)       Other (<\$3) Motor Failure     I.3%       Bolt & Nut Failure     NR Nut & Bolt Failure (24997-000, NR)	Blade Erosion	6.78		
Slower, Fan Assem" 'Y       Sources:4         Bearing Fai.re       32.J\$ 25.9\$ Bearings Worn Out (19542-000,15.8\$), Excessive Vibrations 6 Bearings Losse (19542-000,5.3\$), Brinelled Bearings (24417-000,NR), Bearing Failures (24996-000,NR) (24997-000,NR) Dearing Failures (24996-000,RN) (24997-000,NR) Dearing Failures (24996-000,NR) (24996-000,NR) Dearing Failures (24996-000,NR), Housing Breakage (24996-000,18.4\$)         Mechanical Failure       28.5\$ 23.0\$ Mechanical Failure (24996-000,NR) (24997-000,NR), Housing Breakage (24996-000,18.4\$)         Sensor Failure       11.5\$ 9.2\$ Defective Sensor (19542-000,18.4\$)         Blade Erosion       10.6\$ 8.5\$ Blade Erosion (24996-000,11.7\$)         Out of Balance       7.3\$ 5.9\$ Foundation Imbalance (24996-000,2.6\$), Short (19542-000,2.6\$), Switch Not Working (19542-000,2.6\$), Short (19542-000,2.6\$), Switch Not Working (19542-000,2.6\$)         Switch Failure       4.9\$ 3.9\$ Defective Switch (19542-000,2.6\$), Switch Is Loose (19542-000,2.6\$), Switch Not Working (19542-000,2.6\$), Induced          6.6\$ Has Excessive Vibrations & Mount Is Loose (19542-000,5.3*), Improver Installation (19542-000,2.6\$), Reverse Wiring (19542-000,2.6\$), Operation AL Low Temperatures (24417-000, NR), Delonged Operation AL Low Temperatures (24417-000, NR), Delonged Operation at Low Temperatures (2417-000, NR), Delonged Operation at Low Temperatures (2417-000, NR), Delonged				
Bearing Failure32425.94Bearings Worn Out (19542:00.15.48), Excessive Vibrations 6 Bearings Loose (19542-000, 5.34), Noisy Due To Defective Bearings Loose (19542-000, 5.34), Noisy Due To Defective Bearings (19542-000, 7.64), Other Mechanical Failure (24996-000, 7.64), Other Mechanical Failure (24996-000, 38.34)Mechanical Failure28.5423.04Mechanical Failure (24996-000, NR), Housing Breakage (24996-000, 7.64), Other Mechanical Failure (24996-000, 38.34)Sensor Failure11.559.24Defective Sensor (19542-000, 18.44)Blade Erosion10.648.54Blade Erosion (24996-000, 17.04)Out of Balance7.345.94Foundation Imbalance (24996-000, 11.74)Shorted4.944.04Excessive Current Has Shorted (19542-000, 2.64), Short (19542-000, 2.64), Switch Not Working (19542-000, 2.64)Unknown11.94Unknown (19542-000, 2.64), Switch Not Working (19542-000, 2.64)Induced6.64Has Excessive Vibrations & Mount Is Loose (19542-000, 2.64), Reverse Wiring (19542-000, 2.64), Witch Not Properly Installed (19542-000, 2.64), Phase Disconnected (24417-000, NR), Prolonged Operation at Low Temperatures (24417-000, NR), Caper-000, NR)Other (	Shorted	5.10		
Breakage (24996-000,7.6%), Other Mechanical Failure (24996-000,38.3%)Sensor Fairure11.5%9.2% Defective Sensor (19542-000,18.4%)Blade Erosion10.6%8.5% Blade Erosion (24996-000,17.0%)Out of Balance7.3%5.9% Foundation Imbalance (24996-000,11.7%)Shorted4.9%4.0% Excessive Current Has Shorted (19542-000,2.6%), Short (19542-000,5.3%)Switch Failure4.9%3.9% Defective Switch (19542-000,2.6%), Switch Is Loose (19542-000,2.6%), Switch Not Working (19542-000,2.6%)Unknown11.9% Unknown (19542-000,23.7%) (24997-000,NR)Induced6.6% Has Excessive Vibrations & Mount Is Loose (19542-000,5.3%), Improver Installation (19542-000,2.6%), Switch Not Properly Installed (19542-000,2.6%), Switch Not Properly Installed (19542-000,RR), Poreation With One Phase Disconnected (24417-000,NR), Damage by Foreign Objects (24417-000,NR)Other (<%3) Notor Failure1.3% N Nut & Bolt Failure (24997-000,NR)Bolt & Nut FailureNR Nut & Bolt Failure (24997-000,NR)	Blower,Fan Assem' `y Bearing Fai. re	32%	25.9%	Bearings Worn Out (19542-000,15.8%), Excessive Vibrations 6 Bearings Loose (19542-000,5.3%), Noisy Due To Defective Bearings (19542-000,5.3%), Brinelled Bearings (24417-000,NR), Bearing Failure (24996-000,NR)
Blade Erosion       10.6%       8.5% Blade Erosion (24996-000,17.0%)         Out of Balance       7.3%       5.9% Foundation Imbalance (24996-000,11.7%)         Shorted       4.9%       4.0% Excessive Current Has Shorted (19542-00,2.6%), Short (19542-000,2.6%), Switch Tailure         Switch Failure       4.9%       3.9% Defective Switch (19542-000,2.6%), Switch Is Loose (19542-000,2.6%)         Unknown        11.9% Unknown (19542-000,23.7%) (24997-000,NR)         Induced        6.6% Has Excessive Vibrations & Mount Is Loose (19542-000,5.3%), Improver Installation (19542-000,2.6%), Reverse Wiring (19542-000,2.6%), Operation With One Phase Disconnected (24417-000,NR), Prolonged Operation at Low Temperatures (24417-000,NR), Prolonged Operation at Low Temperatures (24417-000,NR), Damage by Foreign Objects (24417-000,NR)         Other (<%3)	Mechanical Failure	28.ú¥	23.0%	Breakage (24996-000,7.6%), Other Mechanical Failure
Out of Balance7.3%5.9% Foundation Imbalance (24996-000,11.7%)Shorted4.9%4.0% Excessive Current Has Shorted (19542-/00,2.6%), Short (19542-000,5.3%)Switch Failure4.9%3.9% Defective Switch (19542-000,2.6%), Switch Is Loose (19542-000,2.6%), Switch Not Working (19542-000,2.6%)Unknown11.9% Unknown (19542-000,23.7%) (24997-000,NR)Induced6.6% Has Excessive Vibrations & Mount Is Loose (19542-000,5.3%), Improper Installation (19542-000,2.6%), Reverse Wiring (19542-000,2.6%), Switch Not Properly Installed (19542-000,2.6%), Operation With One Phase Disconnected (24417-000,NR), Prolonged Operation at Low Temperatures (24417-000,NR), Damage by Foreign Objects (24417-000,NR)Other (<%3)	Sensor Fai⊥ure	11,5%	9.2%	Defective Sensor (19542-000,18.4%)
Shorted4.9%4.0% Excessive Current Has Shorted (19542-^000,2.6%), Short (19542-000,5.3%)Switch Failure4.9%3.9% Defective Switch (19542-000,2.6%), Switch Is Loose (19542-000,2.6%), Switch Not Working (19542-000,2.6%)Unknown11.9% Unknown (19542-000,23.7%) (24997-000,NR)Induced6.6% Has Excessive Vibrations & Mount Is Loose (19542-000,5.3%), Improver Installation (19542-000,2.6%), Reverse Wiring (19542-000,2.6%), Switch Not Properly Installed (19542-000,2.6%), Operation With One Phase Disconnected (24417-000,NR), Damage by Foreign Objects (24417-000,NR)Other (<%3) Motor Failure1.3% I.3% Motor Damaged (19542-000,2.6%), Motor Failure (24996-000,NR) (24997-000,NR)Bolt & Nut FailureNR Nut & Bolt Failure (24997-000,NR)	Blade Erosion	10.6%	8.5%	Blade Erosion (24996-000,17.0%)
Switch Failure4.9%3.9% Defective Switch (19542-000,2.6%), Switch Is Loose (19542-000,2.6%), Switch Not Working (19542-000,2.6%)Unknown11.9% Unknown (19542-000,23.7%) (24997-000,NR)Induced6.6% Has Excessive Vibrations & Mount Is Loose (19542-000,5.3%), Improper Installation (19542-000,2.6%), Reverse Wiring (19542-000,2.6%), Switch Not Properly Installed (19542-000,2.6%), Operation With One Phase Disconnected (24417-000,NR), Prolonged Operation at Low Temperatures (24417-000,NR), Damage by Foreign Objects (24417-000,NR)Other (<%3)	Out of Balance	7.3%	5.9%	Foundation Imbalance (24996-000,11.7%)
<ul> <li>(19542-000,2.6%), Switch Not Working (19542-000,2.6%)</li> <li>Unknown</li> <li>Induced</li> <li>Induced</li> <li>6.6% Has Excessive Vibrations &amp; Mount Is Loose (19542-000,5.3%), Improper Installation (19542-000,2.6%), Reverse Wiring (19542-000,2.6%), Switch Not Properly Installed (19542-000,2.6%), Operation With One Phase Disconnected (24417-000,NR), Prolonged Operation at Low Temperatures (24417-000,NR), Damage by Foreign Objects (24417-000,NR)</li> <li>Other (&lt;%3)</li> <li>Motor Failure</li> <li>Bolt &amp; Nut Failure</li> <li>NR Nut &amp; Bolt Failure (24997-000,NR)</li> </ul>	Shorted	4.9%	4.0%	
Induced        6.6% Has Excessive Vibrations & Mount Is Loose (19542-000, 5.3%), Impromer Installation (19542-000, 2.6%), Reverse Wiring (19542-000, 2.6%), Switch Not Properly Installed (19542-000, 2.6%), Operation With One Phase Disconnected (24417-000,NR), Prolonged Operation at Low Temperatures (24417-000,NR), Damage by Foreign Objects (24417-000,NR)         Other (<%3)	Switch Failure	4.9%	3.9%	
Improper Installation (19542-000,2.6%), Reverse Wiring (19542-000,2.6%), Switch Not Properly Installed (19542-000,2.6%), Operation With One Phase Disconnected (24417-000,NR), Prolonged Operation at Low Temperatures (24417-000,NR), Damage by Foreign Objects (24417-000,NR)         Other (<%3)	Unknown		11.9%	Unknown (19542-000,23.7%) (24997-000,NR)
Motor Failure         1.3% Motor Damaged (19542-000,2.6%), Motor Failure (24996-000,NR) (24997-000,NR)           Bolt & Nut Failure         NR Nut & Bolt Failure (24997-000,NR)	Induced		6.6%	Improper Installation (19542-000,2.6%), Reverse Wiring (19542-000,2.6%), Switch Not Properly Installed (19542-000,2.6%), Operation With One Phase Disconnected (24417-000,NR), Prolonged Operation at Low Temperatures
Winding Failure NR Open Windings (24417-000,NR)	Bolt & Nut Failure		NR	Nut & Bolt Failure (24997-000,NR)
	Winding Failure		NR	Open Windings (24417-000,NR)

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3-16	Failure Distribution S	ummaries	······		FMD-91
art esc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Cource(s)/Details	
	,Minature aring Failure	66.0%	66.0%	Sources:1 Bearing Failure (13591-000,66.0%)	and a substantia
El	ectrical Failung	20.3%	20,3%	Electric Failure (Genoral) (13591-000, 20.3%)	
Me	chanical Failure	3.7%	13,7%	Mechanical Failure (General) (13591-000,15.(%)	
	usembly duced		100.0%	Sources:1 Overtorqued - Stripped (25101+000,Qty:1)	
	ssembly,Breech Block nding/Sticking	66.7%	40.08	Sources:1 . opped - Binding/Sticking (25101-000,Qty:2)	
Mi	sfire	33.3%	20.0%	Lack of Maintenance - Misfire (25101-003,Qty:1)	
In:	duced		40.0%	<pre>Improper Install ~ Imp Assembly/Install (25101-000,Qt Lack of Maintenance - Birdir.g/Sticking (25101-030,Qty</pre>	
	ssembly,Breech Ring t of Synch.	100.0%	5.4%	Scurces:1 Out of Synch (25101-000,Qty:1) (25101-000,Qty:2)	
In	duced		91.1%	Improper Maintenance Corroded (25101-000,Qty:51)	
Un	known		3.68	Unknown (25101-000, Qty:2)	
	,Fossil Fueled known		<0.1%	Sources:1 Unknown (24996-000,NP)	
Ot	her Leaking	~~~~		Tube Leaks (24996-000, NR)	
	Economizer Failure		NP	Economizer Failure (24996-000,NR)	
	Refractory Failure		NR	Refractory Failure (24996-000,NR)	
	Loss of Control		NR	Control Faiture (24996-000,NR)	
Br Aj Wo St	Summary) oken ed/Deteriorated rn ripped nding/Sticking	79.1% 11.6% 4.7% 2.3% 2.3%			

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FMD-	91			Failure Distribution Summaries	3-17
Part Jasc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	achine okan	79.14	59.61	Sources:1 Broken Bolt(s) (25:01-000,Qty:1) (25101-000,Qty:1), Fart Struck/Damaged-Broken/Damaged (20101-000,Qty:1) (25101-000,Qty:8), Broken/Damaged (20101-000,Qty:23)	
Ag	ed/Deteriorated	11.69	8,8%	Deteriorated/Aged - Broken Bolt(s) (25101-000,Qty:3), Deteriorated/Aged-Broken/Damaged (25101-000,Qty:2)	
Wo	orn	4.74	3.5%	Worn-Louse (25101-000,Cty:1), Worn-Inop/Unserviceable (25101-000,Qty:1)	
Bi	nding/sticking	2.3	1.8%	Binding/Sticking (25101-000,Qty:1)	
St	ripped	2.3	1.8%	Stripped (25101-000,Qty:1)	
î n	duced		- 22.3¥	<pre>Improper Maintenance - Binding/Sticking (25101-000,Qty:1), Improper Maintenance - Found In TI/PMCS/Insp (25101-000,Qty:1), Lack of Maintenance-Metal On Mag Plug (25101-000,Qty:1), Overtorqued-Stripped (25101-000,Qty:1), Caused By Other Failure-Broken/Damaged (25101-000,Qty:1), Improper Maintenance-Broken/Damaged (25101-000,Qty:1), Improper Maintenance - Stripped (25101-000,Qty:1), Lack Of Maintenance - Lcose (25101-000,Qty:1), Improper Installation-Broken/Damaged (25101-000,Qty:1), Improper Installation-Broken Bolt(s) (25101-000,Qty:1), Improper Bolt(s) (25101-000,Qty:1), Operator Error-Broken Bolt(s) (25101-000,Qty:1)</pre>	
Un	known	100) An 100 100 10 1	18%	Unknown (25101-00C,Qty:1)	
	ibbed Shoulder duced		100.0%	Sources:1 Improper Maintenance-Broken/Damaged (25101-000,Qty:1), Lack Of Maintenance - Loose Bolt(s) (25101-000,Qty:1), Lack Of Maintenance-Skips (25101-000,Qty:1), Overtorqued-Broken/Damaged (25101-000,Qty:1)	
Brack <b>e</b> Br	t cken	63.6%	50.0%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:3)	
Bi	nding/Sticking	9.1%	7.18	Binding/Sticking (25101-000,Qty:1)	
اور آ	ed/Deteriorated	9.1%	7.1%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)	
FX	cessive Play	9.1%	7.1%	Worn - Excessive Play (25101~000,Qty:1)	
Bei	nt/Dented/Warpud	9.1%	7.1%	Warped/Bent - Broken/Demaged (25101-000,Qty:1)	
In	duced		14.3%	Caused By Other Failure-Cracked (25101-000,Qty:1), Stolen - Missing (25101-000,Qty:1)	
Un	know		7.1%	Unknown (25101-000,Qty:1)	

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art	Failuro	Norm	Fail	Data
	Mode/Mech	Dist.		Source (s) /Details
	t,Assembly acked/Fractured	(5.3%	36.9%	Sources:1 Cracked Weld-Broken/Damaged (20101-000,Qty:5), Cracked Weld-Cracked (25101-000,Qty:9), Cracked Weld-Found In T1/PMCS/INSP (25101-000,Qty:1), Cracked (25101-000,Qty:2) (25101-000,Qty:3), Vibration - Cracked (25101-000,Qty:3), Part Struck/Damaged - Cracked (25101-000,Qty:1)
Bro	oken	39,64	\$2.3%	Vibration - Broken/Damaged (25101-000,Qty:2), Broken/Damaged (25101-000,Qty:7), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:7), Part Struck/Damaged - Fnd In TI/PMCS/INSP (25101-000,Qty:1), Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:2), Part Struck/Damaged - Out Of Synch (25101-000,Qty:1)
Ber	nt/Dented/Warped	13.2%	10.84	Collapsed/Bent (25101-000,Qty:1) (25101-000,Qty:6)
Bor	nd/Beam Failure	1.98	1.54	Poor Bonding - Broken/Damaged (25101-000,Qty:1)
Inc	duced		16.94	Caused By Other Failure-Cracked (25101-000,Qty:1), Item Abuse/Neglect - Brokan/Damaged (25101-000,Qty:5), Operator Error - Collepsed/Bent (25101-000,Qty:1), Part Struck/Damaged - Binding/Sticking (25101-000,Qty:4)
Unk	Kriown		1.5%	Unknown (25101-000,Q'y:1)
	t,Body Assembly acked/Fractured	75.0%	60.0%	Sources:1 Cracked (25101-000,Q:y:1) (25101-000,Oty:1) (25101-000,Qty:2) (25101-000,Qty:9), Cracked Weld-Cracked (25101-000,Qty:8), Cracked Weld-Creep (25101-000,Qty:1), Vibration - Cracked (25101-000,Qty:2)
Cut	:/Scarred/Punctured	9.45	7.58	Cut/Scarred (25101-000,Qty:2), Worn - Cut/Scarred (25101-000,Qty:1)
Loc	ose	6.3%	5.0%	Loose Screw(s) - Loose (25101-000,Qty:1), Loose (25101-000,Qty:1)
Str	ripped	3.1%	2.5%	Stripped (25101-000,Qty:1)
Bro	oken	3.1%	2.5%	Broken/Damaged (25101-000,Qty:1)
Lea	aking	3.1%	2.5%	Leaking Hydraulic Oil (25101-000,Qty:1)
Inc	du∴ed		20.0%	CLised By Other Failure-Worn Out (25101-000,Qty:1), Caused By Other Failure-Cracked (25101-000,Qty:1), Improper Maintenance - Noisy (25101-000,Qty:1), Lack Of Maintenance - Stripped (25101-000,Qty:1), Overtorqued - Stripped (25101-000,Qty:2), Overtorqued - Loose (25101-000,Qty:1), Missing (25101-000,Qty:1)
	t,Draw Bar oken	78.6%	64.7%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:3), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1), Vibration - Broken/Damaged (25101-000,Qty:3), Broken/Separated - Broken/Damaged (25101-000,Qty:1)
Cra	acked/Fractured	14.34	11.84	Cracked/Split-Broken/Damaged (25101-000,Qty:2)
Sti	ripped	7.14	5 <b>,9</b> 8	Stripped (25101-000,Qty:1)
Inc	duced		17.6%	<pre>Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Item Abuses/Neglect - Broken/Damaged (25101-000,Qty:1), Overtorqued - Stripped (25101-000,Qty:1)</pre>

Part	Fallure	Norm	Fail	Failure Distribution Summaries 3-1
	Mode/Mach		Dist.	
Bracket Brol		66,7%	66.7%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:3)
Wori	r	22.28	22.28	Worn Out (25101-000, Cty:2)
Loos	3e	11.18	11.1%	Worn - Loose (25101-000,Qty:1)
	Level Vial A/Deteriorated	100.0%	100.0%	Sources:1 Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1)
Bracket, Bro)	Recoil Ind ten	<b>8</b> 5 0 <b>%</b>	65.4%	Sources:1 Hroken/Damaged (25101-000,Qty:7) (25101-000,Qty:9), Part Struck/Damaged - Broken/Damaegd (25101-000,Qty:1)
Crac	cked/Fractured	5.0%	3.8%	Past Struck/Damaged - Cracked (25101-000,Qty:1)
Misi	fire	5.0%	3.8%	Misfire (25101-000,Qty:1)
Bent	/Dented/Warped	5.0%	3.8%	Collapsed/Bent: (25101-000,Qty:1)
Unkr	IOWN		15.4%	Unknown (25101-000,Qty:1) (25101-000,Qty:3)
Indu	uced		7.?%	Part Struck/Damaged - Missing (25101-000,2.0%), Stolen - Missing (25101-000,Qty:1), Unknown - Missing (25101-000,Qty:1)
	Stop Ring ling/Sticking	100.0%	100.0%	Sources:1 Binding/Sticking (25101-000,Qty:1)
racket, Worn	Strip Body	75.0%	75.0%	Sources:1 Worn Out (25101-000,Qty:3)
Crac	ked/Fractured	25.0%	25.0%	Cracked/Split-Broken/Damaged (25101-000,Qty:1)
iracket, Brok	Susp Lock en	100.0%	9.1%	Sources:1 Broken/Damaged (25101-000,Qty:1)
Indu	ced		90.9%	Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:10)
rake Worn		39.5%	26.4%	Sources:2 Brake Discs Worn Out (19542-000,2.3%), Parts Are Worn Out (19542-000,2.3%), Worn Out (19542-000,2.3%) (20609-000,Qty:990)
Out	of Adjustment	27.9%	18.6%	Excessive Gap (19542-000,18.6%), Needs Adjustment (19542-000,18.6%)
Leak	ing	16.2%	10.8%	Leaking (20609-000,Qty:467)
Score	ed	7.4%	4.9%	Scored (20609-000,Qty:212)
<b>5</b>	oded	3.5%	2 45	Brakes Corroded (19542-000,4.7%)

art	Failure	Norm	Fail	Data
esc.	Mode/Mech	Dist.	Dist.	Source(s)/Details
	(continued)			
Lo	0 <b>50</b>	3.44	2.34	Brake Pad Bushings Screw Loose (19542-000,2.3%), Screw Loose (19542-000,2.3%)
Br	oken	2.18	1.4%	Parts Broken (19542-000,2.3%), Broken (20609-000,Qty:11)
Un	known		21.48	Unknown (19542-000,20.9%) (20609-000,Qty:473)
In	duced		9.34	Assembly Screw Too Tight (19542-000,2.3%), Improper Adjustment (19542-000,7.0%), Improper Positioning (19542-000,4.7%), Improperly Installed (19542-000,2.3%), Lock Screw Needs Replacement (19542-000,2.3%)
Oti	her (<\$3) Terminal Connection Failure		2.48 1.28	Recrimp Terminal D&C Required (19542-000,2.3%)
	Cable Failure		1.2%	Brake Cable Too Short (19542-000,2.3%)
	Burned/Charred		<0.1%	Burned (20609-000,Qty:4)
	Assembly aring Failure	100.0%	100.0%	Sources:2 Bearing Seized-Contamination/Corrosion (10722-000,Qty:1)
Otł	her Leaking		0.0% NR	Hydraulic & Pneumatic Hose and Actuator Leaks (24996-000,NR)
	Worn Linings		NR	Hydraulic & Pneumatic Worn Linings (24996-000,NR)
	Contaminated		NR	Hydraulic & Pneumatic Contaminated Linings (24996-000,NR), Mechanical Contaminated Linings (24996-000,NR)
	Mechanical Failure		NR	Mechanical Actuator Failure (24996-000,NR)
	Worn		NR	Mechanical Worn Linings (24996-C00,NR)
`	Friction, Material duced		<0.1%	Sources:1 Neglect (25036-000,NR)
Unk	cnown			Unknown (25036-000, NR)
Otł	her Hot Spotting			Heat Spotting (25036-000,NR)
	Crazing		NR	Crazing (25036-000,NR)
	Scored		NR	Scoring (25036~000,NR)
	Fade		NR	Fade (25036-000, NR)
	Metal Pickup		NR	Metal Pick-up (25036-000,NR)
	Grabbing		NR	Grab (25036-000, NR)
	Out of Adjustment		NR	Misalignment (25036-000, NR)

FM				Failure Distribution Summaries 3-2
Part Desc		Norm Dist.	Fail Dist.	Data Source(s)/Details
	e,Lever Group Worn	80,0%	66.7%	Sources:1 Worn - Inop/Unserviceable (25101-000,Qty:4)
	Stripped	20.0%	16.7%	S.ripped Gear/Spline (25101-000,Qty:1)
	Induced		16.7%	Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1)
	e,Motor Bearing Failure	100.0%	100.0%	Sources:1 Seized Bearing-Rust Contamination (10722-000,Qty:1)
	e,Rake Bent/Dented/Warped	100.0%	100.0%	Sources:1 Collapsed/Bent (25101-000,Gty:1)
	e, Rod Broken	41.2%	36.8%	Sources:1 Broken/Damaged (25101-000,Qty:3) (25101-000,Qty:10), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
	Aged/Deteriorated	38.2%	34.2%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:13)
	Out of Adjustment	8.8%	7.9%	Brakes Not Adjusted (25101-000,Qty:1), Out Of Adjustment (25101-000,Qty:2)
	Worn	5.9%	5.3%	Worn - Broken/Damaged (25101-000,Qty:1), Worn/Stripped - Inop/Unserviceable (25101-000,Qty:1)
	Corroded	2.9%	2.6%	Corroded-Broken/Damaged (25101-000,Qty:1)
	Bent/Dented/Warped	2.9%	2.6%	Collapsed/Bent (25101-000,Qty:1)
	Induced		10.5%	Missing (25101-000,Qty:1), Fell Off or Lost - Missing (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Operator Error - Broken/Damaged (25101-000,Qty:1)
	e,Shoe,Assembly Worn	100.0%	100.0%	Sourc <b>es:1</b> Worn - Inop/Unserviceable (25101-000,Qty:2)
	e,Shoe,Lining Worn	66.7%	40.0*	Sources:1 Worn Out (25101-000,Qty:2)
	Out of Adjustment	33.3%	20.0%	Brakes Not Adjusted (25101-000,Qty:1)
	Unknown		40.04	Unknown (25101-000,Qty:2)

-22 Failure Distribution S			كالهوا الأربوة المستجلسة فالكاب ومحاليتك كالمكاف والمتكون والمتعادي والمتعادة والمحادة والكرا المحادي والكرار المحاد
art Failure esc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(=)/Details
rake, Strut, Shoe Lining Bent/Dented/Warped	100.0%	50.0%	Sources:1 Warped/Bent - Inop/Unserviceable (25101-000,Qty:1)
Induced		50.0%	Fell Off or Lost - Missing (25101-000,Qty:1)
reech,Block Group Worn	83.34	52.61	Sources:1 Worn Out (25101-000,Qty:5), Worn - Inop/Unserviceable (25101-000,Qty:3), Worn - Worn Out (25101-000,Qty:2)
Misfire	8.34	5.3	Vibration - Misfire (25101-000,Qty:1)
Loose	8.34	5.3%	Part Missing/Loose - Misfire (25101-000,Qty:1)
Induced		36.8%	Fell Off or Lost - Misfire (25101-000,Qty:7)
Breech,Mechanism Worn	44.4%	40.0%	Sources:2 Worn Out (25101-000,Qty:1), Worn - Inop/Unserviceable (25101-000,Qty:1), Worn - Worn Out (25101-000,Qty:1), Worn - Abnormal Operation (25101-000,Qty:1)
Corroded	11.1%	10.0%	Corroded-Inop/Sluggish Breech (25101-000,Qty:1)
Bushing Failure	11.1%	10.0%	Worn Bushing - Loose (25101-000,Qty:1)
Broken	11.1%	10.0%	Broken/Damaged (25101-000,Qty:1)
Spring Failure	11.18	10.0%	Spring Weak - Inop/Sluggish Breech (25101-000,Qty:1)
Bent/Dented/Warped	11.1%	10.04	Collapsed/Bent (25101-000,Qty:1)
Unknown		10.04	Unknown (25101-000,Qty:1)
Breech, Mechanism, Assembly Seized	50.0%	33.31	Sources:1 a Lack of Maintenance - Locked (25101-000,Qty:1)
Binding/Sticking	50.0%	33.34	Binding/Sticking (25101-000,Qty:1)
Induced		33.34	Lack Of Maintenance - Binding/Sticking (25101-000,Qty:1)
Breech, Mechanism, Handle Spring Failure	75.0%	; 75.0 <b>4</b>	Sources:1 Spring Weak - Inop/Sluggish Breech (25101-000,Qty:3)
No Operation	25.09	25.04	Inop/Sluggish Breech (25101-000,Qty:1)
Brush Out of Adjustment	36.41	33.4	Sources:2 Needs Adjustment (19542-000,66.7%)
Cracked/Fractured	18.24	16.74	Cracked/Fractured (20609-000,Qty:2)
Out of Spec.	18.29	16.74	Out of Specification (20609-000,Qty:2)
Shorted	18.2%	16.74	short (19542-000,33.3%)
Worn	9.1	8.3%	Worn Out (20609-000,Qty:1)
Unknown		8.34	Unknown (20609-000,Qty:1)

MD-91 Failure Distribution Summaries 3				
art Failu esc. Mode/		Norm Dist.	Fail Dist.	Data Source(s)/Details
rush,Electr Broken	rical,Contact	75.0%	75.08	Sources:1 Broken (25464-000,Qty:3)
Leaking				Leaking Internal or External (25464-000,Qty:1)
·				
Buffer Assem Cracked/	wly Fractured	55.6%	48.4%	Sources:1 Cracked/Split-Leaking Hydraulic Oil (25101-000,Qty:1), Cracked/Split-Inop/Unserviceable (25101-000,Qty:1), Cracked/Split-Cut/Scarred (25101-000,Qty:1), Cracked (25101-000,Qty:11), Part Struck/Damaged - Cracked (25101-000,Qty:1)
Leaking		29.6%	25.8%	Leaking Hydraulic Oil (25101-000,Qty:2) (25101-000,Qty:2), Internal Failure - Leaking Hydraulic Oil (25101-000,Qty:1) (25101-000,Qty:2), Part Struck/Damaged - Leaking Fluid (25101-000,Qty:1)
Binding/	Sticking	7.4%	6.5%	Seized (25101-000,Qty:1), Binding/Sticking (25101-000,Qty:1)
Cut/Scar	red/Punctured	3.7%	3.2%	Cut/Scraped (25101-000,Qty:1)
Broken		3.7%	3.2%	Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:1)
Induced				Slams Into Battery (25101-000,Qty:1), Improper Maintenance - Inop/Unserviceable (25101-000,Qty:1), Operator Error - Leaking Hydraulic Oil (25101-000,Qty:1)
Unknown			3.2%	Unknown (25101-000,Qty:1)
	bly,Body Group ket Failure	57.1%	57.1%	Sources:1 Seals Worn - Leaking Hydraulic Oil (25101-000,Qty:1) (25101-000,Qty:3)
Spring F	ailure	42.9%		Spring Weak - Inop/Unserviceable (25101-000,Qty:1), Spring Weak - Leaking Hydraulic Oil (25101-000,Qty:1), Spring Weak - Abnormal Operation (25101-000,Qty:1), Spring Weak - Broken/Damaged (25101-000,1.0%)
ushing (Sumr	nary)			
Worn Out of A	djustment	73.5% 9.3%		
Loose	-	5.4%		
Excessive Aged/Det	e Play eriorated	4.7% 3.9%		
Broken		1.6%		
Cracked/1	Fractured	1.6%		
ishing Worn		100.0%		Sources:1 Worn Out (19542-000,83.3%)
Unknown			16.74	Unknown (19542-000,16.7%)

3-24 Part	Failure Distribution		<b>R</b> -41	FMD-91
	Mode/Mech	Norm Dist.		Data Source(s)/Details
	Bushing, Machine Loose		50.01	Sources:1 Vibration - Loose (25101-000,Qty:1), Loose Screw(s) - Misfire (25101-000,Qty:1)
с	orrod <del>e</del> d	25.04	25.04	Corroded-Seized (25101-000,Qty:1)
м	isfire	25.0%	25.0%	Vibration - Misfire (25101-000,Qty:1)
	ng,Plunger ut of Adjustment	44.4%	35.3%	Sources:1 Out of Adjustment (25101-000,Qty:8), Out of Adjustment - Out of Adjustment (25101-000,Qty:1), Out of Adjustment - Collapsed/Bent (25101-000,Qty:1), Out of Adjustment - Found in TI/PMCS/Insp (25101-000,Qty:1), Vibration - Out Of Adjustment (25101-000,Qty:1)
E	xcessive Play	18.5%	14.78	Loose (25101-000,Qty:1), Worn - Excessive Play (25101-000,Qty:4)
W	orn	18.5%	14.78	Worn - Out Of Adjustment (25101-000,Qty:4), Worn - Misfire (25101-000,Qty:1)
L	bose	11.1%	8.8%	Loose Screw(s) - Excessive Play (25101-000,Qty:2), Part Missing/Loose - Found in TI/PMCS/Insp (25101-000,Qty:1)
В	roken	7.4%	5.9%	Broken/Damaged (25101-000,Qty:1), Out of Adjustment - Broken/Damaged (25101-000,Qty:1)
I	nduced		20.6%	<pre>Improper Install - Found In TI/PMCS/Insp (25101-000,Qty:4), Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Lack of Maintenance - Collapsed/Bent (25101-000,Qty:2)</pre>
	ng,Sleeve orn	64.7%	51.2%	Sources:1 Worn - Missing (25101-000,Qty:1), Worn Bushing - Missing (25101-000,Qty:1), No Failure - Worn Out (25101-000,Qty:1), Loose Nut(s) - Inop/Unserviceable (25101-000,Qty:1), Worn Out (25101-000,Qty:1) (25101-000,Qty:4), Worn Bushing - Excessive Play (25101-000,Qty:1) (25101-000,Qty:7), Loose (25101-000,Qty:1), Worn - Loose (25101-000,Qty:1), Worn Bushing - Fnd In TI/PMCS/INSP (25101-000,Qty:3)
Aq	ged/Deteriorated	14.7%	11.6%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:4), Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1)
Cı	acked/Fractured	5,9%	4.78	Cracked (25101-000,Qty:2)
Lo	00 <b>5</b> 0	5.9%	4.7%	Loose Screw(s) - Excessive Play (25101-000,Qty:1), Out of Adjustment - Loose (25101-000,Qty:1)
Cu	t/Scarred/Punctured	2.9%	2.3%	No Failure - Cut/Scarred (25101-000,Qty:1)
E>	cessive Play	2.9%	2.3%	Excessive Play (25101-000,Qty:1)
Ou	t of Synch.	2.9%	2.3%	Out Of Synch (25101-000,Qty:1)
Ir	duced			<pre>Improper Install - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1), Missing (25101-000,Qty:1), Improper Maintenance - Missing (25101-000,Qty:1), Item Abuse/Neglect - Missing (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:2)</pre>
Un	known		4.78	Unknown (25101-000,Qty:1) (25101-000,Qty:1)

FMD				Failure Distribution Summaries 3-3
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
SI B Oj C A	(Summary) horted roken pened racked/Fractured rcing/Sparking orn schanical Failure	34.0% 25.6% 22.9% 5.1% 4.4% 4.2% 3.6%		
able Si	norted	31.5%	28.8%	Sources:2 Short (20609-000,Qty:3), Cable Shorted From Pin 6 To Pin 25 (10722-000,Qty:1), Cable Shorted-Solder Bridge Vendor Defect (10722-000,Qty:1)
O	pened	19 <b>.2%</b>	17.5%	Opened (20609-000,Qty:4), Open Circuits (10722-000,Qty:1)
C	racked/Fractured	15.1%	13.8%	Cracked/Fractured (20609-000,Qty:1), Fractured Stranded Wire (10722-000,Qty:1)
A	rcing/Sparking	13.7%	12.5%	Arcing (20609-000,Qty:10)
Wo	orn	9.6%	8.8%	Worn Out (20609-000,Qty:7)
Bi	roken	8.2%	7.5%	Broken (20609-000,Qty:6)
Cł	haffed	2.78	2.5%	Frayed (20609-000,Qty:1), Chaffed (20609-000,Qty:1)
able	Nknown Assembly pened	69.0%		Unknown (20609-000,Qty:1) (20609-000,Qty:6) Sources:2 Open Paths-Mask/Etch Process Flaws (10722-000,Qty:1),
Br	roken	19.7%	14.3%	<pre>Open-Fractured Path (10722-000,Qty:1), Seven Open Wires (10722-000,Qty:1), Circuit Opens-Cracked Foil, Misaligned Pins (10722-000,Qty:6) Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:5), Broken/Separated - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:7)</pre>
Wi	re Failure	4.28	3.1%	Wire Harness Damaged - Inop/Unserviceable (25101-000,Qty:3)
Ag	ed/Deteriorated	4.2%	3.1%	Deteriorated - Broken Cable(s) (25101-000,Qty:2), Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
Wa	rn	1.4%	1.0%	Worn - Broken/Damaged (25101-000,Qty:1)
Lo	ose	1.4%	1.0%	Loose Wire(s) - Inop/Unserviceable (25101-000,Qty:1)
In	duced		23.5%	<pre>Fell Off or Lost - Missing (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:2) (25101-000,Qty:8), Missing (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Fell Off or Lost (25101-000,Qty:2), Improper Alignment - Broken/Damaged (25101-000,Qty:1), Improper Installation - Inop/Unserviceable (25101-000,Qty:2), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Safety Wire/Key Failure - Broken/Damaged (25101-000,Qty:1)</pre>
Un	known		4.1%	Unknown (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2)

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art Failure	Norm	Fail	Data
esc. Mode/Mech			Source(s)/Details
able,Electrical,Power Opened	55.0%	55.0%	Sources:2 Open Circuit (24996-000,90.0%), Open Circuit and Other (24997-000,18.0%)
Shorted	45.0%	45.0%	Short to Ground (24996-000,9.0%), Short to Power (24996-000,1.0%), Short Circuit(Insulation Failure) to Gr. or power (24997-000,72.0%)
able,Fiber Optic Induced		100.0%	Sources:1 Parallel Construction (23413-000,Qty:6), Contractor Activity (23413-000,Qty:1), Backhoe Digging (23413-000,Qty:3), Gunshot (23413-000,Qty:2), Hurricane (23413-000,Qty:3), Flood Damage (23413-000,Qty:1), Ice Crush (23413-000,Qty:1), Vandalism (23413-000,Qty:1)
able,Flex Opened	100.0%	100.0%	Sources:1 Pin 47 Open-Excessive Axial Force On Pin (10722-000,Qty:1), Elect. Opens At Pins 38 And 54-Flex Tape Etch Out (10722-000,Qty:1), Opens-Vendor Process Flaws (10722-C00,Qty:2)
able,Harness Opened	30.6%	30.6%	Sources:1 Open (24992-000,30.6%)
Shorted	30.6%	30.6%	Short (24992-000,30.6%)
Mechanical Failure	20.5%	20.5%	Mechanical (24992-000,20.5%)
Overheated	18.3%	18.3%	Overheat (24992-000,18.3%)
able,Printed Wiring Cracked/Fractured	100.0%	100.0%	Sources:1 Fractured Paths-Faulty Bend Operation (10722-000,Qty:5)
able,Strap,Loop Broken	66.7%	66.7%	Sources:1 Part Struck/Damaged - Broken/Damaged (25101-000,Qty:2)
Aged/Deteriorated	33.3%	33.3%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
able,Wire Broken	100.0%	50.0%	Sources:2 Wire Fracture-Low Frequency Cyclic Overstress (10722-000,Qty:1), Broken-Cyclic Overstress (10722-000,Qty:1)
Induced		50.0%	Part Struck/Damaged - Missing (25101-000,Qty:6)

FMD-91			Failure Distribution Summaries	3-27
Part Failure	Norm	Fail	Data	
Desc. Mode/Mach	Dist.	Dist.	Source(s)/Details	
Cable, Wire, CiCoil			Sources:1	
Wire Failure	100.0%	100.0%	Wire Failed In Tension-Mechanical Overstress (10722-000,Qty:1)	
Cable,Wire,Core Broken	87.2%	86.2%	Sources:1 Broken (25464-000,Qty:150)	
Worn	4.78	4.6%	Worn, Chaffed, Frayed, or Torn (25464-000,Qty:8)	
Lamp Failure	2.3%	2.3%	Burned Out or Defective Lamp, (25464-000,Qty:4)	
Contact Failure	1.7%	1.7%	Contact/Conn Defect (25464-000,Qty:3)	
Binding/Sticking	1.7%	1.78	Binding, Stuck or Jammed 25464-000,Qty:3)	
Leaking	1.2%	1.1%	Leaking Internal or External (25464-000,Qty:2)	
Loose	1.2%	1.1%	Loose, Damaged, or Missing Har (25464-000,Qty:2)	
Other (<%2)		1.1%	(	
Cracked/Fractured		0.68	Cracked (25464-000,Qty:1)	
Cut/Scarred/Punctured		0.6%	Cut (25464-000, Qty:1)	

Cable,Wire,Electrical,Low Power, Shorted		Terminals :Short to Grou Terminals :Short to Powe Short to Ground (24997-0 Power (24997-000,30.0%),	ound (24996-000,45.0%), wer (24996-000,30.0%), W/Out ind (24996-000,70.0%), W/Out r (24996-000,30.0%), With Terminals: 00,45.0%), With Terminals: Short to Without Terminals: Short to Ground ut Terminals: Short to Power
Connector Failure	6.2%	With Terminals: Conducto     (24997-000,25.0%)	r br <b>eakage @</b> Terminal
Broken	6.2%	<pre>% W/Terminals: Conductor B (24996-000,25.0%)</pre>	reakage @ Terminal (Open)
Opened	0.5%	% W/Out Terminals :Open an Terminals: Open and Othe	d Other (24996-000,1.0%), Without r (24997-000,1.0%)

Cable, Wire, Stranded Cracked/Fractured Sources:1 100.0% 100.0% Fracture-Cyclic Fatigue (10722-000,Qty:1)

Cable, Wire, Tensile Wire Failure Sources:1 100.0% 100.0% Wire Fractured-Tensile Loading (10722-000,Qty:1)

t Failure		Fail	Data
sc. Mode/Mach	Dist.	Dist.	Source(s)/Details
Shorted	32.8%	29.5%	Sources:8 Low Z (24991-000,67.0%), Short (17867-000,Qty:1) (17867-000,Qty:1) (17667-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:2) (17867-000,Qty:3) (17867-000,Qty:5) (24417-000,NR) (24902-000,Qty:3) (24997-000,NR), Short-Dielectric Crack (10722-000,Qty:1), Short-Improper Installation On Board (10722-000,Qty:2), Low Insulation Resistance (24417-000,NR), High Leakage Current (electrolytic styles) (24417-000,NR), Short-Crack In Element (10722-000,Qty:1), Short-Reflowed End Cap Solder (10722-000,Qty:1), Low Insulation resistance (24997-000,NR)
Broken	24.3%	21.9%	Broken Leads-Copper Fatigue (25001-000,Qty:1), Broken/Damaged (17867-000,Qty:1) (17867-000,Qty:1), Broken (25464-000,Qty:178)
Intermittent Operation	17.8%	16.0%	Unstable (24992-000,77.5%), Intermittent (17867-000,Qty:1) (17867-000,Qty:1) (24417-000,NR), Loose Element & Fractured Interconnects-Vibration (10722-000,Qty:1)
Opened	8.1%	7.3%	High Z (24991-000,33.0%), Open (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:2) (24417-000,NR) (24992-000,4.0%) (24997-000,NR)
Change in Capac.	7.9%	7.1%	Out Of Tolerance (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:3) (17867-000,Qty:5) (17867-000,Qty:6), Out Of Tolarance (17867-000,Qty:2), Capacitance Drift (24417-000,NR), Capacitance Incorrect (25464-000,Qty:162)
Worn	6.1%	5.5%	Worn/Chaffed/Frayed/Torn (25464-000,Qty:199)
Leaking	2.9%	2.6%	Leaky (17867-000,Qty:1) (17867-000,Qty:1) (17667-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:4) (17867-000,Qty:5), Leaking (25464-000,Qty:15)
Induced		7.6%	Engineering Problem (17867-000,Qty:1) (17867-000,Qty:10), Weak/Low Performance (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:3) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:2) (17867-000,Qty:10), Wrong Value (17867-000,Qty:1), Performance Variation (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:2) (17867-000,Qty:2), Nois (17867-000,Qty:1) (17867-000,Qty:1)
Unknown		0.25	Unknown (17867-000,Qty:1) (25464-000,Qty:4)
Other (<%3) Drift		2.2% 0.9%	Drift (24992-000,2.5%), Fails to Ture or Drifts (25464-000,Qty:5), Fluctuates, Unstable or Errati (25464-000,Qty:14)
Noisy		0.8%	Noisy (24992-000,2.5%) (25464-000,Qty:15)
Oscillating		0.1%	Oscillating (17867-000,Qty:1)
Cracked/Fractured		0.1	Crackød (25464-000,Qty:5)
Loose		<0.1	Loose/Damaged/Missing (25464-000,Qty:2)
Lamp Failure		<0.1%	Burned Out Or Defective Lamp, (25464-000,Qty:2)
Burst/Ruptured		<0.1	Burst/Ruptured (25464-000,Qty:1)
Dielectric Breakdown		NR	Dielectric Breakdown (24417-000,NR)

FMD-91 Failure Distribution Summaries				
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	itor (continued) Ther (continued)			
	Change in Value		NR	Change in Value (24997-000,NR)
•	tor,Aluminum (Summary)	40.38		
	orted bened	49.3% .4.0%		
	al Failure Tift	15.4% 1.3%		
	tor,Aluminum,Electrolytic	38.0%	38.0%	Sources:1 Short (25038-000,38.0%)
Se	al Failure	31.0%	31.0%	Electrolyte Loss/Seal (25038-000,31.0%)
Op	veneci	31.0%	31.0%	Open (25038-000,31.0%)
-	tor, Aluminum, Electrolytic, Fo. Norted		49.3%	Sources:5 Short-Ruptured/Cracked Dielectric (25016-000,NR), High
				Disipation Factor-Defective Termination (25016-000,NR), High Disipation Factor-Impared Seal (25016-000,NR), Low Z (24991-000,70.0%), Short (24993-000,30.0%) (24997-000,33.0%), Excessive Leakage Current (24993-000,15.0%)
Op	ened	35.0%	32.3%	Open-Defective Termination (25016-000,NR), High Z (24991-000,30.0%), Open (24993-000,40.0%) (24997-000,27.0%)
Se	al Failure	9.7%	9.0%	Electrolyte leakage and seals (24997-000,27.0%)
Dr	ift	1.8%	1.7%	Low Capacitance-Impared Seal (25016-000,NR), Decrease In Capacitance (24993-000,5.0%), Decrease In Capacitance-Vaporization of Electrolyt (24417-000,NR)
Un	known		7.7%	Unknown (24993-000,10.0%) (24997-000,13.0%)
Capaci	tor,Fixed			Sources:5
Sh	orted	48.9%	48.6%	Short-Dielectric strength (25000-000,Qty:1), Short (24990-000,80.0%) (24990-000,99.0%) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:17) (25027-000,Qty:1), Short-Ruptured/Cracked Dielectric (25016-000,NR)
Cp	ened	28.5%	28.4%	Open (24990-000,1.0%) (24990-000,20.0%) (25000-000,Qty:6) (25000-000,Qty:9), Open-Defective Termination (25016-000,NR), Open-Insufficient Lead To Element Attach-Internal (10722-000,Qty:1)
Dr	ift.	21 <b>.9%</b>	21.8%	Parameter Drift-Intermittent (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:6), Parameter Drift-Power Factor (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:7) (25000-000,Qty:20) (25000-000,Qty:57), Parameter Drift-General (25000-000,Qty:1) (25000-000,Qty:2), Parameter Drift-Insulation Resistance (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:6) (25000-000,Qty:8) (25000-000,Qty:10) (25000-000,Qty:23) (25000-000,Qty:67), Parameter Drift-Delta C (25000-000,Qty:2) (25000-000,Qty:2)

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art.	Failure Distribution Su	Norm	Fail	Data
esc.	Nodu/Mech			Source(s)/Details
	tor, Fixed (continued)			
Dr	ift (cont.inued)			(25000-000,Quy:3) (25000-000,Quy:6) (25000-000,Quy:11) (25000-000,Quy:32) (25000-000,Quy:53) (25000-000,Quy:72)
Co	rroded	9.78	0.7%	Corresion (25000-000, Qty:14)
Se	al Failure	<0.1%	<0.1%	Seal æak#ge (25000-000,Qty:1)
In	duced		0.3%	Mechanical Damage (25000-000,Qty:6)
Un	kriown		°.2₩	Unktiown (25000-000, Qt y:3)
Ot	her Change in Capac.		0.0% NR	keduced Capacitance-Ruptures/Cracked Dielectric (25016-000,1%), "elamination, Reduced Capacitance-Impared Scal (25016-000,NR)
	High Disipation Factor		٨R	High Dissipation Factor-Defective Terminatio. (25016-000,NP)
	Seal/Gaskot Failure		NR	Low Insulation Resistance-Impared Seal (25016-000,NR)
Sh	tor,Fix⊨d,Ceramic orted			Sources:10 Short (24417-000,NR) (24992-060,75.0%) (24993-000,50.0%) (24994-000.35.0%) 74997-000,70.0%) (25000-000,019:1) (25000-000,019:1) (25000-000,019:1) (25000-000,019:3) (2500-000,019:8) (25000-000,019:8) (25000-000,019:2) (25000-000,019:10) (25000-000,019:2) (25000-000,019:23) (25000-000,019:26) (25000-000,019:26), Short = Dielectric Strength (25000-000,019:2) (25000-000,014:1%), Short (Dielectric Breakdown) (25038-000,49:0%)
Dr	ift	26.7	23.64	Parameter Drift - change in C (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:5) (25000-000,Qty:8) (25000-000,Qty:9) (25000-000,Qty:1) (25000-000,Qty:32), Parameter Drift - Power Factor (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:5) (25000-000,Qty:6) (25000-000,Qty:1) (25000-000,Qty:10) (25000-000,Qty:10), Parameter Drift - Insul. Resis (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:7) (25000-000,Qty:2) (25000-000,Qty:3), Parameter Drift - general (25000-000,Qty:2), Parameter Drift-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2), Parameter Drift-Power Factor (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3), Parameter Drift-Power Factor (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty

		······································		Failure Distribution Summaries	3-3
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	∋ata Source(s)/Details	
Capaci	tor, Fixed, Ceramic (contin	ued)			
Dr	ift (continued)			(25000-000,qty:17) (25000-000,qty:39) (25000-000,qty:32),	
აp	pened	21.1%	18.6%	Open (24417-000,NR) (24992-000,25.0%) (24993-000,5.0%) (24994-000,20.0%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:8) (25000-000,Qty:8) (25000-000,Qty:8) (25000-000,Qty:8) (25038-000,18.0%), High Z (24991-000,50.0%), Plate Open-Thin Metallization (10722-000,Qty:2) (10722-000,Qty:2), Open Circuit (24997-000,5.0%)	
Co	ontaminated	4.28	3.7%	Drift Surface Contamination (25038-000,4.0%), Low Insulation Registance Surf. Contam. (25038-000,29.0%)	
1.e	aking	1.34	1.19	Leaky At Gigh Temperature (10722-000,Qty:1)	
In	duced		11.3%	Mechanical Damage (25000-000,Qty:8) (25000-000,Qty:8), Damaged (25027-000,Qty:1)	
Un	known		<b>`.</b> 6¶	Unknown (24993-000,5.0%)	
-	tor,Fixed,Chip wened	100.0%	100.0%	Sources:1 Open-Fractured (25001-000,Qty:3)	
	tor,Fixed,Glass orted	60.0%	60.04	Sources:1 Short (24994-000,60.0%)	
0p	ened	35.0€	35.0%	Oper. (24994-000,35.0%)	
Dr	ift	5.0%	5.0%	Drift (24994-000,5.0%)	
-	tor, Fixed, Mica, Dipped ened	65.0%	65.0%	Sources:1 Open (24994-000,65.0%)	
Dr	ift	20.0%	20.0%	Drift (24994-000,20.3%)	
Sho	orted	15.0%	15.0%	Short (24994-000,15.0%)	
	tor,Fixed,Mica/Glass orthd	71.8%		Sources:3 Short (24993-000,70.0%), Short-Dielectric Breakdown (24417-000,NR), Short( Dielectric Breakdown, Silver Migration) (25038-000,87.5%)	
Ope	ened	12.8	12.54	Open (24993-000,15.0%) (25038-000,12.5%)	
Cha	ange in Capac.	10.3	10.0%	Change in C -Moisture Absorption- (25038-000,25.0%)	
Cha	ange in Value	5.1	5.0%	Change in Value (24993-000,10.0%)	
Uni	known	*=***	2.54	Unknown (24993-000,5.0%)	

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	و هم ورور الم الم المستخدم ومستقل في المار و المستقل الم الم الم الم		-	
ert Failu Failu Failu		Norm Dist.	Fai) Dist.	Data Source(s)/Details
pacitor,Fi Shorted	xed, Paper	63.2%	60.0%	Sources:2 Short-Ruptured/Cracked Die Mactric (25016-000,NR), Short (24953-000,30.0%) (24993-000,90.0%)
Opened		36,8%	35.0%	Open-Defective Termination (25016-000,NR), Open (24993-000,5.0%) (24993-000,65.0%)
Pnknown			5.0%	Unknown (24993-000,5.0%) (24993-000,5.0%)
Other Eigh	Disipation Factor		0.0% NR	High Disipation Factor-Defective Termination (25016-000,NR)
Seal/	Gasket Failure		NK	Low Insulation Resistan( - Impaired Seal (25016-000,NR)
apacitor,Fi Opened	xed,Paper/Plastic	38.34	37.9%	Sources:4 Oper. (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:7) (25000-000,Qty:10) (25000-000,Qty:32) (25038-000,47.0%), High Z (24991-000,59.0%)
Dr!ft		33.3%	32,9%	<pre>Parameter Drift-Delta C (25000-000,Qty:1) (25000-600,Qty:2) (25000-000,Qty:2) (25000-000,Qty:4) (25000-000,Qty:5) (25000-000,Qty:6) (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:24) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:5), Parameter Drift- Power Factor (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:6) (25000-000,Qty:12) (25000-000,Qty:2), Parameter Drift-General (25000-000,Qty:2), Parameter Drift-Insulation Resistance (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:4) (25000-000,Qty:2), Capacitance Drift (24417-000,NR), Instability with Temperature (24417-000,NR), Capacitance Shift (2503d-000,42.0%)</pre>
Shorted		25.8%		<pre>Short-Dielectric Strength (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:9) (25000-000,Qty:1), Short-Dielectric strength (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:1), Short-Flashover (25000-000,Qty:6) (25000-000,Qty:6), Short (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:5) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:20) (25000-000,Qty:2) (25030-000,11.0%), Low Z (24991-000,41.0%), High Dissipation Factor (24417-000,NR), Low Insulation Resistance (24417-000,NR)</pre>
Corroded		2.28	2.14	Corrosion (25000-000,QLy:2) (25000-000,QLy:3) (25000-000,QLy:40)
Seal Fail	lure	0.4%	0.4%	Seal Leakages (25000-000,Qty:1) (25000-000,Qty:8)
Induced			0.7%	Mechanical Damage (25000-000,Qty:5) (25000-000,Q'y:9), Part Struck/Damaged - Broken/Damaged (25000-000,Qty:1)
Unknown			0.5%	Unknown (25000-000, Qty:10)

FMD-91			Failure Distribution Summaries 3-33
Part Failure	Norm	Fail	Data
Desc. Mode/Mech	Dist.	Dist.	Source(s, /Details
Capacitor, Fixed, Plastic Shorted	41.7%	39.34	Sources:3 Short (24990-000,50.0%) (24994-000,35.0%) (24997-000,11.0%), Low I.R. (24997-000,10.0%), High Dissipation factor (24997-000,10.0%)
Opened	40.6%	38.3%	Open (24990-000,50.0%) (24994-000,15.0%) (24997-000,47.0%)
Drift	17.7%	16.7%	Drift (24994-000,50.0%)
ïnduced		5.7%	Quality defects (24997-000,16.0%)
Capacitor,Fixed,Polycarb Shorted	60.0%	50.0%	Sourc <b>es:1</b> Short (24992~000,60.0%)
Opened	40.0%	40.0%	Open (24992-000,40.0%)
Capacitor,Fixed,Tantalum Shorted	52.6%	50.4%	Sources:4 Short (24992-000,60.0%) (24993-000,35.0%) (24997-000,31.0%) (25000-000,0ty:2) (25000-000,Qty:14) (25000-000,Qty:30) (25000-000,Qty:91), Excessive Leakage Current (24993-000,10.0%), High leakage current (24997-000,15.0%)
Opened	29.3%	28.1%	Open (24992-000,40.0%) (24993-000,35.0%) (24997-000,10.5%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:6) (25000-000,Qty:6), High Impedance & other (24997-000,17.5%)
Drift	10 <b>.8%</b>	10.4%	Para. Drift- Power Factor (25000-000,Qty:1) (25000-000,Qty:48), Para. Drift- Delta C (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:12), Para. Drift- Insulation Res. (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:5) (25000-000,Qty:18), Para. Drift- Delta R (25000-000,Qty:1), Decrease In Capacitance (24993-000,5.0%)
Intermittent Operation	7.1%	6.8%	Intermittent (24997-000,26.0%) (25000-000,Qty:1) (25000-000,Qty:2)
Corroded	0.2%	0.2%	Misc Corrosion (25000-000,Qty:2)
Unknewn		4.2%	Unknown (24993-000,15.0%) (25000-000,Qty:2) (25000-000,Qty:3)
Capacitor, Fixed, Tantalum, Slug Shorted	100.0%	100 <b>.0%</b>	Sources:2 Short-External Overstress (10722-000,Qty:1)
Other Opened		0.0% NR	Open (24417-000,NR)

L. 55	11	Capacitance

NR Loss of Capacitance (24417-000,NR)

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art	Failure Mode/Mech	Norm	Fail Dist.	Data Source(s)/Details
	cor,Tantalum (Summary) prted	61.9%		
	ened	16.0%		
	ift.	11.3%		
	termittent Operation gh Leakage Current	4.6% 4.1%		
	ss of Capacitance	2.2%		
apacit	or, Tantalum, Electrolytic, Fo	oil		Sources:4
Sho	orted	42.0%	42.0%	Low Z (24991-000,70.0%), Short (24994-000,10.0%) (25038-000,31.0%), Leakage Current (25038-000,15.0%)
Ope	ened	23.3%	23.3%	High Z (24991-000,30.0%), Open (24994-000,40.0%)
Dri	lft	16.7%	16.7%	Drift (24994-000,50.0%), Decrease In
				Capacitance-Vaporization of Electrolyt (24417-000,NR)
Int	ermittent Operation	12.2%		Intermittent/Open (25038-000,36.5%)
Los	ss of Capacitance	5.8%	5.8%	Loss of Electrolyte (High Impedance) (25038-000,17.5%)
	cor,Tantalum,Electrolytic,So orted		67.3%	Sources:6 Short-Ruptured/Cracked Dielectric (25016-000,NR), High
				Disipation Factor-Defective Termination (25016-000,NR), Low
				Insulaution Resistance-Impared Seal (25016-000,NR), Low Z (24991-000,83.C%), Short (24994-000,55.0%)
				(25038-000,31.0%), Shorted Dielectric (24417-000,NR),
				Short-Faulty Cap/Overstress (10722-000,Qty:1)
Ope	aned	14.5%	14.5%	Open-Defective Termination (25016-000,NR), High Z
•				(24991-000,17.0%), Open (24994-000,5.0%) (25038-000,36.0%),
				Open Internal Connections (24417-000,NR)
Dri	lft	10.0%	10.0%	Drift (24994-000,40.0%)
Hiq	gh Leakage Current	8.3%	8.3%	High Leakage Current (25038-000,33.0%)
Otł	ner		0.0%	
	Intermittent Operation		NR	Intermittent Internal Connections (24417-000,NR)
apacit	or,Variable,Air Dielectric			Sources:1
Int	ermittent Operation	100.0%	100.0%	Intermitent-Crack (25001-000,Qty:1)
-	or, Variable, Parallel Plate			Sources:1
Lea	uking	100.0%	100.0%	Won't Hold Charge (25027-000,Qty:3)
apacit Dri	or,Variable,Piston	60 08	60 0#	Sources:1 Drift (24994-000,60.0%)
	rted			Short (24994-000, 30.0%)
310				Open (24994-000,10.0%)
Ope				

Part	Failure	Norm	Fail	Failure Distribution Summaries 3-
Parc. Desc.			Dist.	
	age, Stake roken	88.9%	80.0%	Sources:1 Broken/Damaged (25101-000,Qty:4), Oversize - Broken/Damaged (25101-000,Qty:1), Broken/Separated - Inop/Unserviceable (25101-000,Qty:3)
Be	ent/Dented/Warped	11.1%	10.0%	Warped/Bent - Broken/Damaged (25101-000,Qty:1)
Ur	ıknown		10.0%	Unknown (25101-000,Qty:1)
	Carrying racked/Fractured	23.5%	16.7%	Sources:1 Cracked (25101-000,Qty:1), Vibration - Cracked (25101-000,Qty:3)
Ου	ut of Adjustment	23.5%	16.7%	Out Of Adjustment - Inop Man Elevation (25101-000,QLy:2), Out Of Adjustment - Noisy (25101-000,Qty:2)
Br	roken	23.5%	16.7%	Broken/Damaged (25101-000,Qty:4)
Wa	orn	17.6%	12.5%	Worn - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2)
Ba	ttery Failure	5.9%	4.2%	Batteries Boiling (25101-000,Qty:1)
Bi	nding/Sticking	5.9%	4.2%	Vibration - Binding/Sticking (25101-000,Qty:1)
In	lduced		29.2%	Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:2), Improper Maintenance - Broken/Damaged (25101-000,Qty:3), Overtorqued - Inop Man Elevation (25101-000,Qty:1), Improper Installation - Broken/Damaged (25101-000,Qty:1)
	Collimator acked/Fractured	80.0%	66.7%	Sources:1 Cracked/Split-Cracked (25101-000,Qty:1), Cracked (25101-000,Qty:2) (25101-000,Qty:5)
Br	oken	20.0%	16.7%	Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Ind	duced		16.7%	Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1)
	e Ray Tube duced		<0.1%	Sources:1 Focusing Degradation (22540-000,NR)
Oti	her Mechanical Overstress			Mechanical Overstress (22540-000,NR)
	Seal/Casket Failure		NR	Degradation of Seals (22540-000,NR)
	e Ray Tube,Disply Monitor t of Spec.	71.4%		Sources:1 Out of Tolerance (20609-000,Qty:5)
Bro	oken	28.6%	15.4%	Broken (20609-000,Qty:2)
Uni	known		46.2%	Unknown (20609-000, Qty:6)

Part	Failure	Norm	Fail	Data
Desc.	Mode/Mech	Dist.	Dist.	Source(s)/Details
	e Ray Tube, Display Unit ower Supply Failure	46.0%	46.0%	Sources:2 Power Supply (24996-000,46.0%) (24997-000,46.0%)
	oss of Control	34.0%		Control and Misc. (24996-000,34.0%) (24997-000,34.0%)
Pe	erformance Degradation	20.0%		C.R. Tube (24996-000,20.0%) (24997-000,20.0%), CR Tubes-Loss of Trace, Decline in Illumination (24996-000,NR) (24997-000,NR), LED's-Decline in Illumination, Fail to Light (24996-000,NR) (24997-000,NR), Liquid Crystal-Decline in Illumination, Instability (24996-000,NR) (24997-000,NR), Vacuum Fluorescent-Fail to Light (24996-000,NR) (24997-000,NR), Plasma-Loss of Illumination (24996-000,NR) (24997-000,NR)
Ot	her Open Filament		C.0% NR	
Chain		100.08	20.08	Sources:1
	nt/Dented/Warped			Collapsed/Bent (25101-000,Qty:1)
lr	duced		40.0%	<pre>Item Abuse/Neglect - Collapsed/Bent (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:1)</pre>
Ur	iknown		40.0%	Unknown (25101-000,Qty:2)
Charge De	er Graded Output	73.8%	48.0%	Sources:1 Degraded - Low Output (18175-000,29.0%) (18175-000,29.0%), Degraded - High Output (18175-000,6.0%) (18175-000,6.0%), Degraded - Erratic Output (18175-000,13.0%) (18175-000,13.0%)
No	Output	26.2%	17.0%	Catastrophic-No Output (18175-000,34.0%)
Un	known		35.0%	Unknown (18175-000,18.0%) (18175-000,18.0%) (18175-000,34.0%)
	r,Rectifier-Stationary,Ferro graded Output			Sources:1 Degraded - Low Output (18175-000,37.0%), Degraded - High Output (18175-000,3.0%), Degraded - Erratic Output (18175-000,12.0%)
Un	known		48.0%	Unknown (18175-000,13.0%) (18175-000,35.0%)
	r,Rectifier-Stationary,Magne graded Output			Sources:1 Degraded - Low Output (18175-000,27.0%), Degraded - High Output (18175-000,1.0%), Degraded ~ Erratic Output (18175-000,20.0%)

FMD-				Failure Distribution Summaries 3-3
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
-	er,Rectifier-Stationary,Silf graded Output			Sources:1 Degraded - Low Output (18175-000,24.0%), Degraded - High Output (18175-000,14.0%), Degraded - Erratic Output (18175-000,7.0%)
Ur	hknown		55.0%	Unknown (18175-000,20.0%) (18175-000,35.0%)
	er,Stationary egraded Output	58.5%	48.0%	Sources:1 Degraded - Low Output (18175-000,29.0%), Degraded - High Output (18175-000,6.0%), Degraded - Erratic Output (18175-000,13.0%)
Nc	Output	41.5%	34.0%	Catastrophic-No Output (18175-000,34.0%)
Un	nknown		18.0%	Unknown (18175-003,18.0%)
co Co	er ontact Failure	47.5%	47.5%	Sources:2 Contact Failure (24993-000,95.0%)
Sh	orted	25.0%	25.0%	Short (24992-000,50.0%)
Op	ened	25.0%	25.0%	Open (24992-000,50.0%)
Co	il Failure	2.5%	2.5%	Coil Failure (24993-000,5.0%)
Op Do Cr De Br Me	t Breaker (Summary) ens Without Command es Not Open acked/Fractured graded Operation oken chanical Failure termittent Operation	29.1% 27.5% 11.6% 8.7% 8.7% 8.4% 6.0%		
	t Breaker ens Without Command	27.7%		Sources:15 Spurious Open (24990-000,45.0%), Open (22540-000,38.0%) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-005,Qty:1) (24992-000,35.0%) (24992-000,38.0%), Catastrophic-Opens Without Command (18175-000,1.0%) (18175-000,1.0%) (18175-000,2.0%) (18175-000,2.0%) (18175-000,3.0%) (18175-000,1.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,12.0%), Catastrophic-Fails To Carry Current (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%), Catastrphoic-Opens Without Command (18175-000,1.0%), Catastrphoic-Fails To Carry Current (18175-000,1.0%), Catastrophic-Does Not Close On Command (18175-000,1.0%), Premature Opening (24996-000,42.0%), Open Circuit (24997-000,38.0%), Premature trip (24997-000,16.0%)
Do	es Not Open	26.24		Fails to Open (24990-000,40.0%), Close (24992-000,65.0%), Short (22540-000,38.0%) (24992-000,38.0%) (24997-000,16.0%), Catastrophic-Does Not Open On Command (18175-000,3.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,9.0%) (18175-000,9.0%) (18175-000,1.0%) (18175-000,9.0%) (18175-000,9.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,2.0%) (18175-000,2.0%) (18175-000,4.0%) (18175-000,6.0%), Catastrophic-Breakdown Across Open Pole-Intern (18175-000,1.0%) (18175-000,2.0%) (18175-000,4.0%) (18175-000,6.0%), Catastrophic-Breakdown Across Open Pole-Extern (18175-000,1.0%) (18175-000,4.0%),

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t				
c. 1	Mode/Mech	Dist.	Dist.	Source(s)/Details
	Breaker (continued)			
Doe	s Not Open (continued)			Catastrophic-Closes Without Command (18175-000,1.0%)
				(18175-000, 1.08) $(18175-000, 1.08)$ $(18175-000, 1.08)$
				(18175-000,1.0%) (18175-000,1.0%), Catastrophic-Does Not
				Break The Current (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%), Catastrophic-Breakdown
				(18175-000,1.0%) (18175-000,1.0%), Catastrophic-Breakdown Between Poles-Exter (18175-000,1.0%) (18175-000,6.0%),
				Catastrphoic-Does Not Open On Command (18175-000,5.0%),
				Catastrphoic- Does Not Break The Current (18175-000,1.0%),
				Catastrphoic-Breakdown To Earth (Internal) (18175-000,1.0%) Catastrphoic-Breakdown Across Open Pole (Intern)
				(18175-000, 2.0%), Catastrphoic-Breakdown Across Open Pole
				(Extern) (18175-000,1.0%), Catastrophic-Breakdown To
				Earth-Inter (18175-000, 1.0%) (18175-000, 1.0%),
				Catastrophic-Breakdown To Earth-Extern (18175-000,1.0%), Shorted/Grounded (23038-002,Qty:1) (23038-002,Qty:1)
Deg	raded Operation	19.3%	12.1%	Degraded (18175-000,32.0%) (18175-000,67.0%) (18175-000,68.0%) (18175-000,69.0%) (18175-000,70.0%)
				(18175-000,70.0%) (18175-000,71.0%) (18175-000,72.0%)
				(18175-000,75.0%) (18175-000,78.0%) (20609-000,Qty:9), Weak
				(23038-004,Qty:1)
Cra	cked/Fractured	10.6%	6.6%	Broken/Fractured (23038-001,Qty:2) (23038-001,Qty:3) (23038-001,Qty:3) (23038-002,Qty:1) (23038-006,Qty:3),
				(23038-001, 019:5) (25038-002, 019:1) (25058-000, 019:5), Cracked (23038-004, 019:2), Broken Fractured
				(23038-006,Qty:1)
Bro	ken	8.3%	5.2%	Broken (23038-002,Qty:3) (23038-004,Qty:1)
510				(23038-004,Qty:1) (23038-004,Qty:10) (23038-005,Qty:1)
				(23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:3) (23038-005,Qty:4)
Mec	hanical Failure	8.0%		Mechanical Failure Of Tripping Device (24993-000,70.0%)
Unk	nown		11.4%	Unknown (18175-000,NR) (23038-001,Qty:3) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1)
				(23038-002,Qty:3) (23038-004,Qty:1) (23038-004,Qty:1)
				(23038-004,Qty:1) (23038-004,Qty:3) (23038-004,Qty:9)
				(23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:2) (23038-005,Qty:3)
				(23038-005, Qty:2) (24993-000, 30.0%) (24997-000, 19.0%)
Ind	uced		2.18	Caused By Other Dev. (23038-001,Qty:1) (23038-001,Qty:1)
11.00				(23038-005, gty:1) (23038-005, gty:1), Overload
				(23038-001,Qty:1) (23038-004,Qty:1), Wrong Part (23038-004,Qty:1) (23038-004,Qty:3)
				(23038-004,019:1) (23038-004,019:3)
Oth	er (<\$5)		23.94	
	Loss of Control		3.1%	Control Inoperative (23038-001,Qty:1) (23038-002,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1) (23038-006,Qty:1)
			2 04	Unstable (22540-000,19.0%) (24992-000,19.0%), Intermittent
	Intermittent Operation		3.04	(23038-004,Qty:1) (24997-000,11.0%)
	Burred		2.98	Burred/Charred (23038-003,Qty:1) (23038-003,Qty:1)
	No Operation		2.6	Failures In Operation (24996-000,32.0%)
	Fails to Close		1.8%	Fails to Close (24990-000,5.0%) (24996-000,5.0%),
				Catastrophic-Does Not Close On Command (18175-000,NR)
				(18175-000,10.0%) (18175-000,13.0%) (18175-000,13.0%) (18175-000,13.0%) (18175-000,15.0%) (18175-000,16.0%)
				(18175-000,18.0%) (18175-000,25.0%), Catastrophic-Does Not
				Make The Current (18175-000, 1.0%) (18175-000, 1.0%)
				(18175-000,1.0%) (18175-000,2.0%), Catastrphoic-Does Not Close On Command (18175-000,15.0%)
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FMD-	91			Failure Distribution Summaries 3
Part Desc.	Failure Mode/Mech	Norm Di <b>s</b> t.	Fail Dist.	Data Source(s)/Details
	t Breaker (continued)	·		
Űť.	her (continued)			Contact/Conn Defect (23038-006,Qty:1)
	Seized		1.5%	Seized (23038-002,Qty:3), Bind/Friction/Seized (23038-002,Qty:2)
	Worn		1.4%	Worn Excessively (23038-001,Qty:1) (23038-004,Qty:8)
	Lamp Failure		1.4%	No Indicating Light (23038-003,Qty:1)
	Arcing/Sparking		1.2%	Arcing And Damage (24990-000,10.0%), Arcing (22540-000,5.0%) (24992-000,5.0%)
	Loss of Power		0.6%	Electrical Pwr Loss (23038-001,Qty:1) (23038-001,Qty:1)
	No Output		0.6%	No Output (23038-001,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1)
	Insulation Failure		0.4%	Insulation Breakdown (23038-002,Qty:1) (23038-004,Qty:1)
	Bent/Dented/Warped		C.4%	Dented (23038-005,Qty:2)
	Drift		0.3%	Fluctuates Unstable (23038-002,Qty:1)
	Jammed/Stuck		0.3%	Jammed (23038-002,Qty:1)
	Incorrect Voltage		0.3%	Incorrect Voltage (23038-002,Qty:1)
	Burned/Charred		0.3%	Burned/Charred (23038-004,Qty:2)
	Blown Fuse		0.2%	Fuse Blown (23038-005,Qty:1)
	Breakdown Between Poles		<0.1%	Catastrophic-Breakdown Between Poles-Exter (18175-000,1.0%), Catastrophic-Breakdown Across Open Pole-Intern (18175-000,2.0%)
	Breakdown to Earth		<0.1%	Catastrophic-Breakdown To Earth-Extern (18175-000,1.0%)
lrcuit	Breaker,Magnetic			Sources:1
Sti	ick Open	38.8%	33.2%	Stuck Open (20609-000,Qty:62)
No	Movement	18.1%	15.5%	No Movement (20609-000,Qty:29)
No	isy	11 <b>.9</b> %	10.2%	Noisy (20609-000,Qty:19)
Int	ermittent Operation	10.6%	9.14	Intermittent (20609-000,Qty:17)
Sti	ick Closed	10.0%	8.6%	Stuck Closed (20609-000, Qty 14), Short (20609-000, Qty:2)
Out	of Adjustment	5.6%	4.8	Out of Adjustment (20609-000,Qty:9)
Cra	icked/Fractured	5.0%	4.3	Cracked/Fractured (20609-000,Qty:8)
Unk	nown		7.0%	Unknown (20609-000,Qty:13)
Oth	er (<\$5) Spurious/False Operation		7.5 <b>%</b> 3.2%	False Response (20609-000, Qty:6)
	Out of Spec.		1.6%	Out of Specification (20609-000,Qty:3)

0.5% Seized (20609-000, gty:1)

Seized

Breach

0.5% Breach (20609-000, Qty:1)

mmaries		FMD
Norm Dist.	Fail Dist.	Data Source(s)/Details
ued)		
	0.5%	Arcing (20609-000,Qty:1)
33.8%	16.2%	Sources:2 Stuck Open (20609-000,Qty:21)
		No Movement (20609-000, Qty:11)
13.1%	6.3%	Connector Defective (19542-000,12.5%)
9.7%	4.6%	Out of Adjustment (20609-000,Qty:6)
9.7%	4.6%	Stuck Closed (20609-000,Qty:6)
8.0%	3.8%	Intermittent (20609-000,Qty:5)
8.0%	3.8%	Seized (20609-000,Qty:5)
	33.6%	Unknown (19542-000,62.5%) (20609-000,Qty:3)
	12.5%	Improper Connections (19542-000,25.0%)
	6.2% 2.3%	Unstable (20609-000,Qty:3)
	1.5%	Short (20609-000,Qty:2)
	1.5%	Cracked/Fractured (20609-000,Qty:2)
	0.8%	Overheated (20609-000,Qty:1)
66.7%	66.7%	Sources:1 Stuck Open (20609-000,Qty:2)
3 <b>3.3</b> %	33.3%	Short (20609-000,Qty:1)
		Sources:1
50.0%	50.0%	Worn - Broken/Damaged (25101-000,Qty:1)
50.0%	50 <b>.0%</b>	Stripped (25101-000,Qty:1)
		Sources:1
		Warped/Bent - Inop Man Elevation (25101-000,Qty:1)
33.34	33.3%	Out Of Adjustment - Binding/Sticking (25101-000,Qty:1)
	Norm Dist. Dist. 33.8% 17.7% 13.1% 9.7% 9.7% 8.0% 8.0% 	Norm Fail Dist. Dist. nued) 0.5% 33.8% 16.2% 17.7% 8.5% 13.1% 6.3% 9.7% 4.6% 8.0% 3.8% 8.0% 3.8% 8.0% 3.8% 33.6% 12.5% 1.5% 0.8% 66.7% 66.7% 33.3% 33.3%

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	FMD-91 Failure Distribution Summaries 3-				
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	(Summary)				
	n nding (Chicking	17.5%			
	nding/Sticking Movement	16.5%			
	aring Failure	13.9%			
	graded Output	13.8%			
	ipping	11.8%			
	ss of Torque	9.3%			
lutch				Sources:3	
Wo	rn	33.3%	33.3%	Worn Out (20609-000,Qty:4), Mechanical Types-Wear (24996-000,NR)	
No	Movement	31.3%	31.2%	Antenna Fails to Rotate (19542-000,62.5%)	
Ou	t of Adjustment	12.5%		Needs Adjustment (19542-000,25.0%)	
	splaced	8.3%		Displaced (20609-000,Qty:1)	
	mmed/Stuck	8.3% 6.3%		Jammed (20609-000,Qty:1)	
De	graded Output	0.31	0.28	Antenna Moves Slowly (19542-000,12.5%)	
Ot	her Mechanical Failure		0.0% NR	Mechanical Types-Mechanical Slippage (24996-000,NR),	
				Mechanical Types-Failure of Actuating Mechanisms (24996-000,NR)	
	Connection Failure		NR	Magnetic Types-Faulty Connections (24996-000,NR)	
	Assembly			Sources:1	
	oken			Broken/Separated - Inop Man Elevation (25101-000,Qty:1)	
In	duced		/5.0%	<pre>Improper Maintenance - Ncisy (25101-000,Qty:1), Lack Of Lubrication - Noisy (25101-000,Qty:2)</pre>	
	,Magnetic aring Failure	60.0%	52. 9 <b>8</b>	Sources:1 Bearing Wear (24993-000,45.0%)	
Lo	ss of Torque	40.0%	35.3%	Loss Of Torque Due To Internal Mechanical Degrad (24993-000,15.0%), Loss Of Torque Due To Coil Failure (24993-000,15.0%)	
Unl	known		11.8%	Unknown (24993-000,10.0%)	
lutch	Mechanical			Sources:1	
	nding/Sticking	55.0%	55.0%	Bind (24990-000,55.0%)	
<b>S1</b> :	ipping	45.0%	45.0%	Slip (24990-000,45.0%)	

irt	Failure	Norm	Fail	Data
sc.			Dist.	
	,Reverse Lock graded Output	52 24	46 28	Sources:1 Internal Failure - Abnormal Operation (25101-000,Qty:12)
				• • • • •
Cre	cep	1/.48	10.43	Internal Failure - Creep (25101-000,Qty:1), Worn - Creep (25101-000,Qty:3)
Bir	nding/Sticking	13.0%	11.5%	Internal Failure - Binding/Sticking (25101-000,Qty:3)
Ski	ipping	8.7%	7.7%	Skips (25101-000,Qty:2)
No	Operation	4.3%	3.8%	Inop Man Elevation (25101-000, Gty:1)
Coi	rroded	4.3%	3.8%	Corroded-Creep (25101-000,Qty:1)
Unl	known		11.5%	Urknown (25101-000,Qty:3)
	Summary) ened	37.9%		
Sho	orted	23.5%		
	ift Sulation Failure	14.8%		
	sulation Failure ad Damage	14.6% 4.8%		
	re Failure	4,5%		
oil			_	Sources: 9
Ope	ened	42.6%	40.1%	Open (24990-000,75.0%) (24992-000,10.0%) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:53), Open-Starved solder joint (25001-000,Qty:1), Open Winding (24993-000,25.0%), Opened (20609-000,Qty:55), Open Magnet Wire (10722-000,Qty:1), Open-Broken Winding Wires (25038-000,NR)
Dr:	1ft	18.6%	17.5%	Parameter Drift-Delta L (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:3), Parameter Drift-Delta Q (25000-000,Qty:1), Parameter Drift-Delta R (25000-000,Qty:1) (25000-000,Qty:4) (25000-000,Qty:6) (25000-000,Qty:16) (25000-000,Qty:16) (25000-000,Qty:31), Parameter Drift-Insulation Resistance (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:19), Parameter Drift-General (25000-000,Qty:7) (25000-000,Qty:58), Drift (20609-000,Qty:66) (24992-000,26.7%)
Sho	orted	18.5%	17.48	Short Dielectric Strength (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4), Short - General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:4), Short (10722-000,Qty:2) (20609-000,Qty:8) (24990-000,25.0%) (24992-000,48.3%), Short-Insulation Breakdown (25038-000,NR)
Ins	sulation Failure	11.4	10.78	Insulation Deterioration (24993-000,75.0%)
Lea	ad Damage	6.1%	5.7	Fractured/Damaged Leads-Mold Pinch (10722-000,Qty:2)
Die	electric Breakdown	1.4%	1.45	Breakdown Between Winding and Core or Case Surface (25016-000,NR;, Dielectric Breakdown (24992-000,10.0%)
Uns	stable Operation	1.4%	1.41	Unstable (24992-000,10.0%)
Unk	เภอพา		3.8%	Unknown (20609-000,Qty:40) (25000-000,NR) (25000-000,Qty:13)
Oth	er (<\$2) Intermittent Operation		1.9% 0.9%	<pre>Intermittent (20609-000, gty:7) (25000-000, gty:2) (25000-000, gty:5)</pre>

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PMD-91		یر. ده بندیرک. دار	Failure Distribution Summaries 3-
Part Peilure Desc. M de/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Coll (continued) Other (continued)			
Seal Failure		0,5%	Seal Leak (25000-000,Qty:2) (25000-000,Qty:8)
Mechanical Damage		0.3%	Mechnical Damage (25000-000,Qty:1) (25000-000,Qty:6)
Leaking		0.24	Leaking (20609-000,Qty:2)
Loss of Q		NR	Radical Decrease or Loss of Q (25016-000,NR)
Change in Value		NR	Radical Decrease or Loss of Inductance (25016-000,NR)
Change in Resistance		NR	Decrease of Insul. Resis. Between Winding and Core (25016-000,NR), Change in DC Resistance of Winding (25016-000,NR)
Winding Failure		NR	Open or Short Circuit in Winding (25016-000,NR)
Broken		NR	Broken Lead (25038-000, NR)
Ccil,Radio Frequency Shorted	38.54	36.4%	Sources:3 Short (24997-000,72.0%), Shorted Turns (24417-002,NR)
Insulation Failure			Insulation Breakdown (25038-000,14.0%), Insulation Deterioration (25038-000,32.0%)
Wire Failure	19.6%	18.5%	Wire over-stress (25036-000,37.0%)
Opened	17.6%	16.6%	Open Circuit (24997-000,16.0%), Open Terminations (24417-002,NR), Faulty Leads (25038-000,17.0%)
Induced		2.8%	Quality Defects (24997-000,5.5%), Degradation of Q (24417-002,NR)
Unknown		2.8%	Unknown (24997-000,5.5%)
Collimator Moisture Intrusion	100.08	23 58	Sources:1 Internal Moisture (25101-000,Qty:4)
Unknown			· -
Induced			Unknown (25101-000,Qty:1) (25101-000,Qty:6) Lack Of Maintenance - Internal Moisture (25101-000,Qty:2) (25101-000,Qty:4)
ompressor Seal/Gasket Failure	32.4	29.0%	Sources:1 Leaks from Gaskets and Seals (24996-000,28.0%)
Bearing Failure	29.5%	26.4%	Bearings Failure (24996-000,25.5%)
Valve Failure	20.8%	18.78	Valves Failure (24996-000,18.0%)
Cooling Failure	9.2*	8.3%	Cooling Failure-If Water Cooled (24996-000,8.0%)
Impeller Failure	8.14	7.3%	Impeller Failure (24996-000,7.0%)
Unknown			Unknown (24996-000,10.0%)

rt. sc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
				· · · · · · · · · · · · · · · · · · ·
	er Peripheral,Disk Drive onnection Failure	,Comp Tape 50.5%	4.7%	Sources:1 Loose Connection (19542-000,4.7%) (19542-000,4.7%)
IC	: Failure	24.74	2.3	Defective IC (19542-000,2.3%) (19542-000,2.3%)
Da	ata Loss	24.78	2.34	Data Lost From Tapes (19542-000,2.3%) (19542-000,2.3%)
Un	hknown		65.19	Unknown (19542-000,65.1%) (19542-000,65.1%)
In	nduced		25 <b>.6</b> %	Defective (19542-000,25.6%) (19542-000,25.6%)
	er Peripheral,Track Ball amp Failure	50.3%	9.75	Sources:1 Defective Lamp (19542-000,9.7%)
	•			•
-	onnector Failure	16.6%		Lose Connector (19542-000,3.2%)
	; Failure	16.6%	• • • •	Defactive IC (19542-000,3.2%)
Di	iode Failure	16.6*		Deflective Diode (19542-000,3.2%)
In	nduced		71.0%	Defective Component (19542-000,67.7%), Improper Soldering Ins:de (19542-000,3.2%)
Un	known		9.7%	Unknown (19542-000,3.2%) (19542-000,6.5%)
	er,Mass Memory oftware Failure	38.4%	24.78	Sources:1 Won't Accept Certain Programs (19542-000,1.0%), Won't Load (19542-000,19.8%), Won't Record (19542-000,4.0%)
Se	ensor Failure	24.7%	15.8%	Defective Sensor (19542-000,14.9%), Defective Vacuum Chamber Sensor (19542-000,1.0%)
No	Rewind	15.3%	9.98	Won't Rewind (19542-000,9.9%)
10	: Failure	10.7%	6.9%	Defective IC (19542-000,6.9%)
Tr	ransistor Failure	6.2%	4.0%	Defective Transistor (19542-000,3.0%), Defective Transistor in Servo Assembly (19542-000,1.0%)
Мо	otor Failure	4.7%	3.0%	Capstan Motor Defective (19542-000,1.0%), Capstan Motor Jammed (19542-000,1.0%), Defective Motor Assembly (19542-000,1.0%)
Un	known	80 an an an 80	12.8%	Unknown (19542-000,1.0%) (19542-000,1.0%) (19542-000,2.0%) (19542-000,8.9%)
In	ducea		6.0%	Cable Wires Switchad (19542-000,1.0%), Defective Soldering on IC (19542-000,2.0%), MTC Defective (19542-000,1.0%), Q1 Q2 Improperly Oviented (19542-000,1.0%), Wrong Fuse Was Installed (19542-000,1.0%)
Oti	her (<\$4) Power Supply Failure			Defective Power Supply (19542-000,1.0%), Power Supply Defective (19542-000,1.0%)
	Disc Failure		2.0%	Defective Disc (19542-000,1.0%), Floppy Drive One Is Defective (19542-000,1.0%)
	Capacitor Failure		2.0%	Defective Capacitor (19542-000,2.0%)
	Connection Failure		2.0	Bad Solder Joints On Connector Pins (19542-000,1.0%), Connector Pins Have Broken (19542-000,1.0%)
	Read/Write Head Failure		1.0%	Read/Write Head Is Defective (19542-000,1.0%)

FMD	-91	Failure Distribution Summaries	3-45		
Part	Failure	Norm	Fail	Data	
Desc.	Mode/Mach	Dist.	Dist.	Source(s)/Details	
	er, Mass Memory (continued) ther (continued)				
	Cable Failure		1.0%	Ribbon Cable Broken (19542-000,1.0%)	
	Servo Amp Failure		1.0%	Servo Amp Defective (19542-000,1.0%)	
	Connector Failure		1.0%	Two Pins Shorted on Connector (19542-000,1.0%)	
	Pin Damage		1.0%	Pins 1 & 3 Are Damaged (19542-000,1.0%)	
	Blown Fuse		1.0%	8 Fuse Blown (19542-00C,1.0%)	
	Loss of Control		1.0%	Defective Control System (19542-000,1.0%)	
	Check Valve Failure		1.0%	B Dafective Check Valve (19542-000,1.0%)	
	Reel Hub Assbly Failure		1.0%	Bad Reel Hub Assembly (19542-000,1.0%)	

Computer,System Hardware Failure	57 <b>.2%</b>	Sources:1 50.1% Hardware (24997-000,50	.0%)
Software Failure	42.8%	37.4% Software (24997-000,37	.4%)
Induced		12.5% Operator (24997-000,12	.5%)

Computer,System,Large Hardware Failure	57.2% 50.1	Sources: * Hardware	1 (24996-000,50.0%)
Software Failure	42.8% 37.4	Software	(24996-000,37.4%)
Induced	12.5	% Operator	(24996-000,12.5%)

Connection,Solder Opened	60.7 <b>%</b>	Sources:2 50.0% Open (24994-000,100.0%)		
Broken	33.3%	25.0% Break (24990-000,50.0%)	25.0% Break (2	
Unknown		20.0% Unknown (24990-000,40.0%)	20.0% Unknown	
Induced		5.0% No Solder (24990-000,10.0%)	5.0% No Solde	)
Other Shorted		0.0% NR Short (24994-000,NR)		
Drift		NR Drift (24994-000,NR)	NR Drift (2	

Connector (Summary)	
Opened	33.6%
Mechanical Damage	25.1%
Intermittent Operation	12.6%
Shorted	9.0%
Mechanical Failure	7.3%
Broken	6.4%
Insertion Loss	6.1%

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46 Failure Distribution S	Norm	Fail	Data
rt Failure sc. Mode/Mech		Dist.	Data Source(s)/Details
nnector Openad	39.04	29.28	Sources:17 Open Circuit (24990-000,60.0%) (24996-000,32.0%) (24997-000,32.0%), High Z (24991-000,33.0%) (24991-000,80.0%) (24991-000,94.0%) (24991-000,100.0%) (24991-000,100.0%), Open (24992-000,21.5%) (24992-000,36.0%) (25038-000,9.0%) (24997-000,9.0%) (25038-000,9.0%), Contaminated (24992-000,9.0%), Connect Defective (23038-001,Qty:1), Corroded (20609-000,Qty:7) (23038-002,Qty:1) (23038-002,Qty:4) (23038-004,Qty:1), Contact Defective (23038-002,Qty:1), Dirty (23038-002,Qty:1), Contact/Conn Defect (23038-004,Qty:1) (23038-005,Qty:1) (23038-006,Qty:1) (25464-000,Qty:40), Opened (20609-000,Qty:407), Open Fin (4, 20)-No Solder Used Cnly Crimped (10722-000,Qty:2), Opens-Mishandling (10722-000,Qty:5), Open-Fracture In The Flex Tape Conductor (10722-000,Qty:6), Open-Cracked Copper Paths (10722-000,Qty:1), Corroded Mild/Moderate (25464-000,Qty:3)
Mechanical Damage	26.1%	19.6¥	<pre>Mechanical Damage (24992-000,24.0%) (25038-000,24.0%), Broken/Fractured (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:2) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:2) (23038-002,Qty:2) (23038-006,Qty:1) (23038-006,Qty:1) (23038-006,Qty:1) (23038-006,Qty:1), Bent/Dented Start (23038-001,Qty:1), Cut/Torn (23038-001,Qty:1), Broked/Fracturea (23038-006,Qty:1) (25464-000,Qty:8), Broken (23038-002,Qty:3) (23038-003,Qty:1) (23038-002,Qty:3) (23038-002,Qty:4) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-003,Qty:2) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-003,Qty:2) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-003,Qty:2) (23038-005,Qty:1) (23038-005,Qty:1) (23038-003,Qty:2) (23038-005,Qty:2) (23038-005,Qty:1) (23038-003,Qty:1) (23038-007 Qty:2), Distorted (23038-005,Qty:1), Connector Fractured-Mechanical Overstress (10722-000,Qty:1), Damaged Connector (25027-000,Qty:1)</pre>
Intermittent Operation	17.5%	13.1%	Intermittent (20609-000,Qty:326) (23038-006,Qty:1) (24990-000,20.0%) (24992-000,22.0%) (24996-000,20.0%) (24997-000,20.0%) (25038-000,22.0%), Intermittent Connection (25027-000,Qty:1) (25027-000,Qty:12), Intermittent or Open Circuit (24996-000,NR) (24997-000,NR)
Shorted	10.8%	8.1\$	<pre>Short (20609-000,Qty:8) (24990-000,10.0%) (24992-000,9.0%) (24992-000,19.1%) (24996-000,NR) (24996-000,7.0%) (24997-000,NR) (24997-000,NR) (24991-000,NR) (25038-000,9.0%), Low Z (24991-000,NR) (24991-000,NR) (24991-000,0.1%) (24991-000,20.0%) (24991-000,67.0%), Shorts (Poor Sealing) (24993-000,30.0%), Shorted/Grounded (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:2) (23038-002,Qty:1) (23038-002,Qty:2) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-005,Qty:1) (23038-006,Qty:1), Shorted Pin (25027-000,Qty:1)</pre>
M.chanical Failure	6.6%	4.9	Mechanical Failure Of Solder Joints (24993-000,25.0%), Miscellaneous Mechanical Failures (24993-000,15.0%), Mechanical Failure (24996-000,NR) (24996-000,22.0%) (24997-000,NR) (24997-000,22.0%), Mechanical Failure and Coupling Problems (24997-000,NR)
Induced		4.84	Damaged For Test Pur (23038-001,Qty:1), Missing (23038-001,Qty:1) (23038-002,Qty:1) (23038-002,Qty:4) .23038-003,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-006,Qty:1). (23038-006,Qty:1)

FMD-				Failure Distribution Summaries 3-47
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Connec	tor (continued)	. 4		
	duced (continued)			(23038-006, Qty:4), Miswired (23038-001, Qty:1),
				Chipped/Nicked (23038-002,Qty:1), Chipped (23038-002,Qty:1),
				Cannibalize (23038-002,Qty:1), Missing; Maintenance (23038-002,Qty:2), Wrong Part (23038-004,Qty:1), Wet
				(23038-005, Qty:1), Caused By Other Dev. (23038-005, Qty:1)
Ur	hknown		4.0%	Unknown (20609-000,Qty:15) (20609-000,Qty:75)
				(23038-001,Qty:1) (23038-001,Qty:2) (23038-001,Qty:3) (23038-002,Qty:1) (23038-002,Qty:2) (23038-002,Qty:2)
				(23038-003,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1)
				(23038-005,Qty:2) (23038-006,Qty:1) (24996-000,NR)
				(24997-000,NR) (24997-000,NR)
Ot	her (<\$4)		16.3%	
	Change in Resistance		2.48	High Resistance (24990-000,10.0%), Degradation Of Insulation Resistance (24993-000,20.0%), Poor Contact
				Resistance (24993-000,10.0%), High and Erratic Contact
				Resistance (24997-000,NR)
	Worn		2.18	Worn Excessively (23038-002,Qty:1) (23038-002,Qty:1) (23038-004,Qty:2) (23038-005,Qty:1) (23038-005,Qty:4), Worn
				Out (20609-000, Qty:10), Worn, Chaffed, Frayed, or Torn (25464-000, Qty:4)
	_			· · · · ·
	Loose		2.08	Loose (23038-001,Qty:1) (23038-001,Qty:2) (23038-002,Qty:1) (23038-002,Qty:2) (23038-002,Qty:2) (23038-005,Qty:1)
				(23038-006,Qty:2), Loose, Damaged, or Missing Har (25464-000,Qty:21)
	Drift		1 68	Fluctuates/Unstable (23038-001,Qty:1) (23038-001,Qty:3)
	Drift		1.05	(23038-004,Qty:1) (23038-006,Qty:1), Fail To Tune/Drift
				(23038-002,Qty:2), Fluctuates, Unstable or Errati (25464-000,Qty:4)
	Audio Fault/Failure		1.6%	Audio Faulty (23038-001, Qty:1) (23038-002, Qty:1)
				(23038-003,Qty:3) (23038-005,Qty:1) (23038-005,Qty:3)
	Spurious/False Operation		1.2%	Faulty Reading (23038-001,Qty:1) (23038-002,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1)
			1	
	Coupling Failure			Coupling Problems (24996-000,10.0%) (24997-000,10.0%)
	Dielectric Breakdown			Dielectric Breakdown (24992-000,33.8%)
	Unstable Operation			Unstable (23038-001,Qty:1) (24992-000,20.2%)
	Incorrect Voltage			Incorrect Voltage (23038-001,Qty:1) (23038-004,Qty:1)
	Loss of Control			Control Inoperative (23039-003,Qty:1) (23038-006,Qty:1)
	Burred		0.5%	Burred (23038-004,Qty:1)
	Insulation Failure		0.4%	Insulation Breakdown (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1)
	Brittle		0.2*	Brittle (23038-003,Qty:1)
	Shafting		0.1%	Shafting (23038-001,Qty:1)
	Arcing/Sparking		<0.1%	Arcing (20609-000, Qty:6)
	Binding/Sticking		<0.1%	Binding (20609-000,Qty:4), Binding, Stuck or Jammed
, <b>-</b>	-			(25464-000, Qty:1)
·	Burned/Charred		<0.1%	Burned (20609-000, Qty:4)
	Degraded Operation		<0.1%	Weak (20609-000,Qty:1)
·				

Part Failure Desc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Connector (continued)		<u> </u>	
Other (continued)		-0.18	1
Leaking		<0.1%	Leaking (20609-000,Qty:1)
Clogged/Clogging		<0.1%	Clogged (20609-000,Qty:1)
Connector,Circular Induced		<0.1%	Sources:2 Cocked Pins (13933-000,NR)
Other Bent/Dented/Warped		100.0% NR	Bent Pins (13933-000,NR)
Broken		NR	Broken Pins (13933-000, NR)
Opened		NR	Open Contacts-Contamination (13933-000,NR)
Change in Resistance		NR	High Resistance Contacts-Contamination (13933-000,NR)
Mechanical Damage		NR	Damage to Contact Retaining Machanism (24417-000,NR)
Connector,Circular,Multicontact Mechanical Failure	62.9%	61.7%	Sources:2 Gross Mechanical Failures (24996-000,64.5%), Gross Mech. Failures Coupling & Mismating Problem (24997-000,64.5%)
Mismating Problems	22.5%	22.1%	Coupling & Mismating Problems (24996-000,64.5%)
Change in Resistance	5.4%	5.3%	High Contact or Erratic Resistance (24996-000,5.5%) (24997-000,5.5%)
Intermittent Operation	4.9%	4.8%	Intermittent or Open Circuit (24996-000,5.0%) (24997-000,5.0%)
Shorted	4.4%	4.3%	Short (24996-000,4.5%) (24997-000,4.5%)
Unknown		1.9%	Unknown (24996-000,2.0%) (24997-000,2.0%)
onnector,Coaxial,F.R.R.F. Flashover	66.5%	44.2%	Sources:2 Terminations (24996-000,44.0%) <sup>-</sup> (24997-000,44.0%)
Mismating Problems			Mismating (24996-000,11.0%) (24997-000,11.0%)

Contaminated

Unknown

Connector,Filter Shorted Sources:1 100.0% 100.0% Short-Severe External Electrical Overstress (10722-000,1.0%)

----- 33.5% Unknown (24996-000,33.3%) (24997-000,33.3%)

8.5% 5.6% Cross Failure (24996-000, 5.6%) (24997-000, 5.6%)

8.5% 5.6% Contamination (24996-000, 5.6%) (24997-000, 5.6%)

FMD-	/ L			Failure Distribution Summaries 3
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	tor,Flex orted	100.0%	100.0%	Sources:1 Short-Shorted Due To Misplacement Of Pin 18 (10722-000,Qty:1)
	tor,Microwave sertion Loss	80.0%	80.0%	Sources:1 High Insertion Loss (High VSWR) (25015-000,80.0%)
υp	ened	20.0%	20.0%	Open (25015-000,20.0%)
	tor,PWB oken	66.7%	66.7%	Sources:3 Broken/Damaged (17867-000,Qty:1) (17867-000,Qty:1)
Bei	nt/Dented/Warped	33.3%	33.3%	Bent Pin Replaced (17867-000,Qty:1), Bent Pin-Misalignment (13740-000,NR)
Un)	known		<0.1%	Unknown (24996-000, NR)
Otł	her Mechanical Overstress		0.0% NR	Insertion/Withdrawl Stress Damage (13740-000,NR)
	Corroded		NR	Corrosion (13740-000,NR)
	Change in Resistance		NR	High or Erratic Contact Resistance (24996-000,NR)
	Shorted		NR	Short (24996-000,NR)
	Mechanical Failure		NR	Mechanical Failure and Coupling Problems (24996-000,NR)
	cor,Pin Oken	100.0%	100.08	Sources:1 Broken Scrands-Tensile Failure (10722-000,Qty:1)
	cor,Receptacle,Electrical n Damage	66.7%	66.7%	Sources:1 Damaged Pin (25027-000,Qty:1) (25027-000,Qty:2) (25027-000,Qty:3)
Brc	bken	33.3%	33.3%	Broken Pins (25027-000,Qty:1) (25027-000,Qty:2)
	cor,Restangular,Multicontact nown		<0.1%	Sources:2 Unknown (24996-000,NR) (24997-000,NR)
Oth	er Intermittent Operation			Intermittent or Open Circuit (24996-000, NR) (24997-000, NR)
	Mechanical Failure		NR	Mechanical Failure and Coupling Problems (24996-000,NR) (24997-000,NR)

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art	Failure	Norm	Fail	Data
esc.		Dist.		Source (s) /Details
	ctor,Socket ontact Failure	47.6%	43.3	Sources:3 Contact Failure (24993-000,30.0%), High Contact Resistanco-Contacts Pitted (10722-000,0ty:2)
Me	chanical Failure	14.6%	13.34	Mechanical Failure Of Solder Joints (24993-000,25.0%), Miscelianeous Mechanical Failures (24993-000,15.0%)
OL	it of Spec.	12.7	11.5%	Out of Tolerance (20609-000, Qty:9)
Ag	ed/Deteriorated	11.04	10.0%	Material Deterioration (24993-000,30.0%)
Be	ent/Dented/Warped	9.9%	9.0%	Distorted (20609-000,Qty:7)
Cr	acked/Fractured	4.24	3.8%	Cracked/Fractured (20609-000,Qty:3)
Un	known	*****	9.0%	Unknown (20609-000,Qty:7)
	t,Post & Wire Token	100.0%	100.0%	Sources:1 Break-Cyclic Fatigue (10722-000,Qty:1)
	ller,Electromechanical roneous Output	75.0%	63.0%	Sources:1 Level Setting Failure(Erroneou« Reading) (24996-000,37.0%), Meter or Gauge Failure to Indicate (24996-000,26.0%)
Lo	ss of Control	25.0%	21.0%	Control Circuit Failure-Open (24996-000,21.0%)
Un	known		16.0%	Unknown (24996-000,16.0%)
	or System,Belt System It Failure	50.0%	50.0%	Sources:1 Belt Failure (24996-000,50.0%)
Id	ler Failure	40.0%	40.0%	Idler Failures (24996-000,40.0%)
Мо	tor Failure	6.5%	6.5%	Motor Failure (24996-000,6.5%)
Dr	ive Pulley Failure	3.5%	3.5%	Drive Pulley Failure (24996-000,3.5%)
	g Coil aking	100.0%	80.0%	Sources:1 Leaking (20609-000,Qty:12)
Un	known		20.0%	Unknown (20609-000,Qty:3)
ounte Ou	r t of Auljustment	45.74	28.1%	Sources:1 Out Of Adjustment - Inaccurate (25101-000,Qty:1) (25101-000,Qty:11), Out Of Adjustment - Excessive Play (25101-000,Qty:1), Out Of Adjustment - Skips (25101-000,Qty:1), Out Of Adjustment - Incomplete (25101-000,Qty:1), Out Of Adjustment - Incomplete (25101-000,Qty:1)
Bi	nding/Sticking	20.0*		Binding/Sticking (25101-000,Qty:1), Internal Failure - Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:3), No Failure - Binding/Sticking (25101-000,Qty:2)
Sk.	ipping	14.3%	8.84	Internal Failure - Skips (25101-000,Qty:1) (25101-000,Qty:2), Skips (25101-000,Qty:1), Worn - Skips

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MD-	and the second			Failure Distribution Summaries 3-5
art JSC.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	(continued)			
SX	ipping (continued)			(25101-000,Qty:1)
Ex	cessive Play	8.6%	5.3%	Internal Failure - Excessive Play (25101-000,Qty:1), Excessive Play (25101-000,Qty:1), No Failure - Excessive Play (25101-000,Qty:1)
Wo	rn	5.7%	3.5%	Worn - Inaccurate (25101-000,Qty:1), Worn - Inop/Unser"iceable (25101-000,Qty:1)
De	graded Output	5.7%	3.5%	Internal Failure - Abnormal Operation (25101-000,Qty:2)
In	duced		17.5%	<pre>Improper Installation - Imp Assembly/Installation (25101-000,Qty:1), Lack Of Maintenance - Binding/Sticking (25101-000,Qty:3), Improper Installation - Inop/Unserviceable (25101-000,Qty:1), Internal Failure - Inaccurate (25101-000,Qty:2) (25101-000,Qty:3)</pre>
Un	known		12.3%	Unknown (25101-000,Qty:1) (25101-000,Qty:6)
Ot.	her (<\$4)		8.8%	
	Stripped			Worn/Stripped - Inop/Unserviceable (25101-000,Qty:1)
	Aged/Deteriorated		1.8%	Deteriorated/Aged - Leaking Nitrogen (25101-000,Qty:1)
	Broken		1.8%	Internal Failure - Broken/Damaged (25101-000,Qty:1)
	Seal Failure		1.8%	Seals Worn - Inop/Unserviceable (25101-000,Qty:1)
	Seized		1.8%	Internal Failure - Seized (25101-000,Qty:1)
	r Assembly nding/Sticking	30.2%	21.7%	Sources:1 Internal Failure - Binding/Sticking (25101-000,Qty:3) (25101-000,Qty:9), Binding/Sticking (25101-000,Qty:1)
Sk	ipping	18.6%	13.3%	<pre>Skips (25101-000,Qty:1) (25101-000,Qty:2), Internal Failure - Skips (25101-000,Qty:1) (25101-000,Qty:3), No Failure - Skips (25101-000,Qty:1)</pre>
Ex	cessive Play	16.3%	11.7%	Excessive Play (25101-000,Qty:1) (25101-000,Qty:1), Internal Failure - Excessive Play (25101-000,Qty:1) (25101-000,Qty:3), Part Missing/Loose - Excessive Play (25101-000,Qty:1)
Out	t of Adjustment	14.0%	10.0%	Out Of Adjustment - Inaccurate (25101-000,Qty:1) (25101-000,Qty:2), Out Of Adjustment - Out Of Adjustment (25101-000,Qty:1), Out Of Adjustment - Fire Extinguishers (25101-000,Qty:1), Out Of Adjustment - Excessive Play (25101-000,Qty:1)
Out	: of Synch.	11.6%	8.3%	Internal Failure - Out Of Synch (25101-000,Qty:4), Out Of Synch (25101-000,Qty:1)
Se	zed	9.3%	6.78	Internal Failure - Seized (25101-000,Qty:1) (25101-000,Qty:2), Out Of Adjustment - Seized (25101-000,Qty:1)
Uni	nown		15.0%	Unknown (25101-000,Qty:2) (25101-000,Qty:7)
Ind	łuced		13.3%	<pre>Internal Failure - Inaccurate (25101-000,Qty:1) (25101-000,Qty:1), Lack Of Maintenance - Binding/Sticking (25101-000,Qty:4), Wrong Part - Imp Assembly/Install (25101-000,Qty:1), Item Abuse/Neglect - Binding/Sticking (25101-000,Qty:1)</pre>

3-52 Part	Failure Distributio	Norm	Fail	FMD-91
Desc.	Mode/Mach	Dist.	Dist.	
Counte	r,Differential			Sources:1
Ot	at of Adjustment	93.3%	87.5%	Out Of Adjustment - Inaccurate (25101-000,Qty:10), Out Of Adjustment - Fnd In TI/PMCS/INSP (25101-000,Qty:4)
St	ripped	6.7%	6.3%	Worn/Stripped - Inop/Unserviceable (25101-000,Qty:1)
Ir	duced	*==***	6.3%	Improper Adjustment - Inaccurate (25101-000,Qty:1)
	er, Reset	22.28	20.04	Sources:1
	t of Adjustment			Out Of Adjustment - Abnormal Operation (25101-000,Qty:1) No Failure - Excessive Play (25101-000,Qty:1)
	-			
	inding/Sticking			Internal Failure - Binding/Sticking (25101-000,Qty:1)
Ur	lknown		40.0%	Unknown (25101-000,Qty:2)
Coupli Le	ing eaking	55.6%	33.3%	Sources:3 Leak (24992-000,100.0%)
We	orn	16.7%	10.0%	Worn Out (20609-000,Qty:6)
Bı	oken	11.1%	6.78	Broken (20609-000,Qty:4)
A	cing/Sparking	5.6%	3.3%	Arcing (20609-000, Qty:2)
Oţ	bened	5.6%	3.3%	Opened (20609-000,Qty:2)
Bu	irned/Charred	2.8%	1.7%	Burned (20609-000,Qty:1)
Lo	0038	2.8%	1.7%	Loose (20609-000,Qty:1)
Ur	hnown		40.0%	Unknown (19542-000,100.0%) (20609-000,Qty:4)
-	ng, Shaft orn	38.7%	31.6%	Sources:1 Worn - Fire Extinguishers (25101-000,Qty:1), Worn - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:3), Worn - Loose (25101-000,Qty:5), Worn - Found In TI/PMCS/Insp (25101-000,Qty:1) (25.01-000,Qty:1)
Ou	t of Adjustment	32.3%	26.3%	Out Of Adjustment - Binding/Sticking (25101-000,Qty:4), Out Of Adjustment - Inop Man Elevation (25101-000,Qty:3), Out Of Adjustment - Abnormal Operation (25101-000,Qty:1), Out Of Adjustment - Out Of Synch (25101-000,Qty:1), Out Of Adjustment - Skips (25101-000,Qty:1)
Ex	c <b>essive</b> Play	22.64	18.4%	Worn - Excessive Play (25101-000,Qty:6), Worn Shaft/Keyway - Excessive Play (25101-000,Qty:1)
Bi	nding/Sticking	6.54	5.3#	Binding/Sticking (25101-000,Qty:2)
In	duced		13.24	Caused By Other Failure-Loose (25101-000,Qty:1), Improper Maintenance - Binding/Sticking (25101-000,Qty:1), Improper Maintenance - Inop Man Elevation (25101-000,Qty:2), Lack Of Lubrication - Binding/Sticking (25101-000,Qty:1)
Un	known		5.3%	Unknown (25101-000,Qty:1) (25101-000,Qty:1)

Dawt	Ted lyne	N	Red 3	Failure Distribution Summaries 3-
	Failure Mods/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	ssembly ken	100.0%	70.0%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:6)
Ind	uced		30.0%	Lack Of Maintenance - Internal Moisture (25101-000,Qty:3)
Cover,A Bro	ccess ken	109.0%	20,8%	Sources:1 Broken/Damaged (25101-000,Qty:3) (25101-000,Qty:6), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:3), Part Struck/Damaged - Inop Man Elevation (25101-000,Qty:1), Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:1)
Unk	nown		75.0%	Unknown (25101-000,Qty:1) (25101-000,Qty:5_)
Ind	uced		4.2%	Improper Maintenance - Broken/Damaegd (25101-000,Qty:1). Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:2)
Cover,A Wor	iming Post n	100.0%	50.0%	Sources:1 Deteriorated/Aged - Worn Out (25101-000,Qty:1)
Unk	nown		50.0%	Unknown (25101-000,Qty:1)
Cover,B Worn	pre Brush n	75.0%	42.9%	Sources:1 Worn Out (25101-000,Qty:3)
Age	d/Deteriorated	25.0%	14.3%	Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1)
Unk	າວພາ		42.9%	Unknown (25101-000,Qty:3)
Cover,B: Worn		100.0%	80.0%	Sources:1 Worn Out (25101-000,Qty:3), Worn - Deteriorated (25101-000,Qty:5)
Unkr	lown	****	20.0%	Unknown (25101-000,Qty:2)
over,Hi Brok		100.0%	50.0%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2)
Indu	lced			Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:2), Item Abuse/Neglect - Collapsed/Bent (25101-000,Qty:1)
over, Ov Aged	erall //Deteriorated	100.0%		Sources:1 Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:15)

Part Failur		Norm	Fail	Data
esc. Mode/M				Data Source(s)/Details
over, Protect Broken	ive	92.2\$	78.3%	Sources:1 Broken/Damaged (25101-000,Qty:9) (25101-000,Qty:25), Oversize - Broken/Damaged (25101-000,Qty:1), Poor Design - Broken/Damaged (25101-000,Qty:11), Broken/Separated-Missing (25101-000,Qty:1)
Aged/Dete	eriorated	7.8%	6.7%	Deteriorated/Aged - Broken/Damaged (25101~000,Qty:4)
Unknown			8.3%	Unknown (25101-000,Qty:1) (25101-000,Qty:4)
Induced			6.7%	Missing (25101-000,Qty:3), Fell Off Or Lost - Missing (25101-000,Qty:1)
Cover,Shaft Out of Ac	ijustment	75.0%	42.9%	Sources:1 Out Of Adjustment - Abnormal Operation (25101-000,Qty:1), Out Of Adjustment - Binding/Sticking (25101-000,Qty:2)
Excessive	Vibration	25.0%	14.3%	Vibration - Handwheel Spin (25101-000,Qty:1)
Induced			42.9%	<pre>Improper Install - Broken/Damaged (25101-000,Qty:1), Item Abuse/Neglect - Cracked (25101-000,Qty:1), Overtorqued - Inop Man Elevation (25101-000,Qty:1)</pre>
over,Telesco Worn	ppe	100.0%	17.2%	Sources:1 Worn - Inop/Unserviceable (25101-000,Qty:4), Worn - Worn Out (25101-000,Qty:1)
Induced			48.3%	Fell Off Or Lost - Missing (25101-000,Qty:8), Missing (25101-000,Qty:2) (25101-000,Qty:3), Stolen - Missing (25101-000,Qty:1)
Unknown			34.5%	Unknown (25101-000, Qty:10)
over,Telesco Cracked/F		130.0%	22.28	Sources:1 Cracked (25101-000,Qty:1) (25101-000,Qty:1)
Induced			77.8%	Fell Off Or Lost - Missing (25101-000,Qty:3), Missing (25101-000,Qty:1) (25101-000,Qty:3)
radle Assemb Cracked/F		97.8%	38.0%	Sources:1 Vibration - Cracked (25101-000,Qty:1) (25101-000,Qty:36), Cracked Weld-Cracked (25101-000,Qty:4), Internal Failure - Cracked (25101-000,Qty:1), No Failure - Cracked (25101-000,Qty:1), Cracked (25101-000,Qty:1)
Broken		2.2*	2.04	Broken Damaged (25101-000,Qty:1)
Induced			10.0%	Caused By Other Failure-Collapsed/Bent (25101-000,Qty:1), Improper Maintenance - Collapsed/Bent (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:2), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1)

Pailure Aode/Mach	Norm	Fail	Failure Distribution Summaries	
		Dist.	Data Severe (a) (Data) a	
	DINC.	131 <b>8</b> C.	Source(s)/Details	
sambly	78.04	66 78	Sourcesil	
	/5.04	00./8	Broken/Damaged (25101-000, gry:6)	
1	25.00	22.20	Worn - Inop/Unserviceable (25101-000,Qty:2)	
iced		11.19	Wrong Part - Broken/Damaged (25101-000,Qty:1)	
haft			Sources:1	
an l	100.00	40.0%	Bracket Broken (19542-000,40.0%)	
)OWT)	*****	60.0%	Unknown (19542-000,60.0%)	
(Sumuery)				
ed	30.5%			
peration	26.9			
-				
ked/Fractured				
У	4.5%			
			Sources:3	
peration	50.0%	50.0%	Not Operable-Wafer Fractured (10722-000,Qty:1)	
ed	16.74	16.7%	Open (24992-000,33.3%) (25016-000,NR)	
t	12.5	12.5%	Drift (24992-000,25.0%)	
У	8.4%	8.4%	Jitter (25016-000,NR), Noisy (24992-000,16.7%)	
ked/Fractured	8.4	8.4%	Crack (24992-000,16.7%)	
able Operation	4.28	4.28	Unstable (24992-000,8.3%)	
r		0.0		
purious/False Operation		NR	Spurious Response (25016-000,NR)	
horted		NR	Short (25016-000,NR)	
Dacillator			Sourcest	
peration	100.0%	100.0%		
Piezoelectric			Sources:1	
n	80.0%	80.04	Broken (25464-000,Qty:4)	
rract Current	20.00	20.0%	Current Incorrect (25464-000,Qty:1)	
	aced aft ien hown (Summary) red peration in peration ed t y ked/Fractured able Operation r purious/False Operation horted Descillator peration Peration	25.0% aced (Summary) red (Summary) red (Summary) red (Summary) red (Summary) red t (Summary) red t rect Current rect Current rect Current rect Current solution solution peration peration purious/False Operation horted Piezoelectric en 80.0%	25.0%       22.2%         aced        11.1%         haft       100.0%       40.0%         hown        60.0%         (Sumwary)       30.5%       26.9%         pperation       26.9%       6.7%         prect Current       5.4%       5.4%         peration       50.0%       59.0%         ed       16.7%       16.7%         t       12.5%       12.5%         y       8.4%       8.4%         ked/Fractured       8.4%       8.4%         able Operation       4.2%       4.2%         r        0.0%         purious/False Operation       NR         horted       NR         Decillator       100.0%       100.0%         Persoelectric       80.0%       80.0%	23.04       23.04       22.24       Worn - Inop/Unserviceable (25101-000, 0ty;2)         isted        11.18       Worng Part - Broken/Damaged (25101-000, 0ty;2)         isted        11.18       Worng Part - Broken/Damaged (25101-000, 0ty;2)         isted        10.04       40.08       Bracket Broken (19542-000, 40.08)         ister       100.04       40.08       Bracket Broken (19542-000, 60.08)         (Summary)        60.08       Unknown (19542-000, 60.08)         (Summary)        60.08       Not Operable-Wafer Practured (10722-000, 0ty;1)         (Sumary)        50.08       Not Operable-Wafer Practured (10722-000, 0ty;1)         ed       16.74       16.78       Operable-Wafer Practured (10722-000, 0ty;1)         ed       16.74       16.78       Operable-Wafer Practured (10722-000, 0ty;1)         ed       16.74       12.54       Ditter (25016-000,

3-56	Failure Distribution Sur	mmaries		FMD-
Part Nesc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
•	al,Quartz bened	88.9%	80.04	Sources:4 Opens (24993-000,80.0%)
No	o Oscillation	11.14	10.04	No Oscillations (24993-000,10.0%), Failure to Oscillate (24997-000,NR)
Ur	hnown	<b></b>	10.0%	Unknown (24993-000,10.0%)
Ot	her Compation Failure		0.0%	Poor Electrical Connections (22540-000,NR)
	Connection Failure		NR	Poor Electrical Connections (22540-000, NR)
	Mechanical Overstress		NR	Excessive Internal Mechanical Stresses (24417-000,NR), Excessive Internal Mechanical Stress (22540-000,NR)
	Contaminated		NR	Increased Internal Resist-Excessive Contamination (24417-000,NR), Excessive Contamination (22540-000,NR)
	Seal/Gasket Failure		NR	Poor Seal (22540-000,NR)
	Drift		NR	Frequency Drift-Poor Seal (24417-000,NR), Frequency Shifts (24997-000,NR), Frequency Drift (22540-000,NR)
	Bent/Dented/Warped		NR	Bent or Damaged Pins (24997-000,NR)
	Intermittent Operation		NR	Intermittent Operation-Poor Electrical Connection (24417-000,NR), Intermittent (24997-000,NR)

Cylinder Leaking	Sources:2 50.0% 45.0% Leak (24992-000,50.0%), Internal Failure Hydraulic Oil (25101-000,Qty:1) (25101-00	
Cracked/Fractured	27.8% 25.0% Mechanical, Fracture, Etc. (24992-000,50.	) <del>*</del> )
Loose	11.1% 10.0% No Failure - Loose (25101-000,Qty:1)	
Contaminated	11.1% 10.0% Contaminated Fluid - Slams Into Battery (	25101-000,Qty:1)
Unknown	10.0% Unknown (25101-000,Qty:1)	

Delay Line Degraded Operation	52.0%	52.0%	Sources:2 DC Level Or Distorted Square Wave Output (10722-000,Qty:13)
Solder Joint Failure	20.04	20.0%	Failure Of The 90 NS Tap-Cracked Solder Joint (10722-000,Qty:1), Solder Joints Fractured (10722-000,Qty:1), 4 Of 40 Capacitor Solder Joints Fractured (10722-000,Qty:1), 15 NS Shift in Signal At Tap 30-Cracked Cap. Solde (10722-000,Qty:2)
Wire Failure	20.0	20.0%	Open Magnet Wires (10722-000,Qty:1), Open In Internal Wire-Mechanical Overstress (10722-000,Qty:1), Erratic Operation-Fractured Wires (10722-000,Qty:2), Magnet Wire Fractured At Pin 1 (10722-000,Qty:1)
Opened	4.0%	4.0%	Electrical Open-Tensile Failure (10722-000,Qty:1)
Output Stuck High	4.0\$	4.0%	High On All Output Taps (10722-000,Qty:1)
Other Transducer Seperation		0.0% NR	Seperation of the Transducer from the Blank (24417-002,NR)

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	MD-91 Failure Distribution Summaries 3				
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	or,Microwave ode Failure	100.0%	100.04	Sources:1 Diode Failure, No Output (25015-000,10.0%), Diode Failure, Power Loss (25015-000,90.0%)	
	or, Smoke, Alarm roneous Alarm	70.0%	70.04	Sources:1 Erroneous Alarm (24996-000,70.0%)	
Lo	as of Power	15.0%	15.0%	Battery or Power Failure (24996-000,15.0%)	
No	Operation	15.0%	15.0%	Failure to Operate (24996-000,15.0%)	
	ential Assy t of Adjustment	100.08	100.0%	Sources:1 Gear Binding - Out Of Adjustment (25101-000,Qty:1)	
Sh Op Dr Me In Bu	(Summary) orted ened ift chanical Failure termittent Operation rned/Charred ad Damage	40.1% 29.7% 12.2% 5.4% 4.6% 4.0%			
Diode Sh	orted	41.4*	38.7%	Sources:11 Short-Physical junction damage (25001-000,Qty:1), Short (10722-000,Qty:1) (24990-000,15.0%) (24992-000,12.5%) (24992-000,30.0%) (24993-000,75.0%) (24997-000,16.0%) (25014-000,Qty:10), Increase in Reverse Leakage (at any temperature) (25016-000,NR), High Reverse (24990-000,60.0%), Low Z (24991-000,7.0%) (24991-000,20.0%) (24991-000,54.0%), High Leakage Current (10722-000,Qty:1), Short-Improper Die Stack Bonding (24417-000,NR), Shorted Wire (24417-000,NR), Intermittent Short-Intern Mobile Conduct Particle (10722-000,Qty:1), Short Circuited (10722-000,Qty:1), Short-Externally Overstressed (10722-000,Qty:1), Low Reverse Breakdown (10722-000,Qty:1), Short-Recrystallization/Thermal Runaway (10722-000,Qty:1), High Electrical Leakage (10722-000,Qty:1)	
Ope	ened	28.6%	26.8%	Open (24990-000,25.0%) (24992-000,62.5%) (24992-000,70.0%) (25014-000,Qty:12) (25027-000,Qty:1) (25027-000,Qty:1), Wire Bond (25014-000,Qty:2), Lifted Wire (25014-000,Qty:1), Increase in Forward Voltage Drop (25016-000,NR), High Z (24991-000,46.0%) (24991-000,93.0%), Open Circuits (24993-000,6.0%), Open Wire (24417-000,NR), Open Winding Between Pins 10 And 11 (10722-000,Qty:1), Coil Pin 16-20 Open (10722-000,Qty:1), Open Circuit (24997-000,45.0%)	
Med	chanical Failure	8.3%		Broken Wire (25014-000,Qty:1), Cracked Die (24417-000,NR) (25014-000,Qty:4), Cracked Glass Case (25014-000,Qty:10), Package (25014-000,Qty:1), Dislocations (24417-000,NR), Fracture-Overtorquing (10722-000,Qty:9), Broken (25027-000,Qty:1) (25027-000,Qty:1), Glass Body Fractured-Mechanical Overstress (10722-000,Qty:1), Mechanical or Quality Defects (24997-000,12.0%)	
Lei	ad Damage	6.84	6.4\$	Lead Fractures-Faulty Welds & Leads In Weld Area (10722-000,Qty:45), Lead Fractured-Mechanical Overstress (10722-000,Qty:2)	

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art	Failure	Norm	Fail	Data
esc.				Source(s)/Details
	(continued) irred/Charred	5.14	4,8%	Burned (25027-000, gty:1) (25027-000, gty:1) (25027-000, gty:1)
Dr	rift	5.0%	4.74	Degraded (25014-000,Qty:8), Drift (24992-000,12.5%), Out Of Spec-Conductive Material Bridging Case (10722-000,Qty:1), Parameter Change (24997-000,25.0%)
Ir	ntermittent Operation	4.85	4.5%	Intermittent (24417-000,NR) (25014-000,Qty:21), Intermittent Circuits (24993-000,18.0%)
Ur	nknown		5.4*	Unknown (24991-000,80.0%) (24993-000,1.0%) (25014-000,Qty:7) (25014-000,Qty:13)
Ot	ther (<\$2) Die/Attachment Failure		1.0* 0.4*	Die Lifted (24417-000,NR), High Forward Voltage-Faulty Die Attachment (10722-000,Qty:3)
	Contaminated		0.24	Contamination (24417-000,NR) (25014-000,Qty:2)
	Whisker Alignment		0.2%	Whisker Alignment (25014-000,Qty:2)
	Diode Failure		0.18	Open Diode-Manufacturing Defect (10722-000,Qty:1)
	Metal Precipition		NR	Metal Precipitation (24417-000,NR)
	External Lead Seperation		NR	External Lead Seperation (24417-000, NR)
	Poor Solderability		NR	Poor Solderability (24417-000,NR)
	Seal Failure		NR	Loss of Hermetic Seal (24417-C00,NR)
	Oxide Defects		NR	Ion Migration Through and Across the Oxide (24417-000,NR), Hole Trapping in the Oxide (24417-000,NR), Holes in the Oxide (24417-000,NR)
	Decrease in Inverse Volt.		NR	Decrease in Working Inverse Voltage (25016-000,NR)
	Diode Array orted	100.0%	100.0%	Sources:1 Short-Al Particle (10722-000,Qty:1), Short-Extra Loose Die In Cavity (10722-000,Qty:1), Shorted-Al Silver Shorting Dice (10722-000,Qty:1)
Op Dr In	Microwave (Summary) ened ift termittent Operation orted	50.2% 23.3% 16.7% 9.8%		
	Microwave ift	70.0%	70.0%	Sources:3 Drift (24994-000,70.0%), Parameter Change (24997-000,NR)
Op	ened	20.0%	20.0%	Open (24417-000,NR) (24994-000,20.0%), Open Circuit (24997-000,NR)
Sh	orted	10.0%	10.0%	Short (24417-000,NR) (24994-000,10.0%) (24997-000,NR)
IJn	known		<0.1	Unknown (24997-000, NR)
_	duced			3db Degradation (24417-000, NR)

FMD-91				Failure Distribution Summaries 3		
Part Desc.	Failure Eode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details		
	Microwzve, Impatt. duced		<0.1%	Sources:1 Degradation-Migration (25037-000,NR)		
Ot.}	ner Shorted		100.00 NR	Short (25037-000,NR)		
•	Microwave, Point Contact aned	80.5%	80.5 <b>%</b>	Sources:1 High Z (24991-000,63.0%) (24991-000,98.0%)		
Shc	prted	19.5%	19.5%	Low Z (24991-000,2.0%) (24991-000,37.0%)		
-	ficrowave,Step Recovery ermittent Operation	50.0%	50.0%	Sources:1 Intermittent Fail-One Of Two Gold Bonds Was Broken (10722-000,Qty:1)		
Ope	ned	50.0%	50.0%	Electrically Open-Bond Not Attached To Die (10722-000,Qty:1)		
Sho Ope Dri Dio Ele	Mectifier (Summary) orted ined ft de Failure octrical Overstress proded	46.14 26.64 18.58 4.94 2.54 1.48				
	lectifier orted	54.9%	50.0%	Sources:4 Short (24994-000,20.0%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:6) (25000-000,Qty:7) (25000-000,Qty:9), 1K ohm short (reverse) (25001-000,Qty:1), Hard Short (1 ohm) (25001-000,Qty:1), Short-Overstress (10722-000,Qty:2)		
Dri	ft	31.9	29.1	Parameter Drift-General (25000-000,Qty:8) (25000-000,Qty:13) (25000-000,Qty:14), Parameter Drift-Insulation Res. (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:5) (25000-000,Qty:5) (25000-000,Qty:7) (25000-000,Qty:7) (25000-000,Qty:7) (25000-000,Qty:8) (25000-000,Qty:7) (25000-000,Qty:10) (25000-000,Qty:8) (25000-000,Qty:11) (25000-000,Qty:10) (25000-000,Qty:28) (25000-000,Qty:28) (25000-000,Qty:7), Parameter Drift-Delta R (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:6), Drift (24994-000,40.0%)		
Ope	ned	9.5%	8.7%	Open (24994-000,20.0%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2), Open-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:10) (25000-000,Qty:25), Open-Operi Junction (25000-000,Qty:2)		
Cor	roded	2.3	2.1\$	Corrosion (25000-000, Qty:4) (25000-000, Qty:10) (25000-000, Qty:24)		

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Part	Failure	Norm	Fai1	Data
Desc.		Dist.	Dist.	Source(A)/Details
Diode,Rectifier (continued) Intermittent Operation		0.6%	0.5%	Intermittent (25000-000,Qty:1) (25000-000,Qty:3), Intermittent-Noise (25000-000,Qty:6)
Se	al Failure	0.4	0.4%	Leakage Seal (25000-000,Qty:1) (25000-000,Qty:3), Seal Leak (25000-000,Qty:3)
Me	chanical Damage	0.40	0.3%	Mechanical Damage (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3)
In	nduced		8.34	Severely Degraded (10722-000,Qty:1)
Un	nknown		0.5%	Unknown (25000-000,Qty:3) (25000-000,Qty:6)
	Rectifier, Bridge Norted	100.0%	100.0%	Sources:1 Short-2 Diodes Overstressed (10722-000,Qty:1)
	Rectifier,Bridge,Three Phase Lode Failure		100.0%	Sources:1 Diode Shorted-Poor Die Attach/Wrong Diode (10722-000,Qty:1), Shorted Internal Diode-Overstress (10722-000,Qty:1)
	Rectifier,High Power mened	59.1%	59.1%	Sources:4 Open-Melted wire bond & die metal. (25001-000,Qty:1), Open Circuit (24996-000,42.5%) (24997-000,42.5%)
Sh	norted	34.84	34.84	Impaired Reverse Blocking Ability (24417-000,NR), Short (24996-000,57.5%) (24997-000,57.5%)
Dr	ift	6.1	6.1	Parameter Change (24996-000,10.0%) (24997-000,10.0%)
	Rectifier,High Voltage ectrical Overstress	100.0%	100.0	Sources:2 Out Of Tolerance High-Overstress (10722-000,Qty:1)
OL	her Thermal Fatique/Stress		0.04 NR	Thermal Fatigue (24417-000, NR)
	Rectifier,Low Power orted	60.0%	60.0%	Sources:1 Short (24994-000,60.0%)
Op	ened			Open (24994-000,40.0%)
Ot	her Drift		0.0% NR	Drift (24994-000,NR)

FMD-91				Failure Distribution	Summaries	3-61
Part Failure Desc. Mcde/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details			
Diode,SCR Shorted	98.04	98.0%	Sources:1 Short (24990-000,98.0	\$)	<u></u>	
Opened	2.04	2.0%	Open (24990-000,2.0%)			
Diode,Small Signal (Summary)						

48.3%
19.84
15.5%
8.84
3.24
3.24
1.18

Diode,Small Signal		Sources:2
Drift	72.74	40.0% Drift (24994-000,80.0%)
Cracked/Fractured	9.14	5.0% Crack In Die Causing Degradation (10722-000,Qty:1)
Shorted	9.14	5.0% Short (24994-000,10.0%)
Opened	9.1%	5.0% Open (24994-000,10.0%)
Induced		45.0% Degraded Junctions-Overvoltage EOS (10722-000,Qty:9)

Diode,Small Signai,General Purpose Drift		28.0%	Sources:1 Parameter Drift- General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:4) (25000-000,Qty:42) (25000-000,Qty:50), Parameter Drift- Delta C (25000-000,Qty:6), Parameter Drift- Delta Ir (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:7) (25000-000,Qty:1) (25000-000,Qty:3), Parameter Drift- Delta R (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:11) (25000-000,Qty:17)
Opened	30.3%	27.25	Open (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:28) (25000-000,Qty:57) (25000-000,Qty:100)
Shorted	19.64	17.6%	Short (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:2) (25000-000, Qty:2) (25000-000, Qty:3) (25000-000, Qty:119)
Intermittent Operation	13.9%	12.5%	Intermittent-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:43), Intermittent-Noise (25000-000,Qty:45)
Seal Failure	2.8%	2.5%	Seal Leak (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:15)
Mechanical Damage	2.34	2.14	Mechanical Damage (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:4) (25000-000,Qty:9)
Unknown		10.34	Unknown (25000-000,Qty:33) (25000-000,Qty:42)

art	Failure Distribution Su	Norin	Fail	Data
	Mode/Mech	Dist.	Dist.	Source(s)/Details
iode,5 Dri	Small Signal, Switching	40.0%	40.0	Sources:3 Drift (24994-000,80.0%)
qO	aned	17.54	17.54	Open (10722-000,Qty:1) (24994-000,10.0%)
Sho	orted	17.5%	17.5	Short (24994-000,10.0%), Short-Sliver/Copper Bridging Die Edge To Anode Stu (10722-000,Qty:1)
Int	ermittent Operation	12.5	12.5	Intermittent Anode Contact (10722-000,Qty:1)
Cha	ange in Resistance	12.5%	12.54	High Resistance-Wrong Die (10722-000,Qty:1)
Oth		*****	0.0	Machanical Stranger (24417-000 NP)
	Mechanical Overstress			Mechanical Stresses (24417-000, NR)
	Thermal Fatique/Stress		NR	Thermal Stress (24417-000,NR)
iode, 1	hyristor (Summary)			
	led Off	45.0% 40.0%		
	orted med	40.04		
	led On	5.0%		
	Thyristor led Off	45.0%	45.0%	Sources:2 Failed Off (24991-000,90.0%)
Sho	erted	40.0%	40.0%	Short (24994-000,80.0%)
Ope	ned	10.0%	10.0%	Open (24994-000,20.0%)
Fai	led On	5.0%	5.0%	Failed On (24991-000,10.0%)
Oth	er Drift		0.04 NR	Drift (24994-000,NR)
	hyristor,PUT led Off	90.0%	90.0%	Sources:1 Failed Off (24991-000,90.0%)
Fai	led On	10.0%	10.0%	Failed On (24991-000,10.0%)
	hyristor, Triac			Sources:1
Fai	led Off			Failed Off (24991-000,90.0%)
Fai	led On	10.0%	10.0%	Failed On (24991-000,10.0%)
	ransorb rted		****	Sources:1 Short-Overstress (10722-000,Qty:1), Short (10722-000,Qty:1)

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the second s				Failure Distribution Summaries 3-6
esc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
lode,	Zener (Summary)			
-	ened	35.2%		
	orted	33.54		
	ift	24.24		
H1	gh Leakage Current	4.44		
	stable Operation termittent Operation	1.8		
	chanical Damage	0.2%		
iode,				Sources:4
Sh	orted	52.24	47.04	Short (24990-000,50.0%) (24992-000,40.0%) (24997-000,15.7%), Low Z (24991-000,83.0%)
Ор	aned	38.14	34.34	Cpen (24990-000,50.0%) (24992-000,60.0%), High Z (24991-000,17.0%), Open Circuits (24997-000,10.5%)
Hiq	gh Leakage Current	6.94	6.24	Excessive Leakage Current (24997-000,26.0%)
	stable Operation	2.8%	2.54	Instability (24997-000,10.5%)
••••	known duced			Unknown (24997-000,26.3%)
			5170	Quality Defects (24997-000,15.7%)
	ener, Voltage Reference			Sources:3
Dri	.57	67.74	67.7%	Parameter Drift-General (25000-000,Qty:1) (25000-000,Qty:16) (25000-000,Qty:25), Parameter Drift-Delta Ir (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1), Parameter Drift-Delta Vz (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:5) (25000-000,Qty:8) (25000-000,Qty:9) (25000-000,Qty:12), Parameter Drift-Delta R (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:5), Parameter Drift-Insulation Resistance (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1), Drift (24994-000,70.0€)
Оре	ned	16.84	16.8%	Open-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Cty:12), Open-Open Junction (25000-000,Qty:4), Open (24417-000,NR) (24994-000,20.0%)
Sho	rted	13.04	13.04	<pre>Short (24417-000,NR) (24994-000,10.0%) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:6) (25000-000,Qty:14), Short-Shorted Junction (25000-000,Qty:1)</pre>
Int	ermittent Operation	1.98	1.9%	Intermittent (25000-000, Qty:1) (25000-000, Qty:5)
Mec	hanical Damage	0.64	0.6%	Mechanical Damage (25000-000,Qty:2)
Oth	er Thermal Fatique/Stress	·**	0.0% NR	Thermal Stress (24417-000,NR)

Part Failure Deac. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
iode,Zener,Voltage Regulator Cpened	45.0%	45.0%	Sources:3 High Z (24991-000,70.0%), Open (24994-000,20.0%)
Drift	35.0%	35.0%	Drift (24994-000,70.0%)
Shorted	20.0%	20.0%	Low Z (24991-000,30.0%), Short (24994-000,10.0%)
Other High Leakage Current	40 2.4 00 00 10 10 10	0.9% NR	Reverse Current Failures (24417-000,NR), Zener Impedance Failures (24417-000,NR)
isk, Burst Cracked/Fractured	87.5%	87.54	Sources:1 Fracture (24992-000,87.5%)
Closed	12.5%	12.54	Closed (24992-000,12.5%)
rum Binding/Sticking	70.0%	30.5%	Sources:1 Drum Sticks (19542-000,30.4%)
Out of Adjustment	30.0%	13.1	Drum Out Of Alignment (19542-000,8.7%), Not Properly Aligned (19542-000,4.3%)
Unknown		26.28	Unknown (19542-000,26.1%)
Induced		4.3%	Damaged Due to Overspeed & Many Impacts (19542-000,4.3%)
Other (<\$8) Opened		25.9% 4.3%	Has Open Tach Winding (19542-000,4.3%)
Servo Amp Failure		4.3	Servo Amp Found To Be Defective (19542-000,4.3%)
Bearing Failure		4.3	Drum Has Excessive Weight Bearing Damage (19542-000,4.3%)
Connector Failure		4.3	Connector P-4 Defective (19542-000,4.3%)
Broken		4.3*	Bracket Broken (19542-000,4.3%)
Bad Rotation		4.34	Bad Rotation After Drop Test (19542-000,4.3%)

Duct		Sources:1
Needs Replacement	57.18	40.0% Used Up Needs Replacement (19542-000,40.0%)
Cracked/Fractured	42.98	30.0% Cracked (19542-000,30.0%)
Unknown	**	20.0% Unknown (19542-000,20.0%)
Induced	agai faik ana gra- agan agar	10.0% Improperly Installed (19542-000,10.0%)

MD	MD-91 Failure Distribution Summaries 3-					
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details		
•	leater, Air o Operation	80.04	80.08	Sources:1 Catastrophic-Failed to Heat (18175-000,80.0%)		
01	verheated	20.04	20.0%	Catastrophic-Overheated (18175-000,20.0%)		
	Tray,Wireway nduced		<0.1	Sources:2 Flashover (24996-000,NR) (24997-000,NR)		
Ot	ther Insulation Failure	8448/48	100.0% NR	1r.sulation Failure (24996-000,NR) (24997-000,NR)		
	Mechanical Failure		NR	Mechanical Failure (24996-000,NR) (24997-000,NR)		
)yname Di	btor rift	62.5%	62.5%	Sources:1 Drift (24392-000,62.5%)		
Oj	pened	25.0%	25.0%	Open (24992-000,25.0%)		
S	norted	12.5%	12.5%	Short (24992-000,12.5%)		
cceni Oi	tric at of Synch.	75.0%	75.0%	Sources:1 Out Of Synch (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:7)		
O	ut of Adjustment	16.7%	16.7%	Out Of Adjustment - Inaccurate (25101-000,Qty:1), Out Of Adjustment - Out Of Synch (25101-000,Qty:1)		
L	0036	8.34	8.3%	Loose Nut(s) ~ Fnd In TI/PMCS/INSP (25101-000,Qty:1)		
	Power Dist. prn	51.18	51.1%	Sources:1 Worn, Chaffed, Frayed, or Torn (25464-000,Qty:24)		
B	roken	46.8%	46.8	Broken (25464-000, gry:22)		
C	ontact Failure	2.1	2.1%	Contact/Conn Defect (25464-000,Qty:1)		
	Rectifying Equ coken	73,9%	73.9	Sources:1 Broken (25464-000,Qty:17)		
B	Inding/Sticking	4.34	4.3	Binding Stuck or Jammad (25464-000, Qty:1)		
Co	ontact Failure	4.34	4.3	Contact/Conn Defect (25464-000,Qty:1)		
Ir	correct Current	4.3*	4.3	Current Incorrect (25464-000, Qty:1)		
Lo	00 <b>50</b>	4.34	4.3%	Loose,Damaged,or Missing Har (25464-000,Qty:1)		
Le	aking	4.3	4.3%	Leaking Internal or External (25464-000,Qty:1)		
	ift	4.3%		Fluctuates, Unstable or Errati (25464-000,Qty:1)		

Part	Failure	Norm	Fail	Data
Desc.	Mode/Mech	Disc.	Dist.	Source(s)/Details
	ical Filter (Summary)			
	ift	35.94		
	oken orted	25.14 23.14		
	ode Failure	7.2		
	ened	5.1		
•	mp Failure	3.61		,
Electr	ical Filter,EMI			Sources:2
Sh	orted	81.8%	81.84	Short-Excessive Solder (10722-000,Qty:2), Failure Of Insulation Resistance (10722-000,Qty:1), Short-Severely Overstressed (10722-000,Qty:2), 1.8 Ohm Short Lead To Case-Electrical Overstress (10722-000,Qty:1), IR Failure-Contamination Of Interior Glass Seal (10722-000,Qty:2), Short (10722-000,Qty:1) (24417-000,NR)
Caj	pacitor Failure	9.1%	9.1%	Capacitor-Mechanical Overstress (10722-000,Qty:1)
Ch	ange in Resistance	9.18	9.18	Resistance Was Variable-Poor Solder Connection (10722-000,Qty:1)
Oti	he <i>r</i>		0.0%	
	Opened			Open-Poor Solder Joint (24417-000,NR)
	Insertion Loss		NK	Low Insertion Loss-Open Capacitor (24417-000,NR), Low Insertion Loss-Shorted Inductor (24417-000,NR), Low Insertion Loss-Poor Solder Joint (24417-000,NR), Low Insertion Loss (24417-000,NR), Low Insertion Loss-Lossy Capacitor (24417-000,NR)
	lcal Filter,Feed-Thru ened	66.7%	66.7%	Sources:1 Opens-Insufficient Support Of Coil In Assemblies (10722-000,Qty:2)
Cha	ange in Capac.	33.3%	33.34	Low Capacitance Value Lead To Case (10722-000, Qty:1)
lectri	cal Filter.Microwave			Sources:1
Dri	•	80.0%	80.0%	Center Frequency Drift (25015-00C,80.0%)
Dic	de Failure	20.0%	20.0%	Diode Failure, No Output (25015-000,20.0%)
	.cal Filter,Network Deen	70.05	70.00	Sources:1
Dri		70.0%		Broken (25464-000,Qty:7)
Dri	np Failure	20.04	20.04	Fluctuates, Unstable or Errati (25464-000,Qty:2)

rt	Failure	Norm	Fail	Failure Distribution Summaries 3-
	Mode/Mech			Source(s)/Details
Ro Wi Bi Be	rical Motor (Summary) Dugh Operation Inding Failure Inding/Sticking Daring Failure Dened	22.44 21.34 21.14 20.94 14.34		
	rical Motor .nding/Sticking	34.4%	18.9%	Sources:5 Binding, Stuck or Jammed (25464-000,Qty:578)
Fa	ils to Run, After Start	19.78	10.8%	Catastrophic-Fails To Run Once Started (18175-000,31.0%) (18175-000,77.0%)
Op	æned	18.1%	9.9%	Has Open Tach-Winding (19542-000,7.7%), Open (24992-000,42.0%)
Br	rush Failure	10.94	6.0%	Failed - Brush (24990-000,15.0%), Performance (Degraded) - Brush (24990-000,15.0%)
Dr	ift	9.9%	5.4%	Drift (24992-000,27.0%), Fluctuates, Unstable or Errati (25464-000,Qty:1)
Ar	cing/Sparking	6.9%	3.84	Arc (24992-000,19.0%)
Un	known		19.1*	Unknown (18175-000,16.0%) (18175-000,16.0%) (19542-000,7.7%) (19542-000,7.7%) (19542-000,61.5%) (25464-000,Qty:2) (25464-000,Qty:15)
In	duced		8.4%	Failed - Lube (24990-000,15.0%), Ferformance (Degraded) - Commutator (24990-000,5.0%), Performance (Degraded) - Lube (24990-000,15.0%), Degraded - Hunts For Correct Position (18175-000,2.0%), Degraded - Fails To Position Correctly (18175-000,2.0%), Degraded - Shaft Fails To Run At Rated Speed (18175-000,3.0%), Degraded - Shaft Fails To Turn At Rated Speed (18175-000,7.0%)
Oti	her (<%6) Switch Failure			Switch Defective (19542-000,15.4%)
	Stator Failure		3.0%	Failed - Stator (24990-000,15.0%)
	Shorted		2.4*	Short (24992-000,12.0%)
	Fails to Op. on Demand		2.3%	Catastrophic-Fails To Operate On Demand (18175-000,23.0%)
	Fails to Position		2.34	Catastrophic-Fails To Position Properly (18175-000,23.0%)
	Rotor Failure		2.0%	Failed - Rotor (24990-000,10.0%)
	Cummutator Failure		2.0\$	Failed - Commutator (24990-000,10.0%)
	Worn		0.4%	Worn, Chaffed, Frayed or Torn (25464-000,Qty:13)
	Broken		<0.18	Broken (25464-000, gty: 3)

Electrical Motor, AC (Summary)	
Winding Failure	24.34
Bearing Failure	21.34
Fails to Run, After Start	18.1%
Mechanical Failure	16.64
Fails to Start	13.74
Electrical Failure	6.0%

art Failure	Norm	Fail	Data
sc. Mode/Mech	Dist.	Dist.	
ectrical Motor,AC Winding Failure	24.3%	18.4%	Sources:4 Under 200 H.P. (Winding Fail) (24996-000,35.0%), Over 200 H.P. (Windings and Ties) (24996-000,44.0%), Open Windings-Defective Wire (24417-001,NR), Winding Failure (24997-000,35.0%)
Bearing Failure	21.3%	16.1%	Under 200 H.P. (Bearings) (24996-000,50.0%), Brinelled or Damaged Bearings-Shock Loads (24417-001,NR), Bearing Failure-Misapplication (24417-001,NR), Bearing Failure (24997-000,50.0%)
Fails to Run, After Start	18.18	13.7%	Catastrophic-Fails To Run Once Started (18175-000,41.0%)
Mechanical Failure	16.6%	12.6%	Over 200 H.P. (All Mechanical) (24996-000,27.0%), Other and Mechanical (24997-000,15.0%), Mechanical Failure (24997-000,36.0%)
Fails to Start	13.7%	10.3%	Catastrophic-Fails To Start (18175-000,31.0%)
Electrical Failure	6.0%	4.5%	Electrical Failure (24997-000,28.0%)
Unknown		17.5%	Unknown (18175-000,21.0%) (24996-000,14.0%) (24996-000,15.0%) (24997-000,36.0%)
Other (<\$4) Lead Damage		7.0% 2.4%	j Over 200 H.P. (Leads) (24996-000,15.0%)
Degraded Operation		2.3%	Dagraded (19175-000,7.0%)
Brush Failure		2.34	Under 200 H.P. (Brushes) (24996-000,7.0%), Brushes (if any) (24997-000,7.0%)
Overheated		NR	Cverheating-Overloading (24417-001,NR), Overheating (24417-001,NR), Overheating of Windings-Op. at Too Low of a Voltag (24417-001,NR)
Shorted		NR	Shorted Windings-Defective Wire (24417-001,NR)
ectrical Motor, Induction, AC			Sources:1
Fails to Run, After Start	52.48	44.0%	Catastrophic-Fails To Run Once Started (18175-000,44.0%)
Fails to Start	40.5%	34.0%	Catastrophic-Fails To Start (18175-000,34.0%)
Degraded Operation	7.1	6.0%	Degraded (18175-000,6.0%)
Unknown		16.0%	Unknown (18175-000,16.0%)

Electrical Motor, Induction, AC, Sing Fails to Run, After Start		Sources:1 .0% Catastrop		nce Started (18175-500,43.0%)
Fails to Start	15.74	.0% Catastrop	hic-Fails To Start	(18175-000,8-0%)
Unknown		.0% Unknown (	18175-000,49.0%)	

	-91			Failure Distribution Summaries 3	3-(
art	Failure Mode/Mach	Norm	Fail	Data Saura (a) (Data) a	
esc.	Mode/Mech	Dist.	Dist.	Source(s)/Details	
	rical Motor, Induction, AC, Nous			Sources:1	
F	ails to Start	67.48	62.0%	Catastrophic-Fails To Start (18175-000,62.0%)	
F	ails to Run, After Start	32.6%	30.0%	Catastrophic-Fails To Run Once Started (18175-000,30.0%)	
11	nknown		9.05	Unknown (18175-000,8.0%)	
0	nknown		0.04	Unknown (101/3-000,0.0%)	
	rical Motor, Motor/Blower (Sum	mary) 27.3%			
	pened D Movement	20.7			
	orn	15.14			
	bisy	14.0%			
	it of Spec. It of Adjustment	12.4%			
0	it of Adjustment	10.54			
	rical Motor, Motor/Blower, AC pened	20.1	11.18	Sources:1 Opened (20609-000,Qty:103)	
-1					
No	Movement	19.78	10.8%	No Movement (20609-000, Qty:101)	
We	orn	18.7%	10.3%	Worn Out (20609-000,Qty:96)	
No	bisy	12.5%	6.98	Ncisy (20609-000,Qty:64)	
Сı	it of Spec.	11.5%	6.3%	Out of Specification (20609-000, Qty:59)	
OL	at of Adjustment	9.6%	5.3%	Out of Adjustment (20609-000, Qty:49)	
Lc	oss of Lubrication	8.0%	4.4*	Loss of Lubrication (20609-000, 2ty:41)	
Ur	known	*=====	33.4	Unknown (20609-000, Qty: 311)	
			33144		
Ot	ther (<\$5)		11.5%		
	Shorted		2.5%	Short (20609-000,Qty:23)	
	Cracked/Fractured		2.14	Cracked/Fractured (20609-000,Qty:20)	
	Spurious/False Operation		1.78	False Response (20609-000, Qty:16)	
	Leaking		1.34	Leaking (20609-000, Qty:12)	
	Intermittent Operation		1.24	Intermittent (20609-000, Qty:11)	
	Displaced		1.0%	Displaced (20609-000, Gty:9)	
	Unstable Operation		0.5%	Unstable (20609-000,Qty:5)	
	Excessive Vibration		0.48	Vibrating (20609-000,Qty:4)	
	Clogged/Clogging		0.49	Clogged (20609-000, Qty:4)	
	Overheated		0.1%	Overheated (20609-000, Qty:1)	
	Improper Timing		0.1%	Improper Timing (20609-000, Qty:1)	
	Burned/Charred		0.14	Burned (20609-000, gty:1)	
			A114	mariner (tanalana)Arliti	

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3-70	Failure Dis	tribution Summaries			FMD-91
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	cical Motor, Mot Operation	tor/Blower, AC, Induction 100.0%		Sources:1 No Operation (20609-000,Qty:1)	<u></u>

Electrical Motor, Motor/Blower, AC, B No Movement		se Sources:1 41.8% No Movement (20609-000,Qty:28)
Noisy	28.6%	23.9% Noisy (20609-000,Qty:16)
Overheated	10.7%	9.0% Overheated (20609-000,Qty:6)
Opened	5.4%	4.5% Opened (20609-000,Qty:3)
Out of Spec.	5.4*	4.5% Out of Specification (20609-000,Qty:3)
Other (<%4) Shorted		16.4% 3.0% Short (20609-000,Qty:2)
Out of Adjustment		3.0% Out of Adjustment (20609-000,Qty:2)
Spurious/False Operation		3.0% False Response (20609-000, Qty:2)
Cracked/Fractured		3.0% Cracked/Fractured (20609-000,Qty:2)
Excessive Vibration		1.5% Vibrating (20609-000,Qty:1)
Displaced		1.5% Displaced (20609-000,Qty:1)
Contaminated		1.5% Contaminated (20609-000,Qty:1)

Electrical Motor, Motor/Blower, AC, Split Phase Sources:1 Cracked/Fractured 50.0% 50.0% Cracked/Fractured (20609-000, Qty:1)

Displaced	50.0%	50.0% Displaced	(20609-000,Qty:1)

Electrical Motor, Motor/Blower, DC No Operation	46.3%	Sources:1 41.6% No Operation (20609-000,Qty:37)
Opened	16.3%	14.6% Opened (20609-000,Qty:13)
Out of Adjustment	12.5%	11.2% Out of Adjustment (20609-000,Qty:10)
Degraded Operation	10.0%	9.0% Degraded (20609-000,Qty:8)
Cracked/Fractured	8.7%	7.9% Cracked/Fractured (20609-000,Qty:7)
Out of Spec.	6.3€	5.6% Out of Specification (20609-000,Qty:5)
Unknown		1.1% Unknown (20609-000,Qty:1)
Other (<84) Overheated		9.0% 2.2% Overheated (20609-000, gty:2)
Noisy		2.2% Noisy (20609-000,Qty:2)
Spurious/False Operation		2.2% False Response (20609-000, Qty:2)
Intermittent Operation		1.1% Intermittent (20609-000, Qty:1)
Drift		1.1% Drift (20609-000,Qty:1)

FMD-9				Failure Distribution Summaries	3-7
esc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	ical Motor, Motor/Blower, DC, C : of Adjustment			Sources:1 Out of Adjustment (20609-000,Qty:1)	************
lectri Noi	ical Motor,Motor/Blower,Fan isy	100.0%	16.7%	Sources:1 Noisy (20609-000,Qty:1)	
Unk	nown		83.3%	Unknown (20609-000,Qty:5)	
	cal Motor,Motor/Blower,Fan, c of Adjustment	Axial 40.0%	33.34	Sources:1 Out of Adjustment (20609-000,Qty:4)	
No	Movement	30.0%		No Movement (20609-000, Qty:3)	
Noi	sy	10.04		Noisy (20609-000, Cty:1)	
	of Spec.	10.0%		Out of Specification (20609-000,Qty:1)	
Stu	ack Open	10.0%		Stuck Open (20609-000, Qty:1)	
Unk	nown			Unknown (20609-000, Qty:2)	
Int Dis No Out	cked/Fractured ermittent Operation uplaced Operation of Adjustment	20.0% 10.0% 10.0%	15.4% 7.7% 7.7% 7.7%	Cracked/Fractured (20609-000,Qty:2) Intermittent (20609-000,Qty:2) Displaced (20609-000,Qty:1) No Operation (20609-000,Qty:1) Out of Adjustment (20609-000,Qty:1)	
	nown			Unknown (20609-000,Qty:1) (20509-000,Qty:1) (20609-000,Qty:1)	
lectri Noi	cal Motor,Motor/Blower,Fan, sy			Sources:1 Noisy (20609-000,Qty:2)	
Out	of Spec.	40.0%	33.31	Out of Specification (20609-000, Oty:2)	
Spu	rious/False Operation	20.0%	16.7%	False Response (20609-000, Qty:1)	
Unki	nown		16.7%	Unknown (20609-000,Qty:1)	
	cal Motor,Motor/Blower,Induc Operation		75.0%	Sources:1 No Operation (20609-000,Qty:3)	
Dega	raded Operation	25.0%	25.0%	Degraded (20609-000,Qty:1)	

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3-72	Failure Distribution Sun			FMD-9
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	ical Motor, Motor/Blower, Syn			Sources:1 Opened (20609-000,Qty:55)
•				•
Ou	t of Spec.	13.04	10.8%	Out of Tolerance (20609-000,Qty:5), Out of Specification (20609-000,Qty:4)
In	termitient Operation	4.38	3.6%	Intermittent (20609-000,Qty:3)
De	graded Operation	2.98	2.4	Degraded (20009-000,Qty:2)
Un	known		16.9%	Unknown (20609-000,Qty:4) (20609-000,Qty:10)
	ical Motor,Servos,Composite ils to Position		40.0%	Sources:1 Catastrophic-Fails To Position (18175-000,40.0%) (18175-000,40.0%)
Fa	ils to Op. on Demand	49.78	39.5%	Catastrophic-Fails To Operate On Demand (18175000,39.0%) (18175-000,40.0%)
In	duced		20.5%	Degraded - Fails To Position Correctly (18175-000,10.0%) (18175-000,16.0%), Degraded - Hunts For Correct Position (18175-000,5.0%) (18175-000,10.0%)
	ical Motor,Squirrel Cage,AC ils to Start		42.0%	Sources:1 Catastrophic-Fails To Start (18175-000,38.0%) (18175-000,46.0%)
Fa	ils to Run,After Start	49.4	41.0%	Catastrophic-Fails To Run Once Started (18175-000,38.0%) (18175-000,44.0%)
Un	known		17.0	Unknown (18175-000,10.0%) (18175-000,24.0%)
	ical Motor,Stepper ugh Operation	100.0%	100.0%	Sources:1 Rough Operation (10722-000,Qty:1)
	ical Motor,Synchronous,AC,S ils to Run,After Start	ingle Pha 51.7%		Sources:1 Catastrophic-Fails To Run Once Started (18175-000,46.0%)
Fa	ils to Start	40.44	36.0%	Catastrophic-Fails To Start (18175-000,36.0%)
De	graded Operation	7.94	7.0%	Degraded (18175-000,7.0%)
Uni	known	****	11.0%	Unknown (18175-000,11.0%)
	ical Motor, Tachometer, Servo aring Failure		45.0%	Sources:1 Bearing Failure (24993-000,45.0%)
Wi	nding Failure	47.18	40.0%	Winding Failure (24993-000,40.0%)

FMD	-91			Failure Distribution Summaries 3-73
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	ronic Test Eqpt nknown		<0.).6	Sources:1 Unknown (24997-000,NR)
01	ther Incorrect Reading		100.0% NR	Zero or maximum reading (24997-000,NR)
	Spurious/False Cperation		NR	Erratic indication (24997~000,NR)
	ting Mech, Left roken	63.6%	18.9%	Sources:1 Broken Bolt(s) (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:1), Poor Design - Broken/Damaged (25101-000,Qty:5)
Ŀ	oose	18.2%	5.4%	Part Missing/Loose - Abnormal Operation (25101-000,Qty:1), Loose Bolt(s) - Stripped (25101-000,Qty:1)
We	orn	9,1%	2.7%	Worn - Inop Man Elevation (25101-000,Qty:1)
Le	eaking	9.1%	2.7%	Part Struck/Damaged - Leaking Fluid (25101-000,Qty:1)
Ir	nduced		70 <b>.3%</b>	<pre>Item Abuse/Neglect - Missing (25101-000,Qty:23), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Missing (25101-000,Qty:1), Item Abuse/Neglect - Broken Bolt(s) (25101-000,Qty:1)</pre>
	ing Mech,Right ant/Dented/Warped	66.7%	40.0%	Sources:1 Collapsed/Bent (25101-000, Gty:2)
Br	roken	33.3%	20.0%	Part Struck/Damaged - Broken Damaged (25101-000,Qty:1)
Ir	nduced		40.0%	Operating Error - Inop/Unserviceable (25101-000,Qty:1), Lack Of Lubrication - Noisy (25101-000,Qty:1)
	pr,Azimuth Movement	64.9%	35.6%	Sources:1 Antenna Won't Move (19542-000,32.3%), No Movement Between Dwells (19542-000,3.2%)
Re	sistor Failure	5.9%	3.2%	Resistor Is Defective (19542-000,3.2%)
Op	tical Assbly Failure	5.9%	3.2%	Optical Assembly Defective (19542-000,3.2%)
La	mp Failure	5.9%	3.2%	Lamp Design Defective (19542-000,3.2%)
In	correct Antenna Rotation	5.9%	3.2%	Incorrect Antenna Rotation (19542-000,3.2%)
Cr	acked/Fractured	5.9%	3.2%	Cracked Glass Disc (19542-000,3.2%)
Ċa	sing Rotates	5.9%	3.28	Casing Rotates (19542-000,3.2%)
	known		42.0%	Unknown (19542-000,41.9%)
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74 Failure Distribution Sur	IIIIIai lea		······································	FMD-9
rt Failure sc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details	
gine	••		Sources:1	
No Movement	44.0%	38.4%	No Movement (20609-000, Qty: 73)	
Leaking	22.98	20.0%	Leaking (20609-000, Qty: 38)	
Cracked/Fractured	10.2%	8.94	Cracked/Fractured (20609-000, Gty:17)	
Intermittent Operation	6.0%	5.3%	Intermittent (20609-000,Qty:10)	
Out of Adjustment	6.0%	5.3%	Out of Adjustment (20609-000,Qty:10)	
Out of Spec.	6.0%	5,3%	Out of Specification (20609-000,Qty:10)	
Spurious/False Operation	4.8%	4.2%	False Response (20609-000, Qty:8)	
Unknown		1.1%	Unknown (20609-000,Qty:2)	
Other (<%5) Noisy	به بو مر به مر	11.6% 3.2%	Noisy (20609-000,Qty:6)	
Seized		2.1	Seized (20609-000, Qty:4)	
Displaced		2.1%	Displaced (20609-000,Qty:4)	
Excessive Vibration		1.1%	Vibrating (20609-000,Qty:2)	
Unstable Operation		1.1%	Unstable (20609-000,Qty:2)	
Shorted		0.5%	Short (20609-000,Qty:1)	
Overheated		0.5%	Overheated (20609-000,Qty:1)	
Improper Timing		0.5%	Improper Timing (20609-000,Qty:1)	
Improper Flow		0.5%	Improper Flow (20609-000,Qty:1)	
gine,Diesel Mechanical Failure	23.34	21.2%	Sources:2 Moving Mechanical Parts (24990-000,30.0%), Engine	
Loss of Control	21.78	19.7%	(24996-000,12.0%) Control Circuits (24996-000,21.0%), Speed Control (24996-000,17.5%)	
Lube & Cooling Sys. Failure	12.78	11.5%	Lube and Cooling (24990-000,23.0%)	
Air & Fuel System Failure	12.75	11.5%	Air and Fuel (24990-000,23.0%)	
Electrical Failure	12.4	11.3*	Electric, Start, Battery (24990-000,1.0%), Starting S/System (24996-000,21.0%)	
Seal/Gasket Failure	8.8%	8.0%	Misc. and Seals (24990-000,16.0%)	
Lubricating System Failure	8.5%	7.7%	Fuel Oil S/System (24996-000,8.0%), Lube S/Systems (24996-000,7.0%)	

Other (<\$7) Cooling System Failure	 9.1% 5.6% Cooling S/System (24996-000,11.0%)
Block and Head Failure	3.5% Blocks and Heads (24990-000,7.0%)

	.91			Failure Distribution Summaries 3-
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	a, Turbine, Gas orn	53.54	53.5%	Sources:2 Worn, Chaffed, Frayed or Torn (25464-000,Qty:463)
Cr	acked/Fractured	44.84	44.8%	Cracked (25464-000,Qty:388)
Le	aking	1.6%	1.6%	Leaking Internal or External (25464-0 `,Qty:1) (25464-000,Qty:13)
Lo	00 <b>5</b> 0	0.14	0.14	loose, Damaged or Missing Har (25464-000,Qty:1)
Ot	her Seals & Bearings Failure		0.0% NR	Seals and Bearings (24996-000,NR)
	Grooving		NR	Fuel Sub-System (24996-000,NR)
	Compressor & Turbine Failur	:e	NR	Compressor and Turbine (24996-000,NR)
	Housing Failure		NP	Housing (24996-000,NR)
	Combustion Sub-System		NR	Combustion Sub-System (24996-000,NR)
	Loss of Lubrication		NR	Lubrication Sub-System (24996-000,NR)
	drator Assy Operation	44.8%	26.3%	Sources:1 Inop Man Elevation (25101~000,Qty:1) (25101-000,Qty:7), Internal Failure - Inop Man Elevation (25101-000,Qty:18)
Binding/Sticking 34.5%		20.2%	Internal Failure - Binding/Sticking (25101-000,Qty:13), Binding/Sticking (25101-000,Qty:1), Unknown - Binding/Sticking (25101-000,Qty:4), Worn - Binding/Sticking (25101-000,Qty:2)	
Lo	00 <b>50</b>	8,6%	5.1%	Internal Failure - Loose (25101-000,Qty:5)
Se	ized	5.2%	3.0%	Internal Failure - Seized (25101-000,Qty:3)
Ou	t of Adjustment	3.4%	2.0%	Out Of Adjustment - Inop Man Elevation (25101-000,Qty:2)
Br	oken	3.4%	2.04	Internal Failure - Broken/Damaged (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:1)
In	duced		37.4%	Caused By Other Failure-Broken/Damaged (25101-000,Qty:1), Improper Adjustment - Inop Man Elevation (25101-000,Qty:1), Improper Maintenance - Inop Man Elevation (25101-000,Qty:2), Improper Maintenance - Binding/Sticking (25101-000,Qty:1), Improper Maintenance - Fnd In TI/PMCS/INSP (25101-000,Qty:1), Improper Maintenance - Leaking Fluid (25101-000,Qty:1), Lack Of Maintenance - Binding/Sticking (25101-000,Qty:1), Lack Of Maintenance - Inop Man Elevation (25101-000,Qty:1), Lack Of Maintenance - Inop/Sluggish Breech (25101-000,Qty:3), Lack Of Maintenance - Fnd In TI/PMCS/INSP (25101-000,Qty:3), Lack Of Maintenance - Noisy (25101-000,Qty:1), Imp Assembly/Install (25101-000,Qty:1)
Unl	known		2.04	Unknown (25101-000, <u>Q</u> ty:2)
Oti	her (<\$3) Excessive Play		2.0% 1.0%	Excessive Play (25101-000, Qty:1)
	Worn		1.0%	Worn - Fnd In TI/PMCS/INSP (25101-000, Qty:1)

Part E	Failure	Norm	Fail	Data
	Mode/Mech	Dist.	Dist.	
	or Right d/Deteriorated	100.0%	50.08	Sources:1 Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1)
Tuar	aced		50.04	Item Abuse/Neglect - Missing (25101-000,Qty:1)
an Bind	ding/Sticking	95.04	95.04	Sources:1 Binding Stuck or Jammed (25464-od0,Qty:19)
Brol	ken	5.0%	5.04	Broken (25464-000, gty:1)
astene: Broj	rs, Lock ken	75.0%	50.0%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2)
	d/Deteriorated	25.0%		Deteriorated/Aged - Broken/Damaged (25101-000, Qty:1)
	uced			Caused By Other Failure-Missing (25101-000,Qty:1), Fell Off or Lost - Missing (25101-000,Qty:1)
Indu Othe	aced .		<0.1%	Rivets (Shear in Shank) (24996-000,NR), Rivets (Crushing Failure) (24996-000,NR), Shear in Shank (24997-000,NR), Crushing Failure (24997-000,NR)
	Nut Failure			Nuts & Bolts (Nut Failure) (24996-000,NR)
F	Bolt Failure		NR	Nuts & Bolts (Bolt Failure) (24996-000,NR)
r	Thread Failure		NR	Nuts & Bolts (Thread Fail) (24996-000,NR), Thread Fail (24997-000,NR)
5	Stud Cracked		NR	Nuts & Bolts (Stud or Lockwasher Cracked) (24996-000,NR), Stud or Lockwasher Cracked (24997-000,NR)
F	fatigue		NR	Pins (Fatigue Fracture) (24996-000,NR), Fatigue Fracture (24997-000,NR)
F	retting		NR	Pins (Fretting) (24996-000,NR), Fretting (24997-000,NR)
c	Corroded		NR	Pins (Corrosion) (24996-000,NR), Corrosion (24997-000,NR)
N	lo Clamping Force		NR	Failure to Provide Clamping Force (24997-000,NR)
B	olt & Nut Failure		NR	Nuts & Bolts Failure (24997-000,NR)
B	Broken		NR	Failure of Fastener (24997-000,NR)
М	echanical Failure		NR	Mechanical Failure (Breakage or Corrosion) (24997-000,NR)
c	Contact Failure		NR	Electrical Contact Failure (24997-000,NR)

FMD-91			Failure Distribution Summaries	3-77
Part Failure Desc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	anganin ng a minintana si ki
Fasteners, Retaining Ring Worn	50.0%	33.31	Sources:1 Needs Replacement (19542-000,33.3%)	
Out of Adjustment	50.0%	33.34	Needs Adjustment (19542-000,33.3%)	
Unknown		33.34	Unknown (19542-000,33.3%)	
Fitting Leaking	33.54	21.94	Sources:2 Leaking (19542-000,28.6%) (20609-000,Qty:26)	
Cracked/Fractured	30.7%	20.14	Cracked/Fractured (20609-000,Qty:69)	
Broken	16.5%	10.8%	Broken (20609-000,Qty:37)	
Aged/Deteriorated	8.9%	5.8%	Deteriorated (20609-000,Qty:20)	
Contaminated	5.4%	3.6%	Needs Cleaning (19542-000,7.1%)	
Scored	4.9%	3.2%	Scored (20609-000,Qty:11)	
Unknown		28.9%	Unknown (19542-000,57.1%) (20609-000,Qty:1)	
Induced		3.6%	Improper Adjustment (19542-000,7.1%)	
Other (<%3) Out of Spec.		2.3% 1.2%	Out of Tolerance (20609-000,Qty:4)	
Bent/Dented/Warped		0.9%	Warped (20609-000,Qty:1), Distorted (20609-000,Qty:2)	
Worn		0.3%	Worn Out (20609-000,Qty:1)	

Fitting,Lubrication Induced Sources:1 Sources:1 ----- 100.0% Item Abuse/Neglect - Missing (25101-000,Qty:1) (25101-000,Qty:2), Fell Off Or Lost - Missing (25101-000,Qty:2), Vibration - Missing (25101-000,Qty:1) (25101-000,Qty:2), Wrong Part - Loose (25101-000,Qty:1), Improper Installation - Missing (25101-000,Qty:1), Improper Installation - Broken/Damaged (25101-000,Qty:1), Improper Maintenance - Stripped (25101-000,Qty:1)

Frame Assembly Bent/Dented/Warped	Sources:1 20.0% 57.1% Warped/Bent - Inaccurate (25101-000,Qty:1) (25101-000,Qty:2), Collapsed/Bent (25101-000,Qty:1)
Broken	20.0% 14.3% Part Struck/Damaged - Inaccurate (25101-000,Qty:1)
Induced	28.6% Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Item Abuse/Neglect - Inaccurate (25101-000,Qty:1)

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art	Failure	Norm	Fail	Data
	Mode/Mach	Dist.		Source(s)/Details
	ssembly, Support cked/Fractured	60.0%	50.0%	Sources:1 Vibration - Cracked (25101-000,Qty:1), Cracked (25101-000,Qty:1) (25101-000,Qty:1)
Bro	ken	20.04	16.7%	Part Struck/Damaged (25101-000, Qty:1)
Age	d/Deteriorated	20.0%	16.7%	Deteriorated/Aged Cracked (25101-000,Qty:1)
Ind	uced		16.74	Overtorqued - Stripped (25101-000,Qty:1)
use Fai	ls to Open	29.8%	25.0%	Sources:10 Failure to Open or Blow (25016-000,NR), Failure to Open (22540-000,NR) (24417-001,NR) (24990-000,15.0%), Failure to Open or Slow to Open Circuit (24996-000,78.0%) (24997-000,78.0%)
Slo	w Open	25.5%	21.48	Slow Open (20609-000,75.0%) (24990-000,75.0%)
Blo	wn Fuse	22.78	19.0%	Fuse Blown (23038-001,Qty:1) (23038-002,Qty:1)
Ope	r;ed	9.3%	7.8%	Open Circuit (25016-000,NR), Opens (24990-000,10.0%), Blown Fuse (23038-006,Qty:1) (23038-006,Qty:6) (23038-006,Qty:13), Open (22540-000,NR)
Pre	mature Open	5.0%	4.2%	Premature Open (20609-000,10.0%), Premature Open Circuit (24996-000,9.5%) (24997-000,9.5%), Unecessary Opening (24417-001,NR)
Los	s of Power	4.28	3.5%	Electrical Pwr Loss (23038-006,Qty:11)
Mec	hanical Failure	3.5%	2.9%	Other (Short to Ground, Mechanical Failure) (24996-000,10.0%) (24997-000,10.0%)
Ind	uced	<b></b>	10.5%	Missing (23038-002,Qty:2), Overloaded (23038-006,Qty:3)
Unk	nown		1.9%	Unknown (23038-006,Qty:3) (23038-006,Qty:3)
	er (<%4) Dut of Spec.		3.7% 2.1%	Out of Specification (20609-000,15.0%)
(	Connection Failure		1.0%	Connection Defective (23038-006,Qty:3)
i	Audio Fault/Failure		0.3%	Audio Faulty (23038-006,Qty:1)
1	No Output		0.3%	No Output (23038-006,Qty:1)
	ark Gap metic Leakage	100.04	100.0%	Sources:1 Failed to Fire-Major Hermetic Leakage (25027-000,Qty:9)
ise, Sui Brol	rge Arrestor Ken	64.7%	52.4%	Sources:1 Broken (23038-006,Qty:11)
Cut,	Scarred/Punctured	29.4	23.84	Cut/Torn (23038-006,Qty:5)
Worn	n .	5.9%	4.88	Worn Excessive (23038-006,Qty:1)
Unkr	own		14.3%	Unknown (23038-006,Qty:3)
Indu	lced		4.8%	Missing (23038-006, gty:1)

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Part	Failure	Norm	Fail	Data
Desc.	Mode/Mech	Dist.	Dist.	Source(s)/Details
Gasket	(Summary)			
Me	chanical Damage	24.7*		
La	aking	21.4%		
Ne	eds Replacement	21.3%		
Ag	ed/Deteriorated	19.4%		
Br	oken	7.1%		
Wo	rn	6.1%		
Gasket	ed/Deteriorated	49 99	29.05	Sources:1 Deteriorated/Aged - Leaking Hydraulic Oil (25101-000,Qty:2)
•-3				<pre>(25101-000,Qty:2), Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Deteriorated/Aged - Low Pow Pl Oil Press (25101-000,Qty:1), Deteriorated/Aged - Leaking Nitrogen (25101-000,Qty:1), Deteriorated/Aged - Deteriorated (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Deteriorated (25101-000,Qty:1), Deteriorated/Aged - Fnd In TI/PMCS/INSP (25101-000,Qty:5), Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)</pre>
Br	oken	24.4%	14.5%	Broken/Damaged (25101-000,Qty:2) (25101-000,Qty:3) (25101-000,Qty:5)
Wo.	rn	19.5%	11.6%	Seals Worn - Slams Into Battery (25101-000,Qty:1), Seals Worn - Leaking Hydraulic Oil (25101-000,Qty:1), Seals Worn - Internal Moisture (25101-000,Qty:2), Seals Worn - Inop/Unserviceable (25101-000,Qty:2), Seals Worn - Leaking Fluid (25101-000,Qty:1), Seals Worn - Fnd In TI/PMSC/INSP (25101-000,Qty:1)
Cra	acked/Fractured	2.4%	1.4%	Cracked (25101-000,Qty:1)
Lea	aking	2.4%	1.4%	Leaking Fluid (25101-000,Qty:1)
Se	ized	2.4%	1.4%	Seized/Frozen - Inop/Unserviceable (25101-000,Qty:1)
Unl	known		36.24	Unknown (25101-000,Qty:25)
Ind	duced		4.3%	<pre>Improper Installation - Leaking Hydraulic Oil (25101-000,Qty:1), Improper Installation - Internal Moisture (25101-000,Qty:1), Improper Install - Missing (25101-000,Qty:1)</pre>
	,Packing,Preform ad/Deteriorated	57.1%	57.1*	Sources:1 Deteriorated/Aged - Cracked (25101-000,Qty:1),
				Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:3), Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1), Deteriorated (25101-000,Qty:1) (25101-000,Qty:1), Deteriorated/Aged - Leaking Hydraulic Oil (25101-000,Qty:1)
Bro	oken	19.0%	19.0%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2)
Woi	rn	19.0%	19.0%	Seals Worn - Leaking Hydraulic Oil (25101-000,Qty:3), Seals Worn - Inop/Unserviceable (25101-000,Qty:1)

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art Failure	Norm	Fail	Data
asc. Mode/Mech	Dist.	Dist.	Source(s)/Details
isket, Seal			Sources:4
Mechanical Damage	32.4%	27.0%	Mechanical Damage (24996-000,54.0%), Organic Mat. (Mechanical Damage) (24997-000,NR)
Needs Replacement	28.0%	23.3%	Needs Replacement (19542-000,46.7%)
Leaking	27.4%	22.8%	Leaking (19542-000,6.7%), Leaks (24996-000,39.0%), Organic Mat. (Gross leaks) (24997-000,NR), Leakage-Wear (25036-000,NR), Leakage-Elastic Deformation-Gasket/Seal Distortion (25036-000,NR), Leakage-Surface Damage (25036-000,NR), Leakage-Embrittlement (25036-000,NR)
Aged/Deteriorated	4.2%	3.5%	Physical Deterioration (24996-000,7.0%), Organic Mat. (Material deterioration) (24997-000,NR)
Seal/Gasket Failure	4.0%	3.3%	Bad Internal Seal In Gear Drive (19542-000,6.7%)
Dislocates During Movement	4.0%	3.3%	Pops Up During Antenna Movement (19542-000,6.7%)
Unknown		13.3%	Unknown (19542-000,26.7%) (24997-000,NR)
Induced		3.3%	Improper Installation (19542-000,6.7%)
Other Pin Holes	** ****	0.0% NR	Ceramic/Glass to Metal(Pin holes/channels @ Metal) (24997-000,NR)
Solder Joint Failure		NR	Ceramic/Glass to Metal(Soldered or brazing failure (24997-000,NR)

Gauge Leaking	40.0%	Sources:2 25.5% Leaking (20609-000,Qty:62), Leak or Rupture (24996-000,NR)
Broken	27.7%	17.7% Ruptured (20609-000,Qty:2), Broken (20609-000,Qty:41)
Out of Adjustment	14.8%	9.5% Out of Adjustment (20609-000,Qty:23)
Binding/Sticking	9.0%	5.8% Binding (20609-000,Qty:14)
Intermittent Operation	4.5%	2.9% Intermittent (20609~000,Qty:7)
Out of Spec.	3.9%	2.5% Out of Tolerance (20609-000,Qty:6)
Unknown		34.2% Unknown (20609-000,Qty:83)
Other (<%3) Displaced		2.1% 1.2% Displaced (20;09-000,Qty:3)
No Operation		0.8% No Operation (20609-000,Qty:2)
Incorrect Reading		NR Incorrect Reading (24996-000,NR)

Gauge,Compass Binding/Sticking	Sources:1 40.9% 29.0% Binding (20609-000,Qty:117)
Leaking	26.2% 18.6% Leaking (20609-000,Qty:75)
No Movement	17.5% 12.4% No Movement (20609-000,Qty:50)
Broken	8.4% 6.0% Broken (20609-000, Qty:24)
Out of Spec.	4.9% 3.5% Out of Tolerance (20609-000,Qty:14)

	91	····-		Failure Distribution Summaries 3-
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Compass (continued) uricus/False Operation	1.78	1.2%	Erratic (20609-000, Qty:5)
Bu	rned/Charred	0.3%	0.2%	Burned (20609-000,Qty:1)
Un	known		29.0%	Unknown (20609-000,Qty:117)
	Pressure ift	40.9%	40.9%	Sources:1 Drift (24992-000,40.9%)
Bi	nding/Sticking	27.3%	27.3%	Binding (24392-000,27.3%)
Sh	orted	9.1%	9.1%	Short (24992-000,9.1%)
Le	aking	9.1%	9.1%	Leak (24992-000,9.1%)
Op	ened	9.1%	9.1%	Open (24992-000,9.1%)
Un	stable Operation	4.5%	4.5%	Unstable (24992-000,4.5%)
Bi: Br Wo: Lo Fat	Summary) nding/Sticking oken rn ss of Lubrication tigue eds Replacement	34.88 26.18 21.58 6.78 6.58 4.48		
ear Wo:	rn	43.4%	31.3%	Sources:3 Worn Out (19542-000,40.0%) (20609-000,Qty:14)
Bir	nding/Sticking			Binding (20609-000, Qty:2) (24990-000, 80.0%)
	ripped	5.3%		Stripped (20609-000, Qty:3)
	oken	3.6%		Broken (20609-000, Qty:2)
	nmed/Stuck	3.6%		Jammed (20609-000, Qty:2)
	splaced	1.8%		Displaced (20609-000, Qty:1)
Noi	-	1.8%		Noisy (20609-000, Qty:1)
	snown		27.9%	Unknown (19542-000,60.0%) (20609-000,Qty:1) (24990-000,20.0%)
	sembly,Housing ding/Sticking	35.7%	29.4	Sources:1 Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:2), Part Struck/Damaged - Binding/Sticking (25101-000,Qty:1), Worn - Binding/Sticking (25101-000,Qty:1)
Exc	essive Play	21.4		Worn - Excessive Play (25101-000,Qty:3)
	ken		17.6%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Out	of Adjustment	14.3%	11.84	Out Of Adjustment - Binding/Sticking (25101-000,Qty:1), Out Of Adjustment - Excessive Play (25101-000,Qty:1)
Ski	pping	7.1	5.9%	Internal Failure - Skips (25101-000,Qty:1)

	Failure Distribution Sum		17 - 1 5	FMD
	ilure de/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
ar Asse Induc	mbly,Housing (continued) ed		17.6%	<pre>Improper Install - Binding/Sticking (25101-000,Qty:1), Lack Of Maintenance - Found In TI/PMCS/Insp (25)01-000,Qty:1), Operator Error - Broken/Damaged (25101-000,Qty:1)</pre>
ar <b>Asse</b> Worn	mbly,Hcusing,Upper Elev	33.3%	23.8%	Sources:1 Worn Out (25101-000,Qty:1), Worn/Stripped - Inop Man Elevation (25101-000,Qty:3), Worn/Stripped - Stripped Gear/Spline (25101-000,Qty:1)
Exces	sive Play	26.7%	19.0%	Excessive Play (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2)
Bindi	ng/Sticking	13.3%	9.5%	Worn - Binding/Sticking (25101-000,Qty:1), Gears Binding - Binding/Sticking (25101-000,Qty:1)
Creep		13.3%	9.5%	Creep (25101-000,Qty:1), Internal Failure - Creep (25101-000,Q'.y:1)
Skipp	ing	13.3%	9.5%	Skips (25101-000,Qty:1) (25101-000,Qty:1)
Induc	ed		14.3%	Caused By Other Failure-Inop Man Elevation (25101-000,Qty:1), Improper Maintenance - Stripped Gear/Spline (25101-000,Qty:1), Lack Of Lubrication - Inop Man Elevation (25101-000,Qty:1)
	(<%7) Operation		14.3% 4.8%	Inop Man Elevation (25101-000,Qty:1)
In	termittent Operation		4.8%	Internal Failure - Intermittent Operation (25101-000,Qty:1)
Br	oken		4.8%	Broken/Separated - Inop Man Elevation (25101-000,Qty:1)
ear Asse Seize	mbly,Worm d	50.0%	50.0%	Sources:1 Seized/Frozen - Inop/Unserviceable (25101-000,Qty:1)
Exces	sive Play	50.0%	50.0%	Excessive Play (25101-000,Qty:1)
ear Box Loss	of Lubrication	66.7%	66.7%	Sources:1 No Oil In Gear Box (19542-000,66.7%)
Needs	Replacement	33.3%	33.3%	Need: Overhaul (19542-000,33.3%)
	Mechanical Device ng/Sticking	81.8*	39.14	Sources:1 Binding (20609-000, gty:9)

Unknown

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----- 52.2% Unknown (20609-000, Qty:12)

	-91			Failure Distribution Summaries 3-
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Set,Matched inding/Sticking	50.0%	20.0%	Sources:1 Gears Binding - Inop/Unserviceable (25101-000,Qty:1)
B	roken	50.0%	20.04	Broken/Damaged (25101-000,Qty:1)
Iı	nduced		40.0%	<pre>Improper Install - Inop/Unserviceable (25101-000,Qty:1), Lack of Maintenance - Inop/Sluggish Breech (25101-000,Qty:1)</pre>
Ur	iknown	<b></b>	20.0%	Unknown (25101-000,Qty:1)
ear,I Wo	Sevel prn	36.4%	36.4%	Sources:1 Worn - Noisy (25101-000,Qty:1), Worn - Inop/Unserviceable (25101-000,Qty:1), Worn Out (25101-000,Qty:1), Worn - Inop Man Elevation (25101-000,Qty:1)
Cł	nipped	27.3%	27.3%	Chipped-Inop Man Elevation (25101-000,Qty:1) (25101-000,Qty:1), Chipped-Noisy (25101-000,Qty:1)
E	cessive Play	18.2%	18.2%	Worn - Excessive Play (25101-000,Qty:1) (25101-000,Qty:1)
Bi	inding/Sticking	9.1%	9.1%	Worn/Stripped - Binding/Sticking (25101-000,Qty:1)
Ou	ut of Adjustment	9.1%	9.14	Out Of Adjustment - Binding/Sticking (25101-000,Qty:1)
	Box Traversing Bal/Gasket Failure	50.0%	50.0%	Sources:1 Seals Worn - Leaking Fluid (25101-000,Qty:1)
Lc	00 <b>3e</b>	50.0 <b>%</b>	50.0%	Loose Nut(s) - Preventive Action (25101-000,Qty:1)
ear,[		<i>(</i> <b>7</b>	20.04	Sources:1
	orn ods Replacement			Worn Out (19542-000,20.0%)
	duced			Needs Replacement (19542-000,10.0%) Improper Adjustment (19542-000,30.0%), Improper Installations (19542-000,10.0%)
Un	known		30.0%	Unknown (19542-000,30.0%)
-	ousing Elev oken	55.2%	44.4%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:11), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:4)
Cr	acked/Fractured	31.0%	25.0%	Cracked (25101-000,Qty:8), Part Struck/Damaged - Cracked (25101-000,Qty:1)
Bi	nding/Sticking	3.4%	2.8%	Binding/Sticking (25101-000,Qty:1)
No	Operation	3.4*	2.8%	Inop Power Elevation (25101-000,Qty:1)
Be	nt/Dented/Warped	3.4%	2.8	Warped Bent - Abnormal Operation (25101-000,Qty:1)
No.	isy	3.41	2.8%	Noisy (25101-000,Qty:1)
In	duced			Lack Of Lubrication - Binding/Sticking (25101-000,Qty:2), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Item Abuse/Neglect - Binding/Sticking (25101-000,Qty:1), Item Abuse/Neglect - Cracked (25101-000,Qty:2)

art Failure	Norm	Fail	Data
esc. Mode/Mach	Dist.	Dist.	Source(s)/Details
ear,Housing Elev (continued) Unknown		2.8%	Unknown (25101-000,Qty:1)
ear, Internal Binding/Sticking	100.0%	100.0%	Sources:1 Binding/Sticking (25101-000,Qty:3)
ear,Sector Loose	28.6%	25.0%	Sources:1 Loose (25101-000,Qty:1), Loose Nut(s) - Inaccurate (25101-000,Qty:1)
Binding/Sticking	28.6%	25.0%	Binding/Sticking (25101-000,Qty:1), Worn - Binding/Sticking (25101-000,Qty:1)
Excessive Play	28.6%	25.0%	<pre>Worn - Excessive Play (25101-000,Qty:1), Part Missing/Loose - Excessive Play (25101-000,Qty:1)</pre>
Worn	14.3%	12.5%	Worn - Inaccurate (25101-000,Qty:1)
Induced		12.5%	<pre>Part Struck/Damaged - Abnormal Operation (25101-000,Qty:1)</pre>
ear, Spur Seized	100.0%	100.0%	Sources:1 Worn/Stripped - Seized (25101-000,Qty:1)
ear,Spur,Helicar Broken	64.6%	64.6%	Sources:1 Breakage Teeth (24996-000,61.2%)
Fatigue	21.4%	21.4%	Surface Fatigue (Pitting and Spalling) (24996-000,20.3%)
Worn	13.9%	13.9%	Wear (Abrasive and Adhesive) (24996-000,13.2%)
ar, Spur, Splined Cracked/Fractured	100.0%	100.0%	Sources:1 Cracked/Split-Binding/Sticking (25101-000,Qty:1)
ear,Traveling,Front Handwheel Bearing Failur <del>e</del>	28.6%	28.6%	Sources:1 Bearing Failure-Inop Man Traverse (25101-000,Qty:2)
Bent/Dented/Warped			Part Struck/Damaged - Collapsed/Bent (25101-000,Qty:2)
Loose	14.3%	14.3%	Part Missing/Loose - Inop Man Traverse (25101-000, Qty:1)
Excessive Play	14.3%	14.34	Excessive Play (25101-000, Qty:1)
No Operation			Inop Man Traverse (25101-000,Qty:1)

	m. 11	N	19 - 2 1		3-8
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	raveling, Front Roller	715 04	<u> </u>	Sources:1	
50	al/Gasket Failure	/5.0%	60.08	Seals Worn - Leaking Fluid (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1)	
				(20101-000,209,1) (20101-000,209,1)	
Be	aring Failure	25.0%	20.0%	Bearing Failure - Excessive Play (25101-000,Qty:1)	
-					
10	duced		20.04	<pre>Improper Installation - Stripped (25101-000,Qty:1)</pre>	
General	tor (Summary)				
	ift	34.0%			
	Output	18.1%			
	graded Operation	15.4%			
Wo	orted	9.3% 7.9%			
	ils to Run, After Start	7.8%			
	ss of Control	7.5%			
ienerat Der	tor graded Operation	49.8%	40.7%	Sources:5 Loss of Output (24990-000,20.0%), Degraded	
	gF			(18175-000,7.0%), Sheared (23038-004,Qty:1), Low Power (23038-005,Qty:1) (23038-005,Qty:1)	
Dri	ift	19.7%	16.1%	Drift or Intermittent (24990-000,80.0%), Drift (20609-000,Qty:2)	
Fai	ils to Run,After Start	14.0%	11.4%	Catastrophic-Fails Once Started (18175-000,24.0%)	
Wor	rn	8.0%	6.5%	Worn Out (20609-000,Qty:192)	
	ils to Start	6.4%		Catastrophic-Fails To Start (18175-000,11.0%)	
Bro	oken	1.18	0.9%	Broken (20609-000, 2ty: 26)	
Cor	ntaminated	1.1%	0.9%	Contaminated (20609-000, Qty:26)	
Unk	cnown		16.2%	Unknown (20609-000,Qty:281) (23038-005,Qty:1)	
Oth	ner (<\$2) Unit of Spec.		2.0% 0.8%	Out of Tolerance (20609-000,Qty:17), Out of Specification	
				(20609-000,Qty:7)	
	Shorted			short (20609-000,Qty:11)	
	Seized Burned/Charred			Seized (20609-000,Qty:8) Burned (20609-000,Qty:8)	
	No Operation			No Operation (20609-000,Qty:4)	
	Leaking			Leaking (20609-000, Qty: 3)	
	Binding/Sticking			Binding (20609-000, Qty:2)	

2.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
erat	Lor, AC		<b></b>	Sources:5
	Output	30.0%	14.1	No Output (23038-004,Qty:4) (23038-004,Qty:6) (23038-006,Qty:14) (23038-006,Qty:25) (23038-006,Qty:63)
Dri	ifu	26.5%	12.5%	Drift (24992-000,62.5%)
Op€	aned	12.4%	5.9%	Open (23038-004,Qty:1) (24992-000,25.0%), Opened (20609-000,Qty:5)
Fai	ils to Run,After Start	12.34	5.8%	Catastrophic-Fails Once Started (18175-000,28.0%) (18175-000,28.0%), Inoperative (23038-004,Qty:1)
Sho	orted	9.4%	4.4%	Short (20609-000,Qty:5) (23038-006,Qty:9) (24992-000,12.5%), Shorted Or Grounded (23038-004,Qty:1)
Int	ermittent Operation	9.3%	4.4%	Intermittent (20609-000,Qty:33)
Unk	nown		18.1%	Unknown (18175-000,52.0%) (18175-000,52.0%) (20609-000,Qty:14) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:2) (23038-004,Qty:23) (23038-006,Qty:2)
Ind	luced		1.8%	Caused By Other Dev. (23038-004,Qty:2), Sheared (23038-004,Qty:2) (23038-004,Qty:2) (23038-006,Qry:1), Improper Energy Resp (23038-004,Qty:1), Operating Error (23038-004,Qty:1), Improper Alignment (23038-006,Qty:1)
	wer (<%5) No Movement		33.0% 4.0%	No Movement (20609-000,Qty:30)
	Loss of Control		3.9%	Control Inoperative (23038-004,Qty:1) (23038-004,Qty:11) (23038-006,Qty:2) (23038-006,Qty:11)
	Degraded Operation		3.8%	Degraded (18175-000,8.0%) (18175-000,8.0%), Electrical Pwr Loss (23038-004,Qty:3) (23038-004,Qty:6), Improper Source Output (23038-004,Qty:1), Fluctuates (23038-006,Qty:2)
	Incorrect Voltage		3.0%	Incorrect Voltage (23038-004,Qty:1) (23038-004,Qty:6) (23038-006,Qty:14)
	Out of Spec.		2.7%	Out of Specification (20609-000,Qty:20)
	Fails to Start		2.4%	Catastrophic-Fails To Start (18175-000,12.0%) (18175-000,12.0%)
	Bearing Failure		2.34	Bearing Failure (23038-004,Qty:1) (23038-006,Qty:18)
	Spurious/False Operation		2.35	False Response (20609-000,Qty:17)
	Worn		1.3%	Worn Excessively (23038-004,Qty:7)
	Out of Adjustment		1.19	Alignment Improper (23038-004,Qty:1), Out of Adjustment (20609-000,Qty:7)
	Displaced		0.8%	Displaced (20609-000,Qty:6)
	Binding/Sticking		0.8%	Bind/Size/Friction (23038-004,Qty:1), Sticky (23038-006,Qty:5)
	Broken		0.8%	Broken (23038-004,Qty:1) (23038-004,Qty:3)
	Cracked/Fractured		0.5%	Cracked/Fractured (20609-000,Qty:4)
	Arcing/Sparking		0.5%	Arcing (20609-000,Qty:1) (23038-004,Qty:2)
	Noisy		0.4%	Noisy (20609-000,Qty:3)
	Excessive Vibration		0.4	Excessive Vibration (23038-004,Qty:2)

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Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
Genera	tor,AC (continued)		·······		
Ot	her (continued) Unstable Operation		0.3%	Unstable (20609-000,Qty:2)	
	Collapsed		0.3%	Collapsed (20609-000,Qty:2)	
	Scored		0.2%	Scored (23038-004, Qty:1)	
	Contaminated		0.2%	Dirty Armature (23038-004, Qty:1)	
	Limit Unadjuctable		0.2%	Unable to Adjust Lim (23038-004,Qty:1)	
	Incorrect Current		0.2%	Incorrect Current (23038-004,Qty:1)	
	Insulation Failure		0.2%	Insulation Breakdown (23038-004,Qty:1)	
	Overheated		0.1%	Overheated (20609-000,Qty:1)	
	tor,DC Operation	23.9%	11.1%	Scarces:4 No Operation (20609-000,Qty:4)	
Sh	orted	22.5%	10.4%	Short (24992-000,41.7%)	
Dr	ift	22.5%	10.4%	Drift (24992-000,41.7%)	
Ou	t of Adjustment	12.0%	5.6%	Out of Adjustment (20609-000,Qty:2)	
Fa	ils to Run, After Start	10.2%	4.8%	Catastrophic-Fails Once Started (18175-000,19.0%)	
Op	ened	8.9%	4.2%	Open (24992-000,16.6%)	
Jn	known	******	26.7%	Unknown (18175-000,64.0%) (23038-005,Qty:3)	
Ot	ner (<%6) Seal/Gasket Failure			Blown Seal/Gasket (23038-005,Qty:1)	
	Loss of Control		3.6%	Control Inoperative (23038-005,Qty:1)	
	Broken		3.6%	Broken (23038-005,Qty:1)	
	Brush Failure		3.6%	Brush Failure/Worn E (23038-005,Qty:1)	
	Out of Spec.		2.8\$	Out of Specification (20609-000, 2ty:1)	
	Intermittent Operation		2.84	Intermittent (20609-000,Qty:1)	
	Spurious/False Operation		2.84	False Response (20609-000, Qty:1)	
	Fails to Start		2.8%	Catastrophic-Fails To Start (18175-000,11.0%)	
	Degraded Operation		1.5%	Degraded (18175-000,6.0%)	

Gen	Loss of Lubrication	41.9%	26.0% Loss of Lubrication (20609-000, Qty:13)	
	Opened	19,4%	12.0% Opened (20609-000,Qcy:6)	
	Shortad	19.4%	12.0% Short (20609-000,Qty:6)	
	Worn	12.9	8.0% Worn Out (20609-000,Qty:4)	
	No Movement	6.54	4.0% No Movement (20609-000, Qty:2)	
	Unknown		38.0% Unknown (20609-000, Gty:19)	

3-88 Part	Failure Distribution Su	Norm	Fail	Data	FMD-9
)esc.			Dist.		
	ator, Tubine eaking	63.2%	63.2%	Sources:1 Leaking (20609-000,Qty:12)	
D	isplaced	15.8%	15.8%	Displaced (20609-000,Qty:3)	
Co	orroded	5.3%	5.3%	Corroded (20609-000,Qty:1)	
Ci	racked/Fractured	5.3%	5.3%	Cracked/Fractured (20609-000,Qty:1)	
No	Operation	5.3%	5.3%	No Operation (20609-000,Qty:1)	
Οι	ut of Spec.	5.3%	5.3%	Out of Specification (20609-000,Qty:1)	
Fa Fa	ator,Turbine (Summary) ails to Run,After Start ails to Start agraded Operation	61.0% 22.2% 16.8%			
	ator,Turbine,Gas,AC ails to Run,After Start	66,28	43.0%	Sources:1 Catastrophic-Fails Once Started (18175~000,43.0%) (18175-000,43.0%)	
Fa	ails to Start	17.7%	11.5%	Catastrophic-Fails To Start (18175-000,11.0%) (18175-000,12.0%)	
De	egraded Operation	16.2%	10.5%	Degraded (18175-000,10.0%) (18175-000,11.0%)	
Ur	nknown		35.0%	Unknown (18175-000,35.0%) (18175-000,35.0%)	
	ator, Turbine, Steam, AC ails to Run, After Start	50.4%	16.0%	Sources:1 Catastrophic-Fails Once Started (18175-000,16.0%) (18175-000,16.0%)	
Fa	ails to Start	31.5*	10.0%	Catastrophic-Fails To Start (18175-000,10.0%) (18175-000,10.0%)	
De	graded Operation	18.1%	5.8%	Degraded (18175-000,5.5%) (18175-000,6.0%)	
Ur	known	~	68.3%	Unknown (18175-000,68.0%) (18175-000,68.5%)	
Br Wo Le Be	iummary) oken orn aking nt/Dented/Warped t of Adjustment	40.0% 29.6% 13.9% 8.7% 7.8%			

FMD-91			Failure Distribution Summaries 3-
Part Failure Desc. Mode/Nech	Norm Dist.	Mais Dist,	Data Source(5)/Detalls
Gun,Collim Infin Aim Ref Broken	71.4%	38,5%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1), Poor Design - Broken/Damaged (25101-000,Qty:8)
Lamp Pailuré	21.4%	11.5%	Inop Fire Control Light (25101-000,Qty:3)
Cracked/Fractured	7.18	3.8%	Poor Design - Cracked (25101-000,Qty:1)
Unknown		23.1%	Unknown (25101-000,Qty:6)
Induced		23.1%	Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:6)
Gun,Firing,Carriage Mechanism Worn	71.4%	63.8%	Sources:1 Worn Out (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:24), Worn - Found In TI/PMCS/INSP (25101-000,Qty:1), Poor Design - Worn Out (25101-000,Qty:2)
Broken	9.5%	8.5%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:3)
Bushing Failure	4.8%	4.3%	Worn Bushing - Excessive Play (25101-000,Qty:1), Worn Bushing - Worn Out (25101-000,Qty:1)
Out of Adjustment	4.8%	4.3%	Out Of Adjustment (25101-000,Qty:2)
Loose	4.8%	4.3%	Loose (25101-000,Qt.y:1), Out Of Adjustment - Loose (25101-000,Qty:1)
Corroded	2.4%	2.1%	Corroded-Broken/Damaged (25101-000,Qty:1)
Excessive Play	2.4%	2.1%	Excessive Play (25101-000,Qty:1)
Induced		6.4%	<pre>Improper Maintenance - Misfire (25101-000,Qty:1), Abnormal Operation (25101-000,Qty:1), Improper Installation - Broken/Damaged (25101-000,Qty:1)</pre>
Unknown	<b></b>	4.3%	Unknown (25101-000,Qty:1) (25101-000,Qty:1)
Gun,Firing,Platform Assembly Induced		84.6%	Sources:1 Safety Wire/Key Fail - Missing (25101-000,Qty:6), Vibration - Missing (25101-000,Qty:4), Wrong Part - PIP/ECP/MWO Install (25101-000,Qty:1)
Unknown		15.4%	Unknown (25101-000,Qty:2)
Gun,Might Aim Post Worn	50.0%	46.0%	Sources:1 Worn - Inop/Unserviceable (25101-000,Qty:2)
Bent/Dented/Warped	25.0%		Collapsed/Bent (25101-000, Cty:1)
Broken	25.0%	20.0%	Broken/Damaged (25101-000, Qty:1)
Induced		20.0%	Fell Off Or Lost - Missing (25101-000, Qty:1)

rt	Failure	Norm	Fail	Data
BC.	Mode/Mech	Dist,	Dist.	Source(s)/Details
	at Aiming oken	83,34	58.8%	Sources:1 Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:3), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:6), Fel Off Or Lost - Broken/Damaged (25101-000,Qty:1)
Be	nt/Dented/Warped	16.7%	11.8%	Collapsed/Bent (25101-000,Qty:2)
In	duced		23.5%	Improper Installation - Inop/Unserviceable (25101-000,Qty:2), Improper Installation - Broken/Damaged (25101-000,Qty:2)
Un	known		5.9%	Unknown (25101-000,Qty:1)
	adrant it of Adjustment	35.0%	16.7	Sources:1 No Failure - Out Of Adjustment (25101-000,Qty:1), Out Of
				Adjustment - Inaccurate (25101-000,Qty:1), Out Of Adjustmen (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Internal Failure - Out Of Adjustment (25101-000,Qty:2)
Ou	it of Synch.	25.0%	11.94	Out Of Synch (25101-000,Qty:5)
Br	roken	15.0%	7.1%	<pre>Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:2)</pre>
Se	al/Gasket Failure	10.00	4.98	Seals Worn - Internal Moisture (25101-000,Qty:2)
Cr	acked/Fractured	5.04	2.48	Cracked (25101-000, gty:1)
Ех	cessive Play	5.0%	2.4	Internal Failure - Excessive Play (25101-000,Qty:1)
Bi	inding/Sticking	5.0%	2.48	Internal Failure - Binding/Sticking (25101-000,Qty:1)
In	nduced		31.04	Wrong Part (25101-000,Qty:1), Internal Failure - Inaccurate (25101-000,Qty:1), Lack Of Maintenance - Internal Moisture (25101-000,Qty:10), Overtorqued - Loose (25101-000,Qty:1)
Un	iknown		21.4%	Unknown (25101-000, gty:1) (25101-000, gty:1) (25101-000, gty:1) (25101-000, gty:6)
	coil,Mechanism aking	50.08	20.38	Sources:1 Leaking Hydraulic Oil (25101-000,Qty:1), Internal Failure -
Lie	anting	50.04	20130	Leaking Hydraulic Oil (25101-000,Qty:14), Internal Failure Leaking Nitrogen (25101-000,Qty:1)
Co	ntaminated	18.8%	7.6%	Contaminated Fluid - Slams Into Battery (25101-000,Qty:5), Internal Failure - Contaminated (25101-000,Qty:1)
Br	oken	9.4	3.8%	Broken/Damaged (25101-000, Qty:3)
Se	al/Gasket Failure	9.4	3.84	Seals Worn - Slams Into Battery (25101-000,Qty:1), Seals Worn - Leaking Hydraulic Oil (25101-000,Qty:1), Seals Worn Low Nitrogen Press (25101-600,Qty:1)
Cr	acked/Fractured	6.3%	2.5%	Cracked/Split-Cracked (25101-000,Qty:1), Cracked (25101-000,Qty:1)
De	graded Output	3.1*	1.34	Internal Failure - Abnormal Operation (25101-000, Qty:1)
Se	ized	3,1%	1.30	Locked (25101-000, Qty:1)
In	duced		55.7%	<pre>Improper Maintenance - Contaminated (25101-000,Qty:1), Improper Maintenance - Corroded (25101-000,Qty:1) (25101-000,Qty:2), Improper Adjustment - Broken/Damaged (25101-000,Qty:1), Improper Installation - Broken/Damaged (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged</pre>

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Part Failure	Norm	Fail	Data
Desc. Mode/Mech	Dist.		Source(s)/Details
un,Recuil,Mechanism (continued) Induced (continued)			(25101-000,Qty:4), Slams Into Battery (25101-000,Qty:1), Improper Maintenance - Slams Into Battery (25101-000,Qty:1) (25101-000,Qty:14), Improper Maintenance - Out Of Adjustment (25101-000,Qty:2), Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Internal Failure - Slams Into Battery (25101-000,Qty:14), Low Nitrogen Press - Slams Into Battery (25101-000,Qty:1)
Unknown		3.84	Unknown (25101-000, Qty:3)
un,Recoil,Mechanism,Variable Broken	55.6%	53.6%	Sources:1 Broken/Damaged (25101-000,Qty:3) (25101-000,Qty:12)
Bent/Dented/Warped	25.9%	25.0%	Collapsed/Bent (25101-000,Qty:1) (25101-000,Qty:5), Part Struck/Damaged - Collapsed/Bent (25101-000,Qty:1)
Worn	7.48	7.18	Worn Out (25101-000,Qty:1), Worn - Abnormal Operation (25101-000,Qty:1)
Binding/Sticking	3.7%	3.6%	Binding/Sticking (25101-000,Qty:1)
No Operation	3.78	3.6%	Inop/Sluggish Breech (25101-000,Qty:1)
Excessive Vibration	3.74	3.6%	Vibration - Abnormal Operation (25101-000,Qty:1)
Induced	******	3.6%	Improper Adjustment - Collapsed/Bent (25101-000,Qty:1)
Fails to Start	100.0%	100.0%	Failure to Spin Up-Faulty Polyimide Ball Retainers (10722-000,Qty:2)
yros,End Housing Cracked/Fractured	40.0%	40.0%	Sources:1 Fractured Magnet Wire At F1 Solder Pad-Mech.Stress (10722-000,Qty:1), Fractured Magnet Wire-Mechanical Stress (10722-000,Qty:1)
Opened	20.0%	20.0%	Open Magnet Wire-Mechanical Overstress (10722-000,Qty:1)
Winding Failure	20.0%	20.0%	Open in F3 Winding (10722-000,Qty:1)
Shorted	20.0%	20.0%	Microsyn Winding Shorted to Pole 10/Case (10722-000,Qty:1)
vroscope Drift	40.5%	30.2%	Sources:2 Drift (20609-000,Qty:55) (24992-000,58.3%)
Out of Spec.	23.3%	17 <b>.4</b> €	Out of Tolerance (20609-000,Qty:1,173), Out of Specification (20609-000,Qty:3)
Opened	19.7%	14.78	Open (24992-000,29.4%)
Shorted	7.9%	5.9*'	Short (20609-000, Qty:1) (24992-000, 11.8%)
Binding/Sticking	3.64	2.7	Sticking (20609-000,Qty:156), Binding (20609-000,Qty:27)
Burned/Charred	3.3	2.4	Burned (20609-000, Qty:164)
Spurious/False Operation	1.74	1.34	Erratic (20609-000,Qty:86)

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art. Failure	Norm	Fail	Data
sac. Mode/Mech	Dist.		Source(s)/Details
yroscope (continued) Unknown			Unknown (20609-000,Qty:1,690)
Other (<%2) Unstable Operation		0.3% 0.3%	Unstable (20609-000,Qty:17)
andle Broken	100.0%	63.6%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:6) (25101-000,Qty:7)
Induced		36.4%	Missing (25101-000,Qty:1) (25101-000,Qty:1), Fell Off or Lost - Missing (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:5)
andle Locking Assy Broken	50.0%	50.0%	Sources:1 Broken/Damaged (25101-000,Qty:2) (25101-000,Qty:2)
Bent/Dented/Warped	25.0%	25.0%	Collapsed/Bent (25101-000,Qty:2)
Cracked/Fractured	25.0%	25.0%	Cracked Weld-Broken/Damaged (2510)-000,Qty:2)
andle,Brake Lever Bent/Dented/Warped	50.0%	50.0%	Sources:1 Collapsed/Bent (25101-000,Qty:1)
Broken	50.0%	50.0%	Eroken/Damaged (25101-000,Qty:1)
andle, Latch Broken	100.0%	100.0%	Sources:1 Broken/Damaged (25101-000, Cty:1) (25101-000, Qty:1) (25101-000, Qty:1)
andwheel Assembly Bent/Dented/Warped	25.0%	18.2%	Sources:1 Collapsed/Bent (25101-000,Qty:2)
Loose	25.0%	18.2%	Worn - Loose (25101-000,Qty:1), Excessive Play (25101-300,Qty:1)
Broken	25.0%	18.2%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1)
Binding/Sticking	12.5%	9.1%	Binding/Sticking (25101-000, Qty:1)
No Operation	12.5%	9.1	Inop Man Traverse (25101-000,Qty:1)
Unknown		18.24	Unknown (25101-000, Quy:1) (25101-000, Qty:1)
Induced		9.1%	Lack Of Maintenance - Inop/Unserviceable (25101-000,Qty:1)

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	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Flexable Wiring rted	100.0%	100.0%	Sources:1 Shorted Pins-Foreign Particle Embedded Between Pin (25027-000,Qty:1)
	Interconnect Rotary armittent Operation	100.0%	100.0%	Sources:1 Intermittent Failure-Crimp Damaged (10722-000,Qty:1)
Heat Exc	changer (Summary)			
Leak		77.8%		
	of Adjustment	6.5%		
	is Replacement :ked/Fractured	6.48 4.78		
	ged/Clogging	3.2%		
Out	of Spec.	1.5%		
Heat Exc Leak	changers Ling	73.4%	61.8%	Sources:4 Internal Leak (24992-000,47.5%), External Leak
	-			(24992-000,42.5%), Leaking (20609-000,Qty:145), Tube Leaks (24996-000,80.0%)
Out	of Adjustment	6.5%	5.1%	Needs Adjustment (19542-000,20.0%), Out of Adjustment (20609-000,Qty:1)
Need	ls Replacement	6.3%	5.0%	Needs Replacement (19542-000,20.0%)
Crac	ked/Fractured	4.4%	3.5%	Fracture - Burst (24992-000,6.0%), Cracked/Fractured (20609-000,Qty:20), Fatigue Cracks From Vibration (24996-000,NR)
Clog	ged/Clogging	3.3%	2.6%	Clogged (24992-000,4.0%), Improper Flow (20609-000,Qty:16), Restricted Flow From Debris in Tubes (24996-000,NR)
Out	of Spec.	1.1%	0.9%	Out of Specification (20609-000,Qty:9)
Unkr	awo		14.4%	Unknown (19542-000,40.0%) (20609-000,Qty:45)
Indu	lced	′	5.0%	Not Properly Fabricated By Vendor (19542-000,20.0%)
	er (<\$2) Broken		1.8% 0.8%	Broken (20609-000, Qty:8)
s	cored		0.4%	Scored (20609-000, Qty:4)
B	reach		0.2%	Breach (20609-000,Qty:2)
o	verheated		0.2%	Overheated (20609-000,Qty:2)
I	ntermittent Operation		<0.1%	Intermittent (20609-000,Qty:1)
U	nstable Operation		<0.1%	Unstable (20609-000,Qty:1)
	orroded			Corrosion (24996-000, NR)

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	ilure ode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	hangers,Elect. Heater,Re ked/Fractured	sistive 30,8%	30.8%	Sources:1 Cracked/Fractured (20609-000,Qty:4)
Out d	of Spec.	30.8%	30.8%	Out of Specification (20609-000,Qty:4)
No Oj	peration	15.4%	15.4%	No Operation (20609-000,Qty:2)
Opene	ad	15.4*	15.4%	Opened (20609-000, Qty:2)
Short	ed	7.7%	7.7%	Short (20609-000,Qty:1)
Heat Exch Leaki	aangers,Radiator ng	100.0%	100 <b>.0%</b>	Sources:1 Leaking (20609-000,Qty:3)
ieater (S Opene		38.8%		
Short Elect Mecha	eration ed rical Failure mical Failure emp. Protection Failure	23.4% 16.1% 8.8% 6.2% 3.4%		
	eated	3.4%		
eater No Or	eration	47 58	42 0%	Sources:1 Catastrophic-Failed To Heat (18175-000,NR)
				(18175-000,57.0%) (18175-000,75.0%)
Overh	eated	28.1*	24.8%	Catastrophic-Overheated (18175-000,5.0%) (18175-000,7.0%) (18175-000,66.0%)
Degra	ded Operation	24.5%	21.7%	Degraded (18175-000,17.0%) (181/5-000,18.0%) (18175-000,33.0%)
Unkno	wn	•	11.5%	Unknown (18175-000,16.9%) (18175-000,20.0%)
*				
eater,Ai No Op	r eration	85.0%	85.0%	Sources:1 Catastrophic-Failed To Heat (18175-000,82.0%) (18175-000,88.0%)
Overh	eated	12.5%	12.54	Catastrophic-Overheated (18175-000,7.0%) (18175-000,18.0%)
Degra	ded Operation	2.5%	2.5%	Degraded (18175-000,5.0%)
eater, El Opene		66.7%		Sources:3 Open Circuit from Overheating (24996-000,80.0%) (24997-000,80.0%)
Short	ed	22.5%		Short (19542-000,40.0%), Shorts to Ground (24996-000,7.0%) (24997-000,7.0%)
Overt	amp. Protection Failure	5.8%	4.78	Failure of Overtemperature Protection (24996-000,7.0%) (24997-000,7.0%)
Jacke	t Rupture	5.08	4.0%	Other (Jackets Rupture, etc.) (24996-000,6.0%) (24997-000,6.0%)
Unkno			20.0%	Unknown (19542-000,60.0%)

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FMD-	91			Failure Distribution Summaries 3		
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details		
	,Electrical,Air Unit Operation	90.0%	90.0%	Sources:1 Catastrophic-Failed To Heat (18175-000,90.0%)		
Ov	erheated	10.0%	10.0%	Catastrophic-Overheated (18175-000,10.0%)		
	,Electrical,Base Roard Operation	76.0%	76.0%	Sources:1 Catastrophic-Failed To Heat (18175-000,76.0%)		
Ovi	erheated	24.0%	24.0%	Catastrophic-Overheated (18175-000,24.0%)		
	,Electrical,Blast Coil Duct Operation	80.0%	80.0%	Sources:1 Catastrophic-Failed To Heat (18175-000,80.0%)		
Ov	erheated	20.0%	20.0%	Catastrophic-Overheated (18175-000,20.0%)		
	,Furnace,Gas ectrical Failure	58.6%	58.6%	Sources:1 Electrical (24996-000,52.7%)		
Me	chanical Failure	41.4%	41.4%	Mechanical (24996-000,37.3%)		
	,Immersion Operation	86.8%	82.5%	Sources:1 Catastrophic-Failed To Heat (18175-000,80.0%) (18175-000,85.0%)		
Ov	erheated	10.0%	9.5%	Catastrophic-Overheated (18175-000,9.0%) (18175-000,10.0%)		
De	graded Operation	3.2%	3.0%	Degraded (18175-000,6.0%)		
In	duced		5.0%	Degraded - Erratic Operation (Alternate Heating) (18175-000,10.0%)		
	, Immersion, Bottom Clamping Operation	88 <b>.9</b> %	80.0%	Sources:1 Catastrophic-Failed To Heat (18175-000,80.0%)		
Ov	erheated	11.1%	10.0%	Catastrophic-Overheated (18175-000,10.0%)		
In	duced		10.0%	Degraded - Erratic Operation (18175-000,10.0%)		
	, Immersion, Circulation Operation	100.0%	100.0%	Sources:1 Catastrophic-Failed To Heat (18175-000,89.0%) (18175-000,90.0%)		

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Part	Falluro	Norm	Fali	Data
	Mode/Mech	Dist.	Dist.	
leater	, Immersion, Flange Type			Sources:1
	Operation .	100.0%	100.0%	Catastrophic-Failed To Heat (19175-000,100.03)
	,1mmersion,Screw Plug			Sources:1
No	Operation	95.0%	95.0%	Catastrophic-Failed To Heat (18175-000,95.0%)
Ove	ərheatəd	5.0%	5.0%	Catastrophic-Overheated (19175-000,5.0%)
	,Immersion,Tubular Operation	80.0%	8J.0%	Sources:1 Catastrophic-Failed To Heat (18175-000,80.0%)
Öve	erheated	10.0%	10.0%	Catastrophic-Overheated (18175-000,10.0%)
Dec	graded Operation	10.0%	10.0%	Degraded (18175-000,10.0%)
	Pipe (Heat Tracer) Operation	61.6%	48.7%	Sources:1 Catastrophic-Failed To Heat (18175-000,51.0%) (18175-000,95.0%)
Out	of Spec.	36.3%	28.7%	Degraded - Out of Limits (18175-000,86.0%)
Dec	graded Operation	2.1%	1.7%	Degraded (18175-000,5.0%)
Ind	luced		18.3%	Degraded - Erratic Operation (18175-000,49.0%), Degraded - Other (18175-000,6.0%)
U:.!	nown		2.7%	Unknown (18175-000,8.0%)
Fai Dec Fai	Summary) lled Off graded Operation lls to Op. on Demand urious/False Operation	50.0% 27.5% 12.5% 10.0%		
	nnunciator Module graded Operation	55.0%	55.0%	Sources:1 Degraded (18175-000,55.0%)
Fai	lls to Op. on Demand	25.0%	25.0%	Catastrophic-Fails To Operate On Demand (18175-000,25.0%)
Spu	urious/False Operation	20.0%	20.0%	Catastrophic-Operates Spurious Or False Response (18175-000,20.0%)
	ectromechanical led Off	100.0%	100.0%	Sources:1 Failed Off (24991-000,100.0%)
0r.h	er		0.0%	

FMD-91			Failure Distribution Summaries 3-97
Part Failure Desc, Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Horn,Electronic (Piozoel) Failed Off	100.0%	100.0%	Sources:1 Failed Off (24991-000,100.0%)
Other Failed On		0.0% NR	Failed On (24991-000,NR)
Hose Broken	76.6%	41.2%	Sources:2 Broken (20609-000,Qty:113)
Worn	13.3%	7.1%	Worn Out (19542-000,14.3%)
Cracked/Fractured	6.8%	3.6%	Cracked/Fractured (20609-000,Qty:10)
Leaking	3.4%	1.8%	Leaking (20609-000,Qty:5)
Induced		35.7%	Defective (19542-000,28.6%), Hose Has Cracks Due To Antenna Movement (19542-000,42.9%)
Unknown		10.4%	Unknown (19542-000,14.3%) (20609-000,Qty:9)
Hose Ascembly Aged/Deteriorated	100.0%	100.0%	Sources:1 Deteriorated/Aged - Cracked (25101-000,Qty:2)
Hose Assembly,Rubber Aged/Deteriorated	89.5%	85.0%	Sources:1 Material Deterioration (24993-000,85.0%)
Mechanical Failure	10.5%	10.3%	End Fitting Mechanical Failure (24993-000,10.0%)
Unknown		5.0%	Unknown (24993-000,5.0%)
Housing Broken	33.3%	20.0%	Sources:1 Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Cracked/Fractured	33.3%		Part Struck/Damaged - Cracked (25101-000,Qty:1), Cracked/Split-Inop/Unserviceable (25101-000,Qty:1)
Aged/Deteriorated	16.7%	10.0%	Deteriorated/Aged - Cracked (25101-000,Qty:1)
Bent/Dented/Warped	16.7%	10.0%	Warped/Bent - Binding/Sticking (25101-000,Qty:1)
Induced			<pre>Improper Install - Broken/Damaged (25101-000,Qty:1), Lack Of Lubrication - FM (25101-000,Qty:1), Caused By Other Failure-Broken/Damaged (25101-000,Qty:1), Caused By Other Failure-Cu<sup>+</sup>/Scarred (25101-000,Qty:1)</pre>

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3-98 Failure Distribution Sum				FMID-91
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
lousing Assembly Loose		50.0%	50.0%	Sourcea:1 Internal Failure - Loose (25101-000,Qty:1), Worn - Loose (25101-000,Qty:1)
Bi	nding/Stickir.g	25.04	25.04	Binding/Sticking (25101-000,Qty:1)
Ъg	ed/Deteriorated	25.04	25.0%	Deteriorated/Aged - Leaking Nitrogen (25101-000,Qty:1)
	g Assembly,Front Operation	40.0%	40.0%	Sources:1 Internal Failure - Inop Man Traverse (25101-000,Qty:2)
	aking			No Failure - Leaking Fluid (25101-000,Qcy:1)
	nding/Sticking			No Failure - Binding/Sticking (25101-000,Qty:1)
De	graded Output			Internal Failure - Abnormal Operation (25101-000,Qty:1)
	g Assembly,Lower Elev Gear al/Gasket Failure	14.34	10.0%	Sources:1 Seals Worn - Leaking Fluid (25101-000,Qty:1)
Lo	0 <b>3</b> 0	14.3%	10.0%	Vibration - Loose (25101-000,Qty:1)
Ex	cessive Play	14.3%	20.0%	Worn - Excessive Play (25101-000,Qty:1)
Be	aring Failure	14.3%	10.0%	Bearing Failure-Inop Man Elevation (25101-000, Oty:1)
Wo	rn	14.3%	10.0%	Worn/Stripped - Noisy (25101-000,Qty:1)
Cr	acked/Fractured	14.3%	10.0%	Part Struck/Damaged - Cracked (25101-000,Qty:1)
Be	nt/Dented/Warped	14.3%	10.0%	Collapsed/Bent (25101-000,Qty:1)
In	duced		30.0%	Item Abuse/Neglect - Cracked (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Operator Error - Broken/Damaged (25101-000,Qty:1)
	g Assembly, Support rroded	100.0%	50.0%	Sources:1 Corroded-Excessive Play (25101-000,Qty:1)
In	ducea		50.0%	Lack Of Maintenance - Loose (25101-000,Qty:1)
ousine Wa:	g,Detent rn	60.0%	60.0%	Sources:1 Worn Out (25101-000,Qty:1), Worn - Found In TI/PMCS/Insp (25101-000,Qty:1), Worn - Out Of Adjustment (25101-000,Qty:1)
Bro	oken	20.0%	20.0%	Part Struck/Damaged ~ Broken/Damaged (25101-000,Qty:1)
Cri	acked/Fractured	20.0%	20.0%	Cracked/Split-Misfire (25101-000,Qty:1)

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FMD-9		1. august 1. mart - 1. 1. ann ann an ann an ann an ann an ann an		Failure Distribution Summaries 3-
Part Desc.	Failure Mode/Mech	Norm Dist.	Fall Dist.	Data Source(s)/Details
Housing Sho	g,End orted	44.4%	44.4%	Sources:1 Introwinding Short at Pole 4-Mechanical Overstress (10722-000,Qty:1), Winding To Case Short-Mechanical Overstress (10722-000,Qty:1), Short Between The Wheel Power And Housing (10722-000,Qty:1), Suspension Winding Shorted To Pole-Damaged Pary'en (10722-000,Qty:1)
0p	ened	33.3%	33,31	F1 Winding Open-Inadequate Stress Relief (10722-000,Qty:1), Open-Mechanical Overstress (10722-000,Qty:2)
Cri	cked/Fractured	22.24	22.2	Fractured/Open Magnet Wires (10722-000,Qty:1), Fractured Magnet Wire-Thermal/Vibration Fatigue (10722-000,Qty:1)
lousing Bir	9,Gear ndirg/Sticking	37.5%	18.8%	Sources:1 Binding/Sticking (25101-000,Qty:1), Internal Failure - Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:2), Worn - Binding/Sticking (25101-000,Qty:1), No Failure - Binding/Sticking (25101-000,Qty:1)
Out	: of Adjustment	18.84	9.4%	Out Of Adjustment (25101-000,Qty:1), Internal Failure - Out Of Adjustment (25101-000,Qty:1) (25101-000,Qty:1)
Cra	acked/Fractured	18.84	9.4%	Cracked (25101-000, Qty:1) (25101-000, Qty:2)
Bro	oken	12.5%	6.34	Broken/Separated - Inop Man Elevation (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:1)
Lea	aking	12.5%	6,3%	Iæaking Fluid (25101-000,Qty:1), No Failure - Isaking Fluid (25101-000,Qty:1)
Un)	nown		18.8%	Unknown (25101-000,Qty:2) (25101-000,Qty:4)
Inc	luced		12.5*	<pre>Improper Installation (25101-000,Qty:2), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Lack Of Lubrication - Binding/Sticking (25101-000,Qty:1)</pre>
Otł	ner (<%6) Stripped		18.8% 3.1%	Stripped Gear/Spline (25101-000,Qty:1)
	Loose		3.1*	Internal Failure - Loose (25101-000,Qty:1)
	Worn		3.1%	Worn/Stripped - Stripped Gear/Spline (25101-000,Qty:1)
	Degraded Output		3.1%	Internal Failure - Abnormal Operation (25101-000,Qty:1)
	Skipping		3.1%	Internal Failure - Skips (25101-000,Qty:1)
	Noisy		3.1%	No Failure - Noisy (25101-000,Qty:1)
-	,Machined ken	66 <b>7</b> 6	57 18	Sources:1 Broken/Damaged (25101-000.0tv:4)

Broken	66.7%	57.1% Broken/Damaged (25101-000,Qty:4)	
Cracked/Fractured	16.74	14.3% Cracked (25101-000,Qty:1)	
Binding/Sticking	16.7%	14.3% Cut-Binding/Sticking (25101-000,Qty:1)	
Unknowr.		14.3% Unknown (25101-000,Qty:1)	

art Osci	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Detailu
ousin	g,Pantel	n, e mil 1911 e a ministra articular antenan		Sources 1
	9, F 411041 0 <b>80</b>	25.01	20.0%	Worn/Suripped - Loose Screw(s) (25101-000, Qty:1)
St	ripped	25.0%	20.0%	Premataure Failure Rebuilt - Stripped (25101-000,Qty:1)
Bi	nding/Sticking	25.0%	20.0%	Binding/Sticking (25101-000,Qty:1)
Ag	ed/Deteriorated	25.0%	20.04	Deteriorated/Aged - Internal Moisture (25101-000,Qty:1)
Ind	duced		20.0%	<pre>Improper Installation = Loose Screw(s) (25101-000,Qty:1)</pre>
cusin Wo:	g,Roller Hub rn	50.0%	50.0%	Sources:1 Worn - Leaking Hydraulic Oil (25101-000,Qty:1)
Lei	aking	50.0%	50.0%	Poor Bonding - Leaking Fluid (25101-000,Qty:1)
	Brake Assy nt/Dented/Warped	100.0%	50.0%	Sources:1 Warped/Bent - Broken/Damaged (25101-000,Qty:1)
Ind	duced		50.0%	Improper Installation - Broken/Damaged (25101-000,Qty:1)
ybrid Ope	ənəd	46.0%	37.5%	Sources:2 Chip Resistors And Capacitors Were Open (10722-000,Qty:3), Open-Internal Bond Pad Corrosion (10722-000,Qty:1), Open-Electromigration (10722-000,Qty:1), Open-Die Misapplication (10722-000,Qty:1)
Deq	graded Output	17.4	14.28	<pre>Pins 13£31 Distorted (25027-000,Qty:1), Pins 4, 8, 22, And 27 (25027-000,Qty:1), Slow Response Time (25027-000,Qty:1), Pins 4 &amp; 8 Distorted (25027-000,Qty:1), Pin 4 Loads Down (25027-000,Qty:1), Pin 1 Pulls 15 V Load (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1), Pin #22 Has Clipped (25027-000,Qty:1), Output Stuck At 300 (25027-000,Qty:1), Output Stuck At 150 (25027-000,Qty:1), Prn Distorted Output (25027-000,Qty:1), Pin 4 (Angle Output) (25027-000,Qty:1), Pin 1 Stuck High (25027-000,Qty:1), Pin 1 Stuck Low Impr (25027-000,Qty:1), Pin 4 (Open (25027-000,Qty:1), (25027-000,Qty:1), Pin 4 Open (25027-000,Qty:1), Pin 1 Stuck Low (25027-000,Qty:1) (25027-000,Qty:1), Pin 1 Stuck Low (25027-000,Qty:1) (25027-000,Qty:1), Pin 1 Stuck Low (25027-000,Qty:1) (25027-000,Qty:1), Pin 8d Output (25027-000,Qty:1), Pin 1 Transition Ti (25027-000,Qty:1), Pin 1 (Output Distor) (25027-000,Qty:1), Pins 4, 8, 22, 6 26 Will (25027-000,Qty:1), Incorrect U109 Output (25027-000,Qty:1), Pin 1 Loads Down (25027-000,Qty:1), P1 Stuck At +15V (25027-000,Qty:1), Pin 4 Stuck 5V Pin 2 (25027-000,Qty:1), Pins 40 6 41 Outputs (25027-000,Qty:1) (25027-000,Qty:1), Pins 40 6 41 Outputs (25027-000,Qty:1) (25027-000,Qty:1), Is Volt Outputs (25027-000,Qty:1), PC Output 6 Pins 40 6 (25027-000,Qty:1)</pre>
Sho	orted	16.6%		Short-ESD Overstress (25027-000,Qty:2), Shorting To Pin 49-Fractured At The Substrate Heel (10722-000,Qty:1), Pin 6 Shorted To 22 V (25027-000,Qty:1), Shorting-Wire Bond #10 Fractured (10722-000,Qty:1)
Bro	ken	8.5%		<pre>Pin 1 Broken (25027-000,Qty:1), Broken Pins @ 20 &amp; 21 (25027-000,Qty:1), Broken RW &amp; Lifted (25027-000,Qty:1), Broken Pin (25027-000,Qty:1) (25027-000,Qty:2) (25027-000,Qty:14)</pre>
No	Output	5.5%	4.5%	No Output @ Pins 4 (25027-000, Qty:1), No O/P P4, 8, 22, 26

FMD-				Failure Distribution Summaries 3-10
Part Degg.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	(cont.inued)			
NC	o Output (continued)			(25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1), No Output @ Pins 4, 8 (25027-000,Qty:1), No Output, Pins 4 & (25027-000,Qty:1) (25027-000,Qty:1), Pin 23 & 25 No Output (25027-000,Qty:1), No Output Pins 40 (25027-000,Qty:1), No Output (25027-000,Qty:1), No Sine Wave Output (25027-000,Qty:1)
In	nproper Output	3.41	2.8%	<pre>Improper Output At P (25027-000,Qty:1), Improper Output (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1), Improper Outputs (25027-000,Qty:1)</pre>
De	graded Operation	2.64	2,14	Bad Output (25027-000,Qty:1) (25027-000,Qty:2) (25027-000,Qty:3)
Un	เkาown		9.04	Unknown (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1)
In	duced.	-20 Ka in 10 Ki in 11	0.3%	Defective (25027-000, (ty:1)
Ot	her (<\$3) Output Distriction	••••	9.0¥ 1.7%	Distorted Outputs (25027-000,Qty:1), Distorted Output (25027-000,Qty:1) (25027-000,Qty:1), Distorted Output At (25027-000,Qty:1) (25027-000,Qty:1)
	Metallization		1.0%	Malformed/Missing Traces in Metalization (25027-000,Qty:3)
	Burned/Charred		1.0%	Burnt (25027-000, Qty:1) (25027-000, Qty:1) (25027-000, Qty:1)
	Low Output		1.0%	Low Output At Pins (25027-000,Qty:1), Low Coutput - Pin 4 (25027-000,Qty:1), Low Output & Pin 22 (25027-000,Qty:1)
	Temperature Sensitive Ou	tput	1.0%	Temp Sens @ Hot +160- (25027-000,Qty:1), Temp Sensitive Output (25027-000,Qty:1), Temp Sensit've From (25027-000,Qty:1)
	Wire Bond Failure		0.78	Fused Bond Wires (25027-000, Qty:1) (25027-000, Qty:1)
	Drift		0.3%	Output Angle Drift (25027-000,Qty:1)
	Out of Spec.		0.3%	Out OF Spec @ Var (25027-000,Qty:1)
	Clipped Outrut		0.3%	Clipped Outputs (25027-000,Quy:1)
	High DC Output		0.3%	High DC Outpur (25027-000,Qty:1)
	Change in Resistance		0.3%	Resistance Outside (25027-000,Qty:1)
	No Operation		0.3%	Inoperative (25027-000,Qty:1)
	Electrical Overstress		0.34	Stressed (25027-000, Qty:1)

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Part	Failure	Norm	Fail	Data
esc.	Mcde/Mech	Dist.	Dist.	Source(s)/Details
	,Buffer/Amplifier ectrical Overstress	100.0%	100.0	Sources:1 Voltage Transient - Overstress (25027-000, Qty:3)
	,Clock Driver,Dual chanical Damage	66.7%	57.18	Sources:1 Mechanically Damaged (10722-000,Qty:8)
La	tch Up	16.7	14.3	Latch Up-Over Vo.ltage Transients (10722-000,Qty:2)
Wi	re Failure	8.34	7.1	Wire Bridging to Die Edge - Lifted (10722-000,Qty:1)
El	ectrical Overstress	8.3%	7.14	Input of Chip Fused Open-External Overstress (10722-000,Qty:1)
In	duced		14.3%	Masking Defects (10722-000,Qty:2)
	,Detector,Under Voltage ansconductance Amp. Failure	100.0%	100.0%	Sources:1 Failed Output Transconductance Amplifier (10722-000,Qty:2)
	,Driver/Receiver ened	55.61	55.64	Sources:1 Open-Overstress (10722-000,Qty:3), Blow Ground Leads-Overstress (10722-000,Qty:2)
El	ectrical Overstress	44.48	44.4%	Electrical Overstress (10722-000,Qty:4)
	,Multiplexer ack Pointer Failure	100.0%	100 <b>.0%</b>	Sources:1 Stack Pointer Does Not Increment Properly (10722-000,Qty:1)
	,Op. Amp. tput Open	75.0%	75.0%	Sources:1 Output Open-Open Solder joint -internal (25027-000,Qty:3)
Out	tput Unstable	25.0%	25.0%	Output Unstable-Intermittent Solder Connection (25027-000,Qty:1)
-	,Op. Amp.,Power ened	69.2%	69.2%	Sources:1 Open Conductors-Cracked Substrates (10722-000,Qty:9)
Deg	graded Performance	15.4%	15.4 <b>%</b>	Clipping Of Negative Output V < $1/2$ Spec Minimum (10722-000,Qty:1), Detachment Of The Molytab From The Header (10722-000,Qty:1)
Cra	acked/Fractured	7.7%	7.78	Cracked Substrate (10722-000,Qty:1)
Cor	ntaminated	7.78	7.7%	Loose Conductive Particle (10722-000,Qty:1)

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FMD-91	· · · · · · · · · · · · · · · · · · ·			Failure Distribution Summaries 3-10
	ilure de/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
H <b>ybrid,Os</b> No Ou		50.0%	50,0%	Sources:2 No Output (Remained Low)-Internal Wire Break (10722-000,Qty:3)
Loose		16.78	16.7%	Damaged Die;Components Broken Loose (25027-000,Qty:1)
Inter	mittent Operation	16.78	16.7%	Intermittent-Foor Wire Bonds (25027-000,Qty:1)
Short	ed	16.7%	16.78	Shorted Internal Coil (25027-000,Qty:1)
Hybrid,Pro Cracke	eamp ed Substrate	100.0%	100.0%	Sources:1 Cracked Substrate-Mechanical Overstress (10722-000,Qty:2)
Hybrid,Red Shortd	gulator,Switching ad	100.0%	100.0%	Sources:1 Power Transistor - B-E Short-Electrical Overstress (25027-000, gty:1)
	in Film Circuit tor Failure	90.0%	90.0%	Sources:1 Internal Resistors Open (25027-000,Qty:5), Internal Resistors Out of Tolerance (25027-000,Qty:3), Misaligned Thin Film Resistors (25027-000,Qty:1)
Metal	lization	10.0%	10.0%	Defective Substrate, Metal and Ceramic Voids (25027-000,Qty:1)
Hybrid, Tra Opened	ansceiver,Dual d	100.0%	100.0%	Sources:1 Open In Substrate V- Circuit Path-Manufact. Defect (10722-000,Qty:1)
IC Bipola Degrae	r ded Operation	84.5%	66.1%	Sources:1 Degraded (24995-000,Qty:823) (24995-000,Qty:10,770)
Mechan	nical Failure	14.0%	10 <b>.9%</b>	Mechanical Anomaly (24995-000,Qty:343) (24995-000,Qty:1,576)
Shorte	ed	0.9%	0.7%	Short (24995-000,Qty:25) (24995-000,Qty:99)
Openeo	đ	0.6%	0.5%	Open (24995-000,Qty:14) (24995-000,Qty:73)
Induce	ed		21.8%	Functional Anomaly (24995-000,Qty:677) (24995-000,Qty:3,146)
	r, Interface ied Operation	58.1%	35.68	Sources:1 Degraded (24995-000,Qty:30) (24995-000,Qty:99)
Die/At	tachment Failure	22.1	13.53	Die (24995-000,Qty:21) (24995-000,Qty:28)
Mechar	nical Failure	14.4%	8.84	Mechanical Anomaly (24995-000,Qty:10) (24995-000,Qty:22)
Shorte	d	5.4%	3.34	Short (24995-000,Qty:1) (24995-000,Qty:11)
Induce	<b>r</b> d		38.7%	Functional Anomaly (24995-000,Qty:55) (24995-000,Qty:85)

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3-104 Failure Distribution	Summaries	FMD-91
Part Failure	Norm Pail	Data
Desc. Mode/Mach	Dist, Dist,	Source (s) /Details
IC Bipolar, interface, MOS	a fan seise sais wit s	Sources:1
Degraded Operation	37.04 28.64	Degraded (24995-000,01y:1) (24995-000,01y:9)
Mechanical Failure	29.68 22.98	Mechanical Anomaly (24995-000,0:9:2) (24995-000,0:9:5)
Shorted	18.5% 14.3%	Short (24995-000,Qty:2) (24995-000,Qty:3)
Opened	14.8% 11.4%	Open (24995-000,Qty:2) (24995-000,Qty:2)
Induced	22.98	Functional Anomaly (24995-000,NR) (24995-000,Qty:8)

IC	Bipolar, LSI Corroded	41.5%	Sources:1 40.5% Corrosion (23459-008,Qty:17)
	Mobile Ions	26.8	26.2% Mobile Ions (23459-008,Qty:5) (23459-008,Qty:6)
	Shorted	14.6%	14.3% Au Wire Short (23459-008,Qty:2) (23459-008,Qty:4)
	Drift	7.3%	7.1% Parameter Drift (23459-008,Qty:1) (23459-008,Qty:2)
	Leaking	4.9%	4.8% Leakage (23459-008,Qty:2)
	Electrical Overstress	4.9%	4.8% EOS (23459-008,Qty:2)
	Induced		2.4% Mask Defect (23459-008,Qty:1)

IC Bipolar, Memory Degraded Operation	86.2%	Sources:1 69.2% Degraded (24995-000,Qty:8) (24995-000,Qty:405)
Mechanical Failure	7.5%	6.0% Mechanical Anomaly (24995-000,Qty:18) (24995-000,Qty:18)
Shorted	4.0%	3.2% Short (24995-000,Qty:4) (24995-000,Qty:15)
Opened	2.3%	1.8% Open (24995-000,Qty:1) (24995-000,Qty:10)
Induced		19.2% Functional Anomaly (24995-000,Qty:31) (24995-000,Qty:87)

IC Bipolar, TTL Bond/Beam Failure	45.0%	Sources:1 58.0% Bonds/Beams (25031-000,37.0%) (25031-000,39.0%)
Electrical Overstress	23.14	19.5% Overstress (25031-000,4.0%) (25031-000,35.0%)
Metallization	20.1%	17.0% Metallization (25031-000,4.0%) (25031-000,30.0%)
Surface Defects	10.7%	9.0% Surface Defects (25031-000,18.0%)
Oxide Defects	1.24	1.0% Oxide Defects (25031-000,2.0%)
Unknown		15.5% Unknown (25031-000,9.0%) (25031-000,22.0%)

FMI	<b>D-91</b>			Failure Distribution Summaries 3-105
Part Desc		Norm Dist.	Fail Dist.	Data Source(s)/Details
	ipolar,TTL & DDI. Shorted	60.0%	60.01	Sources:1 Short (24994-000,60.0%)
	Opened	40.0%	40.0%	Open (24994-000,40.0%)
4	Dther Drift		0.0% NR	Dzift (24994-000,NR)
	ipolar,TTL,Data Selector/MUX Eroken	100.0%	100.0%	Sources:1 Broken Leads-High Cyclic Fatigue (25027-000,Qty:17)
	ipolar,VLSI Degraded Operation	68.8%	33.14	Sources:1 Degraded (24995-000,Qty:1) (24995-000,Qty:40) (24995-000,Qty:87)
(	Opened	20.4%	9.8%	Open (24995-000,NR) (24395-000,Qty:14) (24995-000,Qty:24)
1	Mechanical Failure	7.5%	3.6%	Mechanical Anomaly (24995-000,NR) (24995-000,Qty:1) (24995-000,Qty:13)
5	Shorted	3.2%	1.6%	Short (24995-000,NR) (24995-000,Qty:1) (24995-000,Qty:5)
3	Induced		51 <b>.9</b> %	Functional Anomaly (24995-000, Qty:3) (24995-000, Qty:40) (24995-000, Qty:158)
	gital (Summary) Opened Shorted Dutput Stuck High Contaminated Dutput Stuck Low Degraded Operation Oxide Defects	18.8% 17.1% 16.3% 16.3% 12.7% 9.8% 9.0%		
	gital Dutput Stuck High	22.1%	17.6%	Sources:11 High (24990-000,40.0%), Output High (24991-000.56.0%), Logic 1 (24992-000,45.0%)
c	Output Stuck Low	21.8%	17.4%	Low (24990-000,40.0%), Output Low (24991-000,44.0%), Logic 0 (24992-000,55.0%)
c	pened	21.3%	17.08	Open (24993-000,33.0%), Pin 16 Fused Open-Overstress (10722-000,Qty:1), Open Circuit (24997-000,3.0%), Airbridge Failure due to Electromigration (25037-000,NR)
Я	roken	13.1%	10.5%	Broken Pin (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:2) (25027-000,Qty:3) (25027-000,Qty:3) (25027-000,Qty:3) (25027-000,Qty:3) (25027-060,Qty:22) (25027-000,Qty:47)
S	horted	12.2%	9.7%	Short Hi (24993-000,33.0%), Short Low (24993-000,33.0%), Short (24997-000,11.0%)
ם	egraded Operation	6.0%	4.8%	Bad Output (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:2) (25027-000,Qty:3) (25027-000,Qty:9), Electrical Stability (24417-001,NR), Change in parameters (24997-000,22.0%)
M	echanical Failure	3.6%	2.94	Mechanical Problem (24997-000,23.0%)

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art F	ilure	Norm	Fail	Data
	ode/Mech			Source(s)/Details
C Digita Induc	al (continued) ced		6,98	Supplier Test Procedures or Errors (25035-001,3,8%), Supplier Test Procedures (25035-001,4.6%) (25035-001,6.9%) (25035-001,16.7%) (25035-001,16.7%) (25035-001,20.0%) (25035-001,26.7%) (25035-001,27.1%) (25035-001,31.4%) (25035-001,34.2%) (25035-001,47.3%), Bulk Silicon Defects (24417-001,NR), Functional Anomalies (24997-000,41.0%)
Unkno	own		•0.7€	Unknown (24997-000,NR) (25035-001,2.0%) (25035-001,2.3%) (25035-001,3.6%) (25035-001,3.8%) (25035-001,3.9%) (25035-001,4.4%) (25035-001,7.1%) (25035-001,7.5%) (25035-001,9.1%) (25035-001,9.9%) (25035-001,10.5%) (25035-001,10.8%) (25035-001,25.0%)
	r (<\$4) 6 Output			Loss Of Logic (24990-000,20.0%)
0	de Defects		2.54	Oxide/Diffusion Faults (25035-001,7.7%) (25035-001,15.4%), Diffusion/Oxide Defects (25035-001,1.8%) (25035-001,9.3%) (25035-001,10.8%) (25035-001,12.8%) (25035-001,15.8%) (25035-001,16.4%) (25035-001,17.4%) (25035-001,19.8%) (25035-001,20.0%) (25035-001,22.5%) (25035-001,28.8%) (25035-001,29.4%) (25035-001,29.5%) (25035-001,31.1%) (25035-001,46.9%)
Cc	ontaminated		2.34	Cuntamination (25035-001,2.5%) (25035-001,4.4%) (25035-001,4.7%) (25035-001,7.9%) (25035-001,8.7%) (25035-001,9.1%) (25035-001,10.9%) (25035-001,13.5%) (25035-001,14.6%) (25035-001,16.3%) (25035-001,19.7%) (25035-001,21.5%) (25035-001,22.7%) (25035-001,24.1%) (25035-001,25.2%) (25035-001,50.0%) (25035-001,61.5%), Contamination or Corrosion (24417-001,NR)
Wi	re Bond Failure		2.0	<pre>Wiring Bonding (25035-001,1.8%) (25035-001,3.0%) (25035-001,3.9%) (25035-001,11.7%) (25035-001,12.5%) (25035-001,12.9%) (25035-001,13.2%) (25035-001,13.4%) (25035-001,13.6%) (25035-001,18.9%) (25035-001,21.1%) (25035-001,23.4%) (25035-001,25.0%) (25035-001,33.9%) (25035-001,58.2%), Wire Bonding Defects (24417-001,NR)</pre>
P	ckage/Related Failure		1.0%	Package (25035-001,2.0%) (25035-001,2.6%) (25035-001,3.0%) (25035-001,3.7%) (25035-001,3.8%) (25035-001,4.6%) (25035-001,5.5%) (25035-001,6.1%) (25035-001,6.7%) (25035-001,9.1%) (25035-001,9.7%) (25035-001,10.8%) (25035-001,14.1%) (25035-001,17.6%) (25035-001,30.0%), Package Defects (24417-001,NR)
Ma	tallization		0.9%	Metalization (25035-001,2.2%) (25035-001,2.7%) (25035-001,3.0%) (25035-001,3.1%) (25035-001,3.6%) (25035-001,3.9%) (25035-001,4.0%) (25035-001,4.6%) (25035-001,4.7%) (25035-001,5.0%) (25035-001,7.9%) (25035-001,8.5%) (25035-001,9.1%) (25035-001,9.9%) (25035-001,11.6%) (25035-001,15.4%) (25035-001,27.8%), Die Metallization Defects (24417-001,NR)
Cr	acked/Fractured		0.6%	Cracked Die (25035-001,1.5%) (25035-001,1.8%) (25035-001,1.8%) (25035-001,2.0%) (25035-001,3.3%) (25035-001,6.7%) (25035-001,18.2%) (25035-001,44.4%), Cracked Dice of Substrates (24417-001,NR)
Di	e/Attachment Failure		0.68	Die Attachment (25035-001,1.1%) (25035-001,1.5%) (25035-001,1.8%) (25035-001,2.2%) (25035-001,2.3%) (25035-001,3.9%) (25035-001,4.4%) (25035-001,4.5%) (25035-001,5.4%) (25035-001,11.2%) (25035-001,11.3%) (25035-001,12.5%) (25035-001,15.4%)
Во	nd/Beam Failure		0.24	Bonding (25035-601,7.7%) (25035-001,23.1%)
ī.e	ad Defects			External Lead Defects (24417-001,NR)

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FMD-	A DESCRIPTION OF THE OWNER OWNER			Failure Distribution Summaries 3-
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	ital (continued)			
Ot.	her (continued) Seal/Gasket Failure		NP.	Hermatic Seal Defects (24417-001,NR)
	Resistor & Capacitor Chip	Defects	NR	Registor and Capacitor Chip Defects (24417-001,NR)
	Surface Defects		NR	Silicon Surface Defects (24417-001,NR)
	Thin FIlm Defects		NR	Substrate Thin Film Defects (24417-001, NR)
	Substrate Bonding Defects		NR	Substrate Bonding Defects (24417-001,NR)
	Transistor Failure		NR	Internal Field Effect Transistor Failure (25037-000, NR)
	Resistor Failure		NR	Internal Resistor Failure (25037-000,NR)
	Capacitor Failure		NR	Internal Capacitor Failure (25037-000,NR)
	Worn Linings		NR	Internal Inductor Failure (25037-000,NR)
	Backgating Isolation Effec	ts	NR	Backgating-Isolation Effects (25037-000, NR)
-	ital, Array, PAL graded Operation	80.04	66.7%	Sources:1 Failed To Operate To Truth Table (10722-000,Qty:1), Data Output At Q2 Pin Changed To A Divide By 4 (10722-000,Qty:1), Erratic (10722-000,Qty:1), Incorrect Output (10722-000,Qty:1)
S'n	orted	20.0%	16.7%	Short-Oxide Pin Hole Short Metallization to Ground (10722-000, Qty:1)
Un	known	\$\$ \$\$ \$\$ \$\$ \$\$	16.7%	Unknown (10722-000,Qty:1)
	ital,Bipolar tput Stuck Low	28.04	28.0%	Sources:1 Output Stays Low (25015-000,28.0%)
	tput Stuck High			Output Stays High (25015-000,28.0%)
	tput Open			Output Open (25015-000,22.0%)
	put Open			Input Open (25015-000,22.0%)
	ital,Bipolar,Memory graded Operation	79.0%	79.0%	Sources:1 Slow (25015-000,79.0%)
Da	ta Bit Loss	21.0%	21.0%	Data Bit Loss (25015-000,21.0%)
	ital, Buffer, CMOS, Quad			Sources:1
	duced		100.0%	The True Output And Its Complement At Same Level (10722-000, Qty:1)

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esc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	graded Output	50.0%	25.0	Sources:2 Degraded Output-ESD Damage (25001-000,Qty:2)
sł	orted	50.0%	25.0%	Short-ESD Damage (25001-000,Qty:2)
Ir	duced	******	50.0%	VDD Leads Melted-SCR Latchup (10722-000,Qty:2)
-	ital, CMOS, Memory ectrical Overstress	24.8%	22.34	Sources:3 Electrical Overstress (23935-000,NR) (23935-000,NR) (23935-000,2.0%) (23935-000,20.0%), Overstress (25031-000,60.0%)
Op	ened	18.5%	16.7%	Open Matal Line (25001-000,Qty:1)
Ou	tput Stuck Low	18.5%	16,74	Data Output at Address E2C(hex) Stuck at '0' (25001-000,Qty:1)
Di	electric Breakdown	17.44	15.6%	Dielectric Breakdown (23935-000,NR) (23935-000,NR) (23935-000,0.1%) (23935-000,2.0%) (23935-000,50.0%) (23935-000,98.0%)
Me	tallization	13.0%	11.7%	Electromigration (23935-000,13.0%), Metal (23935-000,Ciy:3) (23935-000,Qty:6) (23935-000,Qty:62), Metallization (25031-000,34.0%)
Dr	ift	4.4%	4.0%	Parametric Drift (23935-000,NR) (23935-000,NR) (23935-000,0.1%) (23935-000,38.0%)
Co	entaminated	3.4%	3.14	Contamination (23935-000,Qty:5) (23935-000,Qty:603)
Ur	iknown		4.4%	Unknown (23935-000,NR) (23935-000,NR) (23935-000,Qty:4) (23935-000,Qty:21) (23935-000,Qty:54) (23935-000,Qty:789) (23935-000,19.0%)
Ot	her (<\$3) Oxide Defects		5.7% 1.7%	Oxide (23935-000,Qty:7) (23935-000,Qty:274), Oxide Defects (25031-000,1.0%)
	Bond/Beam Failure		1.7%	Bonds/Beams (25031-000,5.0%)
	Package/Related Failure		1.2*	Package Related (23935-000,NR) (23935-000,NR) (23935-000,0.1%) (23935-000,20.0%) (23935-000,28.0%), Package (23935-000,Qty:24) (23935-000,Qty:214)
	Latch Up		1.14	Latch Up (23935-000,NR) (23935-000,NR) (23935-000,0.1%) (23935-000,10.0%)
	Output Stuck High		NR	Latch Up (23935-000, NR)
	Electromigration		NR	Electromigration (23935-000,NR)

Digital, CMOS, RAM Intermittent Operation

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Sources:1 100.0% 100.0% Intermittently Latched High During Vibration (10722-000,Qty:1)

	91			Failure Distribution Summaries 3-
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	ital,CMOS,SSI/MSI roneous Output	42.1%	40.0%	Sources:2 Not Addressing Properly-Overstressed - ESD (10722-000,Qty:7), Erratic Or Erroneous Output-ESD Induced Overstress (10722-000,Qty:1)
qO	ened	35.1*	33.3%	Open (2 channels, pins 14 £ 15) (25001-000,Qty:1), Open -Discontinuity in Tungsten Thin Film Trace (25001-000,Qty:1)
In	termittent Operation	17.5%	16.7%	Electrically Intermittant-Cracked Ceramic Body (25001-000,Qty:1)
No	Output	5.3%	5.0%	No Output-Externally Induced Overstress (10722-000,Qty:1)
In	duced		5.0%	Low Level-Overstress (10722-000,Qty:1)
	ital,Converter,A/D orted	50.0%	50.0%	Sources:2 Short-Insufficient Die Attach (10722-000,Qty:1)
Ou	t of Spec.	50.0%	50.0%	Out of Spec (25027-000, Uty: 6)
-	ital,Converter,D/A roneous Output	100.0%	100.0%	Sources:1 Erroneous Digital Data (10722-000,Qty:1)
	ital,FET,Switch orted	1.00.0%	1 <b>00.0%</b>	Sources:1 FET Analog Switch Shorted-Power Reversal (10722-000,Qty:1)
	ital,HMOS,Memory ntaminated	78,9%	63.5%	Sources:1 Contamination (25032-000,60.0%) (25032-000,67.0%)
0x:	ide Defects	21.1%	17.0%	Oxide Defects (25032-000,11.0%) (25032-000,23.0%)
Ind	luced		19.5%	Silicon Defects (25032-000,17.0%) (25032-000,22.0%)
	ital,MOS tput Open	35 <b>.6</b> %	35.6%	Scurces:1 Cutput Open (25015-000,36.0%)
	put Open	35.6%		Input Open (25015-000, 36.0%)
Suj	oply Open	11.9%		Supply Open (25015-000,12.0%)
Out	put Stuck Low	8.9%	8.9%	Output Low (25015-000,9.0%)
01	put Stuck High	7.9%	7 04	Output High (25015-000,8.0%)

Part Failure Desc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
C Digital, MOS, Memory Da'a Bit Loss	31.8%	26.78	Sources:3 Data Bit Loss (25015-000,80.0%)
Shorted	24.7%	20.7%	Short (24994-000,60.0%) (24995-000,Qty:9) (24995-000,Qty:19) (24995-000,Qty:161)
Opened	21.38	17.8%	Open (24994-000,40.0%) (24995-000,Qty:7) (24995-000,Qty:36) (24995-000,Qty:94), Input Open (25015-000,6.0%), Output Open (25015-000,6.0%)
Degraded Operation	16.5%	13,8%	Degraded (24995-000,Qty:276) (24995-000,Qty:539) (24995-000,Qty:2,169), Slow (25015-000,8.0%)
Mechanical Failure	5.6%	4.7%	Mechanical Anomaly (24995-000,Qty:13) (24995-000,Qty:604) (24995-000,Qty:645)
Induced		16.3%	Functional Anomaly (24995-000,Qty:298) (24995-000,Qty:310) (24995-000,Qty:3,750)
Other Drift		0.0% NR	Drift (24994-000,NR)
C Digital, Memory Oxide Defects	54.7%	52.0%	Sources:1 Oxide Defects (25031-000,51.0%) (25031-000,53.0%)
Bond/Beam Failure	17.9%	17.0%	Bonds/Beams (25031-000,7.0%) (25031-000,27.0%)
Electrical Overstress	13.7%	13.0%	Overstress (25031-000,9.0%) (25031-000,17.0%)
Surface Defects	12.6%	12.0%	Surface Defects (25031-000,24.0%)
Metallization	1.18	1.0%	Metallization (25031-000,2.0%)
Unknown		5.0%	Unknown (25031-000,1.0%) (25031-000,9.0%)
C Digital, Memory, Chip Single Cell	30.0 <del>%</del>	30.0%	Sources:1 Single Cell (24250-037,30.0%)
Column	25.0%	25.0%	Column (24230-037,25.0%)
Row	25.0%	25.0*	Row (24250-037,25.0%)
Full Chip	10.0%	10.0%	Full Chip (24250-037,10.0%)
Row & Column	10.0%	10.0%	Row & Column (24250-037,10.0%)
C Digital, Memory, EAROM Contaminated	62.54	62.5%	Sources:1 Reversable Failure -Internal Contamination (25027-000,Qty:5)
Output Stuck Low	12.5	12.5	Address Location Stuck Low (25027-000,Qty:1)
Improper Memory Patterns	12.5	12.5%	Improper Memory Patterns (25027-000, Qty:1)

High Leakage Current 12.5% 12.5% High Leakge Current (Vee) (25027-000, Qty:1)

FM	D-91			Failure Distribution Summaries 3-11
Part		Norm Dist.	Fail Dist.	Data Source(s)/Details
IC I	Digital, Memory, EPROM Opened	78.6%	78.6t	Sources:2 Open Circuits (10722-000,Qty:1), Open Vcc/Ground-Static Discharge Damage (25029-000,Qty:3), Vpp Open and 4 Open Address Lines-ESD Damage (25029-000,Qty:1)
	Degraded Ontput	21.4	21.4	Degraded Performance Parameters-ESD Damage (25029-000,Qty:3)
IC [	Digital, Memory, HCMCS Drift	42.9	42.9	Sources:1 Parameter Drift (23459-008,Qty:9)
	Leaking	19.0%		Leakage (23459-008, Qty:2) (23459-008, Qty:2)
	Mobile Ions	9.5%	9.5%	Mobile Ions (23459-008,Qty:2)
	Diffusion Failure	9.5%	9.5%	Diffusion Failure (23459-008,Qty:2)
	Electrical Overstress	9.5%	9.5%	ESD (23459-008,Qty:2)
	Chip Out	4.8%	4.8	Chip Out (23459-008,Qty:1)
	Contaminated	4.8%	4.8%	Contamination (23459-008,Qty:1)
IC I	Digital, Memory, MOS Degraded Operation	46 6 <b>1</b>	40.35	Sources:1 Degraded (24995-000,Qty:7) (24995-000,Qty:18)
	Shorted			Short (24995-000, NR) (24995-000, Qty: 19)
	Mechanical Failure	10.93		Mechanical Anomaly (24995-000, NR) (24995-000, Qty:6)
	Opened	9.1%		Open (24995-000, NR) (24995~000, Qty:5)
	Induced			Functional Anomaly (24995-000, Qty:2) (24995-000, Qty:5)
IC I	Digital, Memory, PROM Degraded Operation	51.74	31.0%	Sources:1 Parameter chunge (24997-000,31.0%)
	Shorted	18.34	11.04	Short (24997-000,11.0%)
	Opened	16.7%	10.04	Cpen Circuit (24997-000,10.0%)
	Mechanical Failure	13.3*	8.0%	Mechanical defects (24997-000,8.0%)
	Induced		40.0%	Functional Anomaly (24997-000,40.0%)
	Digital, Memory, RAM No Operation	26.2%	25.0%	Sources:4 Would Not Operate at Cold Temperatures (25027-000,Qty:50)
	Degraded Operation	17.34	16.5%	Parameter changes (24997~000,69.5%)
	Shorted	16.5%	15.7%	Short (24994-000,60.0%) (24994-000,60.0%) (24997-000,3.0%)
	Opened	13.84	13.24	Open (24994-000,40.0%) (24994-000,40.0%), Open Circuit (24997-000,13.5%)
	Erroneous Output	13.14	12.54	Incorrect Data Output (10722-000.Qty:2)
	Contaminated	6.54	6.34	Failed PIND Test-Conductive Particles Found Inside (10722-000,Qty:1)

Part Fallure Desc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
IC Digital, Memory, RAM (continued) Broken	6.5%	6.34	Surface Mount Chips Fractured At Mounting (10722-000,Qty:1)
Induced		4.0%	Functional faults (24997-000,17.0%)
Other (<%2) Mechanical Failure	*****		Mechanical faults (24997-000,2.0%)
Drift		NR	Drift (24994-000, NR) (24994-000, NR)
C Digital, Memory, RAM, Static Output Stuck High	50.0%	50.0%	Sources:1 Tow Addresses LSB Appeirs Locked High (10722-000,2ty:1), Two Pins Locked High-Corrosion (10722-000,Qty:1), Locked In A 1 State-Corroded Open Internal Lead (10722-000,Qty:1)
Erroneous Output	33.3%	33.3%	Output Bits Would Toggle From 0's to 1's (16722-000,Qty:1), Address Reads Incorrect Data - LSB Appears Locked (10722-000,Qty:1)
Opened	16.7%	16.7%	Open Circuit-Corrosion Found Inside (10722-000,Qty:1)
C Digital, Memory, UVEPROM Open Bit Locations	94.2%	94.2%	Sources:1 Open bit locations (unaccessable to read or write) (25027-000,Qty:65)
Stress Cracking of Die	5.8*	5.8%	Memory Would Not Erase-Stress Cracking of Die (25027-000,Qty:4)
C Digital, Memory, UVPROM Data Loss	50.0%	50.0%	Sources:1 Lose Data With Time (10722-000,Qty:1)
Shorted	50.0%	50.0%	Address Lines Shorted-Dendritic Metallic Growth (10722-000,Qty:1)
C Digital, Memory, VMOS Contaminated	77 88	75 08	Sources:1 Ionic Contamination (25033-000,75.0%)
Oxide Defects			Oxide (25033-000.20.0%)
Diode Failure	1.5%		Diode Leakage (25033-000,1.4%)
Unknown			Unknown (25033-000,0.2%) (25033-000,1.0%) (25033-000,2.4%)
C Digital, Memory/LSI Die/Attachment Failure	75 <b>.5%</b>	75.5%	Sources:1 Die - Metallization (25034-000,54.0%), Die - Oxide/Dielectric (25034-000,16.0%), Die - Glassivation (25034-000,2.2%), Die - Surface (25034-000,2.2%), Die - Bulk Aspects (25034-000,0.7%)
Package/Related Failure	14.84	14.8%	Package - Die Attach Bond (25034-000,8.0%), Package - Lead Frame/External Leads (25034-000,5.2%), Package - Body (25034-000,1.5%)
Wire Bond Failure	9.78	9.78	Interconnects - Wirebond (25034-000,6.7%), Interconnects - Wire (25034-000,3.0%)

	Failure	11	17 . 4 1	Failure Distribution Summaries 3-
Part Desc.	Mode/Mach	Norm Dist.		Data Source(s)/Details
	ital,Migroprocessor gh Leakage Current	41.7%	41.78	Sources:2 Excessive Current Draw-Damaged Ground Circuit Meta (10722-000,Qty:2), Three-State Leakage Current-Electrical Overstress (10722-000,Qty:3)
Die	9/Attachment Failure	33.34	33.34	Pind Failures-Loose Die Attach (10722-000, Cty:4)
Out	tput Stuck Low	16.78	16.7%	Output Shorted To Gnd-Overstress (10722-000,Qty:2)
Sho	orted	8.3%	8.3%	Short-Surface Scratch Smeared Metallization (10722-000,Qty:1)
Ot}	ner Metallization		0.0% NR	Metallization Defects (24417-001,NR)
	Contaminated		NR	Contamination Under Metal Runs/Electromigration (24417-001,NR), Contamination of Oxide Layer/Pin Holes in Oxide (24417-001,NR)
	Cracked/Fractured		NR	Microcracks in Metal Runs (24417-001,NR)
	Oxide Defects		NR	Oxide Defects (24417-001,NR)
-	tal,Quad,True/Comp Buffr ened	100.0%	100.0%	Sources:1 Open At Output Pin 1-External Overstress (10722-000,Qty:1)
	tal,SSI/MSI put Stuck High	38.4%	29.1%	Sources:7 Output Stuck High (25001-000,Qty:1), .2 Kohm short from output to Vcc-ESD Damage (25001-000,Qty:1), Node Stuck High-Overstress - High Current Transien (25027-000,Qty:7), Output Node Stuck High-Electrical Overstress (25027-000,Qty:57), Logic Low Level At Outputs Are High (Approx 1 V) (10722-000,Qty:7), Pin 5 Locked High-External Overstress > 5.0 Volts (10722-000,Qty:1), All Outputs Binary 1 [High] State-Vcc Line Fused (10722-000,Qty:1)
Ope	ned	18.7%	14.2%	Open (24992-000,25.0%), Pin #1 Open-Cracked Package at Pin #1 (25001-000,Qty:1), Output Burned Open-Overstress (10722-000,Qty:1), Open Circuit At Output Pin 2 (10722-000,Qty:3), Open Circuit At Pin 10 (10722-000,Qty:1), Open Circuit At IC Pin 10-External Overstress (10722-000,Qty:1), Pins 6 And 24 Open-Electrical Overstress (10722-000,Qty:1), Open-Overstress (10722-000,Qty:1)
Dri	ft	13.2%	10.0%	Drift (24992-000,50.0%)
Sho	rted	12.0%		Short (24992-000,25.0%), VCC Was Shorted To Ground-Electrical Overstress (10722-000,Qty:3), Shorted From Pin 15 (A2) To Pin 3 (V-)-EOS/ESD (10722-000,Qty:6), Short To Ground (Pin 12) Of Input Pins 10 & 11 (10722-000,Qty:1), Outputs Associted W/12 & 13 Resistive/Shorted (10722-000,Qty:1), Channel Shorts B-E On Both Input TransOverstress (10722-000,Qty:1), Output Transistors Shorted & Gnd Metal Fused Open (10722-000,Qty:1)
Ele	ctrical Overstress	7.7%	5.9%	Electrical Overstress (25027-000,Qty:29)
Cra	cked/Fractured	7.4%	5.6%	Fractured Lids (10722~000,Qty:18)
Err	oneous Cutput	2.5*	1.94	Outputting Erroneous Data-External Overstress (10722-000,Qty:1), PIND Failure-Organic Fiber (10722-000,Qty:1), Failing Outputs-Excess Energy Dissipation

urt NG.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	ital, SSI/MSI (continued) roneous Output (continued)			
61	roneous output (continueu)			(10722-000,Qty:3), Failed To Produce Correct Data-VCC Line Fused Open (10722-000,Qty:1)
Un	known		18.1%	Unknown (23546-001,6.9%) (23546-001,13,5%) (23546-001,15.6%) (23546-001,21.8%) (23546-001,24.5%) (23546-001,64.4%) (24996-000,NR) (24996-000,NR) (24996-000,NR) (24997-000,NR) (24997-000,NR) (24997-000,NR)
In	duced	~~~~*	0.6%	Degradation Of 6 Of 8 Outputs-External Overstress (10722-000,Qty:1), Vcc Lead, Internal, Fused Open-Improper Socket Ins (10722-000,Qty:1)
Oti	her (<\$3) Output Stuck Low		5.6% 1.6%	Outputs Were Locked In A Low State-Ext. Overstress (10722-000,Qty:2), Shorts Between Output Pins 14, 16, 18, And Ground (10722-000,Qty:1), Outputs Stuck Low-Electrical Overstress (10722-000,Qty:2)
	No Output		1.5%	Incorrect or No Output-Electrical Overstress (25027-000,Qty:6), Device Inoperative-High Voltage Overstress (10722-000,Qty:1)
	Package/Related Failure		1.1%	VAC Leak (23546-001,4.1%) (23546-C01,5.0%)
	Failling VSWR		0.8%	Failing VSWR (23546-001,2.5%) (23546-001,4.1%)
	Output Leaky to Ground		0.3%	Output Pin 8 Leaky To Gnd (10722-000, Qty:1)
	Intermittent Operation		0.3%	Intermittent Latch Up (10722-000,Qty:1)
	Connector Failure		NR	Connector Failing (24996-000,NR), Connector failure (24997-000,NR)
Der No Our Shi	ear (Summary) graded Operation Output tput Stuck Low orted termittent Operation	47.8% 31.8% 9.5% 6.4% 4.5%		
Line	ear graded Operation	50.1%	46.8%	Sources:5 Degraded (24995-000,Qty:41) (24995-000,Qty:544), Bad Output (25027-000,Qty:1) (25027-000,Qty:3), Change in parameters -degraded- (24997-000,62.0%), Functional Anomalies (24997-000,24.0%)
No	Output	40.7%	38.0%	High Or Low (24990-000,10.0%), No Output (24990-000,80.0%), High Output (25015,32.0%), Low Output (25015,68.0%)
Sh	orted	3.14	2.94	Short (24995-000,Qty:13) (24995-000,Qty:89) (24997-000,6.0%)
Ope	ened	2.34	2.18	Open (24995-000,gty:12) (24995-000,gty:69), Open Circuit (24997-000,4.0%)
Dr	lft	2.1	2.0%	Drift (24990-000,10.0%)
Med	chanical Failure	1.74	1.64	Machanical Anomaly (24995-000,Qty:4) (24995-000,Qty:59), Machanical faults (24997-000,3.0%)
Tne	iuced	~~~~ <i>~</i>	6.64	Functional Anomaly (24395-000, Qty:80) (24995-000, Qty:326)

Part. D <b>es</b> c.	Tailure , Mode/Meuh	Norm Dist.	FLil Dist.	Data Source(s)/Details
	Inear, Comparator Opened	100.05	100.04	Sources:1 Open V+ Line-Electrical Overstress (10722-000,Qty:1), V+ (Pin 3) Open To All Circuitry-Elect Overstress (10722-000,Qty:1)
	neal,Line Driver Dutput Stuck Low	56.04	58.04	Sourcestl Autput Stuck Low (25015-000,58.0%)
1	nput Open	16.0%	16.05	Input Open (25015-000,16.0%)
¢	hitput Open	16.0%	16.0%	Output Open (25015-000,16,0%)
S	upply Open	10.3%	10.34	Supply Open (25015-0%0,10.0%)
	near,Op. Amp. egraded Operation	· 57.0¥	53.64	Sources:3 Output Voltage Instability (250('1-000,Qty:1), Clipped Output Waveform-Electrical Overstress (25027-000,Qty:16), Incorrect AGC Output-Silver Particles Bridging Cl (10722-000,Qty:2)
I	ntermittent Operation	13.1	12.34	Intermittent Failure (25027-000,Qty:10), Intermittent-Presence Of A Mobile Particle (10722-000,Qty:1)
s	horted	9.74	9.1%	PIND Failure (10722-000,Qty:4), Channel Short From +VCC4-VCC-Electrical Overstress (10722-000,Qty:1), Pin 5 Short To Case-Overstress (10722-000,Qty:1)
E	lectrical Overstress	5.74	5.4%	Overstress - Current Transients (25027-000,Qty:5)
R	esistor Failure	4.8%	4.5%	Resistor Net Value Shift-Dent In Met/Film Resistor (10722-000,Qty:3)
D	egraded Output	4.8%	4.54	Functionally Discrepant (10722-000,Qty:3)
ŋ	rift	4.8*	4.51	DC Offset Failures-Damaged Metallization (10722-000,Qty:3)
0	ther (<\$5) No Output			No Output-External Voltage Overstress (10722-000,Qty:1), No Response Noted At Output Pin-Elect Overstress (10722-000,Qty:1)
	Bond/Beam Failure		1.5%	Liftad Bond (10722-000,Qty:1)
	Output Stuck High			Output Locked At Positive Rail-Pin 9 Overstressed (10722-000,Qty:1)

IC Linear, Op. Amp., Power Die/Attachment Failure

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Sources:1 100.0% 100.0% Lifted Substrates (10722-000,Qty:2)

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Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	near,Op. Amp.,Quad agraded Output	50.0%	50.04	Sources:2 Low Slew Rate-Poor Die Attach (25027-000,Qty:1)
N	o Operation	31.34	31.34	Nonfunctional-Overstress Current (10722-000,Qty:5)
S	horted	12.5%	12.5%	Shorted V+ To VOverstress (10722-000,Qty:1), Resistive Short In Op Amplifier (10722-000,Qty:1)
Q	pened	6.3%	6.34	Open In The V+ Line (10722-000,Qty:1)
	nser, Regulator, Voltage nduced		100.0%	Sources:1 Emitter Leads Of Control Transistors Fused (10722-000,Qty:3)
	near,Switch Wire Bond Failure	50.0%	50.0%	Sources:1 Opens At Various Internal Leadwire Bonds (10722-000,Qty:1)
S	witch Failure	50.0%	50.0%	Three Of The Four Switches Were Inoperative (10722~000,Qty:1)
	near, Switch, Quad pened	50.0%	50.0%	Sources:1 Open Circuit-External Overstress (10722-000,Qty:1)
S	witch Failure	50.0%	50.0%	Switch 3 (Pin 9) Was Not Functional (10722-000,Qty:1)
	near,Voltage Follower egraded Operation	100.0%	100.0%	Sources:1 Output Of The Device Was Abnormal (10722-000,Qty:1)
	near,Voltage Reference,Pre xtraneous Bond		100.0%	Sources:1 PIND Failure-Loose, Extraneous Bond (10722-000,Qty:2)
	near,Voltage Regulator horted	75.0%	50.0%	Sources:3 Short-Bond "toe" Overhang (25027-000,Qty:1) (25027-000,Qty:2)
E.	lectrical Overstress	25.0%	16.7%	External Overstress (10722-000,Qty:1)
I	nduced		33.3%	Inverting Degraded-Externally Induced Overstress (10722-000,Qty:2)
	ar,Explosive Squib horted	44.5%	44.5%	Sources:1 Short (24992-000,44.5%)
Cı	racked/Fractured	33.3%	33.34	Crack (24992-000,33.3%)
Oŗ	pened	11.14	11.14	Open (24992-000,11.1%)
Le	eaking	11.14	11.14	Leak (24992-000,11.1%)

MD-91 art Failure Norm Fail				Failure Distribution Summaries 3-1
sc.		Norm Dist.	Fail Dist.	Data Source(s)/Details
dic. Ou	tor it of Adjustment	47.94	20.81	Sources:2 Out of Adjustment (20609-000, Qty:2, 420) (23038-001, Qty:5)
Wa	ern	12.34	5,34	Worn Excessively (23038-001,Qty:6), Worn Out (20609-000,Qty:251)
Bi	nding/Sticking	10.24	4.4*	Binding/Seized Frict (23038-001,Qty:2), Binding (20609-000,Qty:440)
In	correct Feedback	8.1*	3,5%	Feedback Incorrect (23038-001, Qty:6)
Sp	urious/False Operation	8.0%	3.54	Faulty Reading (23038-001,Qty:3), Erratic (20609-000,Qty:236)
00	t of Spec.	6.74	2.94	Out of Tolerance (2060)-000,Qty:396)
Ex	cessive Vibration	6.74	2.9%	Excessive Vibration (23038-001,Qty:5)
Un	known		40.6%	Unknown (20609-000,Qty:2,826) (23038-001,Qty:34)
In	duced		1.34	<pre>Improper Adjustment (23038-001,Qty:1), Miswired (23038-001,Qty:1), Burned (20609-000,Qty:14)</pre>
Ot	her (<\$6) No Output		14.84 2.34	No Output (23038-001,Cty:4)
	Incorrect Voltage		1.74	Incorrect Voltage (23038-001,Qty:3)
	Oscillating		1.74	Oscillation (23038-001, Qty:3)
	Loss of Control		1.7%	Control Inoperative (23038-001,Qty:3)
	Broken		1.5%	Broken (20609-000,Qty:43) (23038-001,Qty:2)
	Improper Output		1.2%	Improper Source Output (23038-001,Qty:1), Pressure Incorrect (23038-001,Qty:1)
	Cracked/Fractured		0.8%	Cracked/Fractured (20609-000,Qty:114)
	Collapsed		0.6%	Pinched/Flat/Collars (23038-001,Qty:1)
	Burred		0.6%	Burred (23038-001, (ty:1)
	Change in Resistance		0.6%	Resistance High (23038-001,Qty:1)
	Corroded		0.6%	Corroded (23038-001,Qty:1)
	Drift		0.6%	Fluctuates/Unstable (23038-001,Qty:1)
	Out of Balance		0.6%	UnBalanced (23038-001,Qty:1)
	Leaking		0.1%	Leaking (20609-000,Qty:14)
	Shorted		<0.1	Short (20609-000,Qty:13)
	Stripped		<0.1%	Stripped (20609-000,Qty:4)
	Opened		<0.1%	Opened (20609-000, Qty:2)

art	Failure	Norm	Fail	Data
art esc.		Dist.	Dist.	Source(s)/Details
	tor,Fault Ball en Wire	70.04	70.0%	Sources:1 Internal Wizing Open (10722-000,Qty:1), Open Wires And Slot Damage-Vibration Fatigue (10722-000,Qty:6)
Bi	nding/Sticking	30.0%	30.0%	Cap Sticking When Reset-Lack Of Lub. & Organic Con (10722-000,Qty:2), Cap Sticking (10722-000,Qty:1)
	tor,Fault Locating ened	75.0%	66.7%	Sources:1 Open Circuit-Tensile Failure (10722-000,Qty:3), Open Winding (10722-000,Qty:2), Open Winding-Tensile Failure (10722-000,Qty:1)
In	termittent Operation	25.0%	22.24	Ind. Switched States-Misalignment of Reset Magnet (10722-000,Qty:2)
Un	known		11.14	Unknown (10722-000,Qty:1)
	itor,Level Measurement known		<0.1%	Sources:1 Unknown (24996-000,NR)
Ot	her Erroneous Readings		100.0% NR	Erroneous Readings (24996-000,NR)
	Degraded Operation		NR	Failure to Indicate (24996-000, NR)
	Loss of Control		NR	Control Circuit Fail (24996-000,NR)
	ator, Pressure Measurement aknown		<0.1	Sources:1 Unknown (24996-000,NR)
Ot	her Sensors and Transducers H		100.0% NR	Sensors and Transducers (24996-000,NR)
	Transmitter Failure		NR	Transmitters (24996-000, NR)
	Switch Failure		NR	Control Switches (24996-000, NR)
	tor,Rate of Flow croneous Output	77.84	73.74	Sources:1 Failure to Indicate (24996-000,30.0%), Erroneous Readings (24996-000,40.0%)
Lc	es of Control	22.24	21.1*	Control Circuit Fail (24996-000,20.0%)
Un	known		5.34	Unknown (24996-000,5.0%)

				Failure Distribution Summaries 3-11
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Injector Corroded		87.5%	87.5	Sources:1 Corroded (24992-000,87.5%)
De	formed	7.5	7.5	Deform (24992-000,7.5%)
Cı	acked/Fractured	5.0%	5.0%	Fracture - Burst (24992-000,5.0%)
inner				Sources:1
Le	aking	54.8%	52.04	Cracked/Split-Leaking Air (25101-000,Qty:1), Leaking Air (25101-000,Qty:1) (25101-000,Qty:4), Overheated - Leaking Air (25101-000,Qty:4), Part Struck/Damaged - Leaking air (25101-000,Qty:30), Stolen - Leaking Air (25101-000,Qty:1), Unknown - Leaking Air (25101-000,Qty:5), Vibration - Leaking Air (25101-000,Qty:2), Part Struck/Damaged - Leaking Air (25101-000,Qty:3)
Cu	t/Scarred/Punctured	33.34	31.6%	Cut-Leaking Air (25101-000,Qty:1) (25101-000,Qty:24), Cut-Punctured (25101-000,Qty:1), Cut-Cut/Scarred (25101-000,Qty:1), Punctured (25101-000,Qty:3), Unknown - Cut/Scarred (25101-000,Qty:1)
Ag	ed/Deteriorated	10.8%	10.2%	Deteriorated/Aged - Leaking Air (25101-000,Qty:9), Deteriorated/Aged - Deteriorated (25101-000,Qty:1)
Ba	nt/Dented/Warped	1.1*	1.0%	Collapsed/Bent (25101-000,Qty:1)
In	duced		5.1%	<pre>Improper Installation - Cut/Scarred (25101-000,Qty:2), Improper Installation - Leaking Air (25101-000,Qty:2), Abnormal Operation (25101-000,Qty:1)</pre>
nsula Ag	tor ed/Deteriorated	50.0%	50.0%	Sources:1 Deterioration Of Plastic Material (24993-000,50.0%)
Br	oken	50.0%	50.0%	Mechanical Breakage (24993-000,50.0%)
	or,Vibration,Rubber ed/Deteriorated	100.04	85.04	Sources:1 Material Deterioration (24993-000,85.0%)
-	known			Unknown (24993-000,15.0%)
	or,Vibration,Spring ring Failure	100.0%	5 08	Scurces:1 Spring Fatigue (24993-000,5.0%)
- qe	sany sullur	100.04		
Tn	duced	کو بن ہے ہے تبد عند	HO.D≡	Degradation Of Damping Medium (24993-000,80.0%)

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Part Failure Desc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(J)/Details
oint Mecharical, Universal Broken	69.0%	41.48	Sources:1 Broken/Damaged (25101-000,Qty:27), Broken/Separated - Broken/Damaged (25101-000,Qty:2)
Worn	23.84	14.3%	Worn - Incp/Unserviceable (25101-000,Qty:1) (25101-000,Qty:1), Worn - Excessive Play (25101-000,Qty:7), Worn - Loose (25101-000,Qty:1)
Cracked/Fractured	4.8%	2,9%	Cracked/Split-Inop/Unserviceable (25101-000,Qty:1), Cracked (25101-000,Qty:1)
Excessive Vibration	2.4*	1.49	Vibration - Inop/Unserviceable (2510)-000, Qty:1)
Induced		40.0%	Caused By Other Failure-Broken/Damaegd (25101-000,Qty:4), Fell Off Or Lost - Missing (25101-000,Qty:1), Improper Installation - Broken/Damaged (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:3), Wrong Part - Broken/Damaged (25101-000,Qty:10), Fell Off Or Lost (25101-000,Qty:1), Lack Of Maintenance - Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:4), Lack Of Maintenance - Fnd In TI/PMCS/INSP (25101-000,Qty:1), Lack Of Maintenance - Corroded (25101-000,Qty:2)
ey Bent/Dented/Warped	100.0%	100.0%	Sources:1 Collapsed Bent (25101-000,Qty:1)
ey,Locking Loose	86.7%	76.5%	Sources:1 No Failure - Loose (25101-000,Qty:1), Worn - Loose (25101-000,Qty:12)
Worn	13.34	11.8%	Worn Out (25101-000, Qty:1) (25101-000, Qty:1)
Induced	~~~~~~	11.9%	Caused By Other Failure-Worn Out (25101-000,Qty:1), Caused By Other Failure-Broken/Damaged (25101-000,Qty:1)
Key,Machine Worn	71.4%	55.6%	Sources:1 Worn Out (25101-000,Qty:1) (25101-000,Qty:4)
Excessive Play	14.3%	11.1%	Worn - Excessive Play (25101-000,Qty:1)
Bent/Dented/Warped	14.3%	11.1%	Warped/Bent - Found In TI/PMCS/Insp (25101-000,Qty:1)
Induced		22.2	Fell Off Or Lost - Missing (25101-000,Qty:1), Improper Maintenance - Missing (25101-000,Qty:1)
<pre>Key,Woodruff Loose</pre>	50.0%	25.0%	Sources:1 Part Missing/Loose - Inop Man Elevation (25101-000,Qty:1)
Aged/Deteriorated	50.0%	25.0%	Deteriorated/Aged - Skips (25101-000,Qty:1)
Unknown		25.0%	Unknown (25101-000,Qty:1)
Induced	سر سا کہ اگر میں علم	25.0%	Caused By Other Failure-Binding/Sticking (25101-000,Qty:1)

FMD-91				Failure Distribution Summaries 3-1	
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
Keyboard Mechanical Failure		25.98	1.8.4%	Sources:3 Mechanical Type (Other) (24996-000,9.0%), Solid State (Mechanical Failure) (24996-000,50.0%), Mechanical Types: (Other) (24997-000,9.0%), Solid state (Mechanical failure) (24997-000,50.0%)	
Sp	oring Failure	23.34	16.5%	Mechanical Type (Spring Fatigue) (24996-000,26.0%), Mechanical Type (Broken Spring) (24996-000,27.0%), Mechanical Types: (Spring Fatigue) (24997-000,26.0%), Mechanical Types: (Broken Spring) (24997-000,27.0%)	
Co	ntact Failure	22.6%	16.1%	Mechanical Type (Contact Miss) (24996-000,51.5%), Mechanical Types: (Contact Miss) (24997-000,51.5%)	
Wi	ring & Connection Failure	11.0%	7.8%	Solid state (Wiring & connection fail) (24997-000,50.0%)	
Co	nnection Failure	11.0%	7.8%	Solid State (Wiring & Connection Fail) (24996-000,50.0%)	
Lo	cked Up	6.1%	4.3%	Locked Up (19542-000,13.0%)	
Un	known		23.2*	Unknown (19542-000,69.6%)	
In	duced	******	1.4%	Improper Connections (19542-000,4.3%)	
Ot	her (<\$3) Indictor/Display Failure	40 mit an 46 40 an	4.3% 1.4%	Led Display Defective (19542-000,4.3%)	
	IC Failure		1.4%	U-32 Defective (19542-000,4.3%)	
	Cable Failure		1.4%	Cable (GP554) Defective (19542-000,4.3%)	

Klaxon, Annunciator Module Degraded Operation	52.0%	Sources:1 52.0% Degraded (18175-000,52.0%)
Spurious/False Operation	25.0%	<pre>25.0% Catastrophic-Operates Spurious Or False Response (18175-000,25.0%)</pre>
Fails to Op. on Demand	23.04	23.0% Catastrophic-Fails To Operate On Demand (18175-000,23.0%)

36.1%
28.0%
13.1%
9.5%
5.6%
3.9%
3.8%

Lamp

mp	Sources:7
Lamp Failure	56.2% 41.7% Light Bulb Failure (23038-001, Qty:15) (23038-002, Qty:6)
	(23038-002, Qty:14) (23038-002, Qty:24) (23038-002, Qty:48)
	(23038-002, qty:57) (23038-003, qty:3) (23038-003, qty:5)
	(23038-003,Qty:7) (23038-003,Qty:7) (23038-003,Qty:13)
	(23038-003,Qty:25) (23038-003,Qty:29) (23038-004,Qty:18)
	(23038-006,Qty:2) (23038-006,Qty:3) (23038-006,Qty:19)
	(23038-006,Qty:29) (23038-006,Qty:35) (23038-006,Qty:62), No
	Indicating Light (23038-002,Qty:1) (23038-002,Qty:1)
	(23038-002,Qty:2) (23038-003,Qty:1), Light Bulb
	(23038-002,Qty:35), No Indicating Lights (23038-004,Qty:2),
	Light Bulb failure (23038-006, Qty:9) (23038-006, Qty:27)
Opened	19.5% 14.5% Open (23038-002,Qty:1) (24990-000,100.0%), Open Fillament

rt Failure	Norm		Data
sc. Mode/Mech	Dist.	Dist.	Source(s)/Details
mp (continued) Opened (continued)			
			Tube (23038-002,Qty:1) (23038-002,Qty:2), Fused (23038-002,Qty:1)
Burred	7.4%	5.5%	Burred/Charred (23038-001,Qty:9) (23038-002,Qty:1) (23038-002,Qty:12) (23038-002,Qty:16), Burred (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:4) (23038-002,Qty:5) (23038-002,Qty:13)
Broken	6.34	4.7%	Broken (23038-002,Qty:1) (23038-002,Qty:4) (23038-002,Qty:5) (23038-002,Qty:5) (23038-002,Qty:6) (23038-002,Qty:6) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:2) (23038-004,Qty:11) (23038-006,Qty:1) (23038-006,Qty:2)
Burned/Charred	5.18	3.8%	Burned/Charred (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:9) (23038-004,Qty:9)
Cracked/Fractured	3.04	2.28	Broken/Fractured (23038-001,Qty:4), Cracked (23038-002,Qty:1) (23038-003,Qty:4), Broken/Cracked (23038-006,Qty:3)
Loss of Control	2.4	1.8%	Control Inoperative (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:2) (23038-002,Qty:2) (23038-002,Qty:2) (23038-002,Qty:5) (23038-003,Qty:1) (23038-003,Qty:1) (23038-004,Qty:4)
Unknown		22.6%	Unknown (23038-001,Qty:7) (23038-002,Qty:2) (23038-002,Qty:4) (23038-002,Qty:6) (23038-002,Qty:8) (23038-002,Qty:14) (23038-002,Qty:16) (23038-003,Qty:1) (23038-003,Qty:10) (23038-004,Qty:9) (25101-000,Qty:1)
Induced		1.78	Missing (23038-001,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:2) (23038-002,Qty:2) (23038-003,Qty:1) (23038-006,Qty:1) (23038-006,Qty:5) (23038-006,Qty:5), Wrong Part (23038-002,Qty:1), Improper Energy (23038-002,Qty:1), Maintenance Error (23038-003,Qty:1)
Other (<%2) Insulation Failure		1.5% 0.5%	Insulating Breakdown (23038-001,Qty:1), Insulation Breakdown (23038-002,Qty:2)
Shorted		0.2%	Short: (23038-002,Qty:1) (23038-002,Qty:3), Grounded (23038-002,Qty:1), Shorted/Grounded (23038-002,Qty:1)
No Operation		0.2%	<pre>Inoperative (23038-002,Qty:1) (23038-002,Qty:2) (23038-003,Qty:1)</pre>
Worn		0.2%	Worn Excessively (23038-002,Qty:2) (23038-002,Qty:3)
Corroded		<0.1%	Corroded (23038-002,Qty:2)
Spurious/False Operation		<0.1	Faulty Reading (23038-002,Qty:1)
Connection Failure		<0.1	Connection Defect (23038-002,Qty:1)
Stripped		<0.1%	Stripped (23038-002,Qty:1)
Intermittent Operation		<0.1	Intermittent (23038-002,Qty:1)
Blown Fuse		<0.18	Fuse Blown (23039-002, Gty:1)
Burst/Ruptured		<0.1%	Burst (23038-002,Qty:1)
Contaminated		<0.1%	Dirty (23038-002,Qty:1)
No Output		<0.1*	No Output (23038-002,Qty:1)

FMD-91			Failure Distribution Summaries	
Part Failure Desc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details	
Lamp,Bulb Lamp Failure	68.8%	53.84	Source#:4 Light Bulb Failure (23038-001,Qty:3) (23038-004,Qty:1) (23038-004,Qty:3) (23038-005,Qty:1) (23038-005,Qty:4) (23038-005,Qty:6) (23038-005,Qty:64) (23038-006,Qty:22)	
Shorted	17.18	13.4*	Shorted Or Grounded (23038-004,Qty:9) (23038-005,Qty:1)	
Burned/Charred	5.6 <del>1</del>	4.4%	Burned/Charred (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:3) (23038-005,Qty:25)	
Loss of Control	3.34	2.6	Control Inoperative (23038-005,Qty:4) (23038-006,Qty:2)	
Broken	2.0	1.64	Broken (23038-005,Qty:1) (23038-005,Qty:10)	
Burst/Ruptured	1.94	1.5%	Burst (23038-004,Qty:1)	
Cracked/Fractured	1.3%	1.0%	Cracked (23038-005, gty: 7)	
Induced		11.3%	Missing (23038-001,Qty:1) (23038-005,Qty:2) (23038-006,Qty:1;, Wrong Part (23038-001,Qty:1)	
Unknown		8.2%	Unknown (23038-004,Qty:3) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:22)	
Other (<\$2) Seal/Gasket Failure		2.3% 0.7%	Blown Seal/Gasket (23038-005,Qty:5)	
Opened		0.7%	No Indicating Lights (23038-005,Qty:1), Blown Fuse (23038-005,Qty:1), Fused (23038-005,Qty:1), Open (23038-005,Qty:1), Open Filament Tube (23038-005,Qty:1)	
Burred		0.34	Burred (23038-005,Qty:2)	
No Output		0.1%	No Output (23038-005,Qty:1)	
Loose		0.1%	Loose (23038-005,Qty:1)	
No Operation		0.1%	Inoperative (23038-005, Qty:1)	
Loss of Power		0.1	Electrical Pwr Loss (23038-005, Qty:1)	

Lamp,Electric Lamp Failure	Sources:1 92.5% 92.5% Burned Out Or Defective Lamp, (25464-000,Qty:319)
Broken	7.2% 7.2% Broken (25464-000,Qty:25)
Corroded	0.3% 0.3% Corroded Mild/Moderate (25464-000,Qty:1)

Lamp, Flourescent,	Incondescent
Worn	

Sources:1 100.0% 100.0% Wearout (Open) (24991-000,100.0%)

Lamp, Incandescent Opened Sources:7 54.3% 20.1% Degradation (Loss Of Filament Emission) (24993-000,90.0%), Open (23038-001,Qty:1) (23038-001,Qty:2) (23038-005,Qty:1) (23038-005,Qty:3), No Indicating Light (23038-001,Qty:1) (23038-005,Qty:1), No Indicating Lights (23038-004,Qty:2) (23038-004,Qty:11), Open Filament Tube (23038-005,Qty:1) (23038-005,Qty:2), Evaporation of the Tungsten Filament (22540-000,NR) (22540-000,NR), Electromigration of the Tungsten Filament (22540-000,NR)

t Failure	Norm	Fail	Data
sc. Mode/Mech	Dist.	Dist.	
p,Incandescent (continued) Burned/Charred	17.8%	6.68	Charred (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:2) (23038-001,Qty:4) (23038-001,Qty:5), Burned/Charred (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:3) (23038-004,Qty:12) (23038-005,Qty:2) (23038-005,Qty:3) (23038-005,Qty:4) (23038-005,Qty:6) (23038-005,Qty:9) (23038-005,Qty:13) (23038-005,Qty:18)
Broken	11.9%	4.4%	Broken (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:2) (23038-001,Qty:2) (23038-001,Qty:3) (23038-004,Qty:1) (23038-004,Qty:3) (23038-004,Qty:4) (23038-004,Qty:5) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:2) (23038-005,Qty:2) (23038-005,Qty:3) (23038-005,Qty:3) (23038-005,Qty:18), Broken/Missing (23038-004,Qty:1), Broken Filament Wire (24417-000,NR)
Cracked/Fractured	7.5%	2.8%	Catastrophic (Filament Breakage, Glass Breakage) (24993-000,10.0%), Cracked (23038-001,Qty:1) (23038-001,Qty:4)
Loss of Control	5.8%	2.1%	Control Inoperative (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:8) (23038-004,Qty:10) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:3)
Burred	2.9%	1.1%	Burred (23038-001,Qty:3) (23038-001,Qty:4)
Unknown			Unknown (22540-000,NR) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:2) (23038-001,Qty:2) (23038-001,Qty:3) (23038-001,Qty:3) (23038-001,Qty:5) (23038-001,Qty:7) (23038-001,Qty:8) (23038-001,Qty:8) (23038-001,Qty:17) (23038-001,Qty:23) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:5) (23038-004,Qty:1) (23038-004,Qty:7) (23038-004,Qty:5) (23038-004,Qty:4) (23038-004,Qty:21) (23038-004,Qty:31) (23038-004,Qty:49) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:3) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:3) (23038-005,Qty:1) (23038-005,Qty:15) (23038-005,Qty:17) (23038-005,Qty:3) (23038-005,Qty:91) (23038-005,Qty:3)
Induced			Caused By Other Dev. (23038-001,Qty:1), Missing (23038-001,Qty:3) (23038-004,Qty:1) (23038-004,Qty:4) (23038-004,Qty:9) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:2) (23038-005,Qty:5) (23038-005,Qty:9) (23038-005,Qty:13), Improper Fit (23038-004,Qty:1), Defective Soldering of Leads (24417-000,NR)
Other (<%3) No Operation		0.8%	Inoperative (23038-001,Qty:2) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:3)
Improper Output		0.74 :	Improper Source Output (23038-004,Qty:9)
Shorted			Short (23038-001,Qty:1) (23038-001,Qty:1), Short Or Srounded (23038-004,Qty:1) (23038-005,Qty:1), Shorted Or Srounded (23038-004,Qty:2) (23038-005,Qty:1), Shorting of Med Wires in Base of Based Lamps (24417-000,NR)
Liquid/Vapor Lock		0.5% I	.iquid/Vaper Lock (23038-004,Qty:6)
Blown Fuse		0.2% F	use Blown (23038-001,Qty:1) (23038-005,Qty:1)
Corroded		0.14 0	crroded (23038-004,Qty:1) (23038-005,Qty:1)

FMD-				Failure Distribution Summaries 3-1
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	incandescent (continued) ther (continued)		یہ کے پاریسے جنہتے ہیں: 44 کیوں	
Ut	Worr		<0.1*	Worn Excessively (23038-005,Qty:1)
	Failling VSWR		<0.1%	High VSWR (23038-005,Qty:1)
	Leaking		NF.	Leaky Envelopes (24417-000,NR)
	Poor Filament Weld/Crimp		NR	Poor Weld / crimp of the Filament (24417-000,NR)
	Electrical Overstress		NR	Overstress (24417-000,NR)
	Seal Failure		NR	Damaged Glass Seals-due to poor soldwring (24417-000,NR)
• •	indicator wened	100.0%	100.0%	Sources:1 Opened (20609-000,Qty:11)
	ndicator,LED ss of Lumination	70.0%	70.0%	Sources:2 Loss of Illumination (24996-000,70.0%) (24997-000,70.0%)
No	Output	30.0%	30.0 <del>1</del>	Fail to Light (24996-000,30.0%) (24997-000,30.0%)
	uclear mp Failure	60.0%	60.0%	Sources:1 Inop Fire Control Lgt (25101-000,Qty:3)
Ag	ed/Deteriorated	40.0%	40.0%	Deteriorated/Aged - Inop Fire Control Light (25101-000,Qty:2)
	d Assembly t/Scarred/Punctured	34.3%	30.8%	Sources:1 Cut-Cut/Scarred (25101-000,Qty:1), Cut-Inop/Unserviceable (25101-000,Qty:1), Cut/Scarred (25101-060,Qty:22)
Wo	rn	32.94	29.5%	Deteriorated/Aged - Worn Out (25101-000,Qty:1), Worn Out (25101-000,Qty:8), Worn - Cable Frayed (25101-000,Qty:4), Worn - Inop/Unserviceable (25101-000,Qty:9), Worn - Broken/Damaged (25101-000,Qty:1)
Bro	oken	14.3%	12.8%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:3) (25101-000,Qty:5), Broken/Separated - Broken/Damaged (25101-000,Qty:1)
Cak	ole Failure	11.4%	10.3%	Cable Frayed (25101-000,Qty:8)
Loc	5 <b>5</b> 6	2.9	2.6	Worn - Loose (25101-000,Qty:2)
Age	ad/Deteriorated	2.94	2.6%	Deteriorated/Aged - Broken Damaged (25101-000,Qty:2)
Cra	acked/Fractured	1.48	1.34	Cracked/Split-Broken/Damaged (25101-000,Qty:1)
Ind	tuced		6.4%	<pre>Improper Maintenance - Inop/Unserviceable (25101-000,Qty:1), Item Abuse/Neglect - Cut/Scarred (25101-000,Qty:2), Improper Maintenance - Missing (25101-000,Qty:2)</pre>
Unk	nown		3.88	Unknown (25101-000, gty:3)

- <u>126</u>	Failure Distribution Sur		FMD-9	
art esc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Semi conductor duced		<0.1	Sources:1 Voltage Transients (22540-000,NR)
Unknown			<0.1%	Unknown (22540-000, NR)
Ot	her Metallization		100.04	P-Side Metalization Breakdown (22540-000,NR)
	Facet Damage		NR	Catastrophic Facet Damage (22540-000,NR)
	Dark Line Defects		NR	Dark Line Defects (22540-000,NR)
	Dark Spot Defects		NR	Dark Spot Defects (22540-000,NR)
	Change in Resistance		NR	Thermal Resistance Degradation (22540-000,NR)
	Homogeneous Degradation		NR	Homogeneous Degradation (22540-000,NR)
	Aged/Deteriorated		NR	Non-catastrophic Facet Deterioration (Erosion) (22540-000,NR)
	Intensity Pulsations		NR	Intensity Pulsations (22540-000,NR), Optical Frequency Shifts & Light Intensity Changes (22540-000,NR)
	Semiconductor, He-Cd ndenser Blockage	42.2%	42.28	Scurces:1 Condenser Blockage (22540-000,gty:35)
Ca	dmium Depletion	34. <b>9</b> %	34.93	Cadmium Depletion (22540~000,Qty:29)
Cr	acked/Fractured	9.64	9.6%	Glass Crack (22540-000, Qty:8)
Ou	t of Adjustment	4.8%	4.8%	Tube Alignment / Glass Strass (22540-000,Qty:4)
Ov	er Pressure Tube Failure	3.6%	3.64	Over Pressure Tube (22540-000,Qty:3)
He	lium Depletion	3.64	3.64	Helium Depletion (22540-000,Qty:3)
Co	ntaminated	1.2%	1.2	Cathode Contaminated (22540-000,Qty:1)
Oti	her Degraded Output		0.0% NR	Power Output Degradation-Helium Gas Loss (22540-000,NR), Power Output Degradation-Cadmium Depletion (22540-000,NR), Power Output Degradation-Discharge Contamination (22540-000,NR), Power Output Degradation-Growth of Cd Deposits int (22540-000,NR)
	Filament Failure		NR	Filament Failure (22540-000,NR)
	Rapid Gas Loss		NR	Rapid Gas Loss-Glass Crack (22540-000,NR), Rapid Gas Loss-Seal Leak (22540-000,NR)
	Resonator Misalign.		NR	Resonator/Beam Misalignment (22540-000,NR)
-	Semiconductor,Helium-Neon duced		<0.1%	Sources:1 Lagradation of Dielectric Coatings (22540-000,NR)
Oti	ner Loss of Power			Loss of Power-Progressive Reduction in Gas Pressur (22540-000,NR), Loss of Power-Change in Gas Mix Ratio (22540-000,NR)
	Gas Diffusion		NR	Gas Diffusion Through the Glass Envelope (22540-000, NR)

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FMD-91 Failure Distribution Summaries 3						
Part Masc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details		
	Semiconductor, Helium-Neon	(continue	d)			
OK.	her (continued) Cathode Sputtering		NR	Cathode Sputtering (22540-000,NR)		
aser, In	YAG duced	100 100 11, 001 01, 000	<0.1	Sources:1 Degradation Sputter-Deposition Machanism (22540-000,NR)		
Ot	her Contaminated		100.0% NR	Dust on Optical Surfaces (22540-000,NR)		
	Out of Adjustment		NR	Misalignment (22540-000, NR)		
	Cooling System Failure			Cooling System Failure (22540-000,NR)		
-	sembly nt/Dented/Warped	77.8%	41.28	Sources:1 Collapsed/Bent (25101-000,Qty:1) (25101-000,Qty:6)		
	oken	11.1		Broken/Damaged (25101-000, Qty:1)		
	036	11.14		Loose (25101-000,Qty:1)		
In	duced		47.1%	Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:2), Item Abuse/Neglect - Collapsed/Bent (25101-000,Qty:1), Lack Of Maintenance - Binding/Sticking (25101-000,Qty:5)		
	ptical,Element acked/Fractured	60.0%	60.0%	Sources:1 Vibration - Cracked (25101-000,Qty:1) (25101-000,Qty:1), Internal Failure - Cracked (25101-000,Qty:1)		
Br	oken	20.0%	20.0%	Operation Error - Broken/Damaged (25101-000,Qty:1)		
Cui	t/Scarred/Punctured	20.0%	20.0%	Cut/Scarred (25101-000, Qty:1)		
	Fire Control			Sources:1		
Out	t of Adjustment	37.0	28.0%	Out Of Adjustment (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Out Of Adjustment - Out Of Adjustment (25101-000,Qty:1) (25101-000,Qty:7), Out Of Adjustment - Inaccurate (25101-000,Qty:8) (25101-000,Qty:10)		
Out	t of Synch.	27.28	20.6%	Out Of Synch (25101-000,Qty:2) (25101-000,Qty:4) (25101-000,Qty:15), Internal Failure - Out Of Synch (25101-000,Qty:1)		
λgi	ed/Deteriorated	9.98	7.5%	Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Deteriorated/Aged - Inop Fire Conrol Light (25101-000,Qty:1), Deteriorated/Aged - Inop Fire Control Light (25101-000,Qty:1) (25101-000,Qty:2)		
Bro	oken	8.64	6.54	Broken/Separated - Inop/Unserviceable (25101-000,Qty:1), Broken/Damaged (25101-000,Q:y:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2)		
Cra	acked/Fractured	8.64	6.54	Cracked (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Unknown - Cracked (25101-000,Qty:1), Dropped - Cracked (25101-000,Qty:1) (25101-000,Qty:1)		

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3-12	8 Failure Distribution Sur	nmaries		FMD-91
Part Desc	Failure	Nort. Dist.	Fail Dist.	Data Source(s)/Details
	l Fire Control (continued) Lamp Failure	4.9%	3.7	Internal Failure - Inop Fire Control Light (25101-000,Qty:1) (25101-000,Qty:3)
	Seal/Gasket Failure	3.74	2.8%	Seals Worn - Inop/Unserviceable (25101-000,Qty:3)
	Induced		12.14	<pre>Improper Alignment - Out Of Adjustment (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:1), Dropped - Inaccurate (25101-000,Qty:1), Dropped - Broken/Damaged (25101-000,Qty:2) (25101-000,Qty:3), Improper Adjustment - Out Of Adjustment (25101-000,Qty:1), Item Abuse - Cracked (25101-000,Qty:1), Wrong Part - Inop Fire Control Light (25101-000,Qty:1), Wrong Part - Inop/Unserviceable (25101-000,Qty:1)</pre>
I	Unknown	مله الله على دين الله على	10.3	Unknown (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:9)
	Other (<%3) Lmaking		1.9% 0.9%	Vibration - Leaking Nitrogen (25101-000,Qty:1)
	Worn		0.9%	Worn - Out Of Synch (25101-000,Qty:1)
	l,Vial Out of Adjustment	56.6%	53.3%	Sources:1 Out Of Adjustment - Fnd In TI/PMCS/INSP (25101-000,Qty:2) (25101-000,Qty:3), Out Of Adjustment - Out Of Adjustment (25101-000,Qty:7) (25101-000,Qty:8), Out Of Adjustment - Inaccurate (25101-000,Qty:19) (25101-000,Qty:22), Out Of Adjustment - Out Of Synch (25101-000,Qty:1), Out Of Adjustment - Inop/Unserviceable (25101-000,Qty:1), Out Of Adjustment (25101-000,Qty:1)
	Aged/Deteriorated	14.2*	13.3	Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:5) (25101-000,Qty:6), Deteriorated/Aged - Contaminated (25101-000,Qty:1), Deteriorated/Aged - Inop Fire Control Light (25101-000,Qty:2) (25101-000,Qty:2)
:	Broken	9.78	9.24	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2), Part Struck/Damaged - Out Of Synch (25101-000,Qty:1), Intentional Damage - Broken/Damaged (25101-000,Qty:1)
I	Out of Synch.	6.24	5.8%	Out Of Synch (25101-000,Qty:1) (25101-000,Qty:3), Internal Failure - Out Of Synch (25101-000,Qty:1), Vibration - Out Of Synch (25101-000,Qty:2)
;	Lamp Failure	5.3	5.0%	<pre>Internal Failure - Inop Fire Control Light (25101-000,Qty:1) (25101-000,Qty:3), Inop Fire Control Light (25101-000,Qty:1), No Failure - Inop Fire Control Light (25101-000,Qty:1)</pre>
I	Norn	4.4%	4.2	Deteriorated/Aged - Worn Out (25101-000,Qty:1), Worn Out (25101-000,Qty:1), Worn - Inop/Unserviceable (25101-000,Qty:3)
C	Cracked/Fractured	3.54	3.34	Cracked (25101-000,Qty:1) (25101-600,Qty:2), Unknown - Cracked (25101-000,Qty:1)
1	Induced	*****	4.28	<pre>Item Abuse/Neglect - Inop/Unserviceable (25101-000,Qty:1), Part Struck/Damaged - Batteries Boiling (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged (25101-000.Qty:3)</pre>
τ	Jnknown	<b></b>	0.8%	Unknown (25101-000, Gty:1)
c	Dther (<\$2)		0.8%	

FMD-	91				Failure Distribution Summaries	3-129
Part Desc.	Failure Mode/Nech	Norm Dist.	Fail Dist.	Data Source(s)/Details		
kastalagi manasaa	Excessive Play		0.01	No Failure - Excessi	ve Play (25101-000, Qty:1)	

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Induced

Lever Assembly Binding/Sticking	Sources:1 33.3% 14.3% Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:1)
Seized	33.3% 14.3% Corroded-Seized (25101+000,Qty:1), Seized (25101-000,Qty:1)
Broken	33.3% 14.3% Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1)
Induced	57.1% Lack Of Lubrication - Binding/Sticking (25101-000,Qty:5), Lack Of Lubrication - Seized (25101-000,Qty:1), Lack Of Maintenance - Binding/Sticking (25101-000,Qty:1), Lack Of Maintenance - Seized (25101-000,Qty:1)

Lever,Brake Cracked/Fractured	50.0%	Sources:1 25.0% Cracked (25101-000,Qty:1)
Broken	50.0%	25.0% Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Unknown		25.0% Unknown (25101-000,Qty:1)
Induced		25.0% Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1)

Lever,Cam,Tube Out of Adjustment	38.5%	33.34 Oi	ources:1 ut Of Adjustment (25101-000,Qty:1) (25101-000,Qty:1), Out f Adjustment - Out Of Synch (25101-000,Qty:2), Out Of djustment - Found In TI/PMCS/Insp (25101-000,Qty:1)
Out of Synch.	15.4%	13.3% 00	ut Of Synch (25101-000,Qty:2)
Broken	15.4%	13.3% B	roken/Damaged (25101-000,Qty:2)
Bent/Dented/Warped	15.4%		art Struck/Damaged - Collapsed/Bent (25101-000,Qty:1), bllapsed/Bent (25101-000,Qty:1)
Worn	7.7%	6.7% Wa	orn - Out Of Adjustment (25101-000,Qty:1)
Loose	7.7%	6.7 <b>%</b> V:	ibration - Loose (25101-000,Qty:1)
Induced			aused By Other Failure-Broken/Damaged (25101-000,Qty:1), mproper Maintenance - Out of Adjustment (25101-000,Qty:1)
Lever,Cocking Bent/Dented/Warped	42.9%	37.5% Cd	ources:1 ollapsed/Bent (25101-000,Qty:1), Part Struck/Damaged - ollapsed/Bent (25101-000,Qty:1), Warped/Bent - Misfire 25101-000,Qty:1)
Broken	42.98		roken/Damaged (25101-000,Qty:1), Broken/Separated-Misfire 25101-000,Qty:2)
Misfire	14.3%	12.53 M	isfire (25101-000,Qty:1)

----- 12.5% Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1)

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Norm Dist.	Fail Dist.	Data Source(s)/Details
45.3%	24.78	Sources:6 Light Bulb Failure (23038-001,Qty:1) (23038-001,Qty:2) (23038-002,Qty:1) (23038-002,Qty:1) (23038-003,Qty:2) (23038-004,Qty:3) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:5) (23038-005,Qty:6) (23038-005,Qty:7) (23038-006,Qty:4), No Indicating Light (23038-001,Qty:1), No Indicating Lights (23038-005,Qty:1)
32.38	17 <b>.6</b> %	Broken (23038-002,Qty:2) (23038-002,Qty:5) (23038-003,Qty:4) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:3) (23038-005,Qty:1) (23038-006,Qty:3)
7.1%	3.94	Control Inoperative (23038-002,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:2)
4.8%	2.64	Short Or Grounded (23038-001,Qty:1), Shorted Or Grounded (23038-004,Qty:1) (23038-004,Qty:2)
3.7%	2.0%	Broken/Fractured (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1), Cracked '23038-005,Qty:1)
3.4%	1.9%	Faulty Reading (23038-001,Qty:1) (23038-005,Qty:1)
3.4	1.94	Grounded Electricaly (23038-003,Qty:1)
	33.5%	Missing (23038-001,Qty:1) (23038-001,Qty:3) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:2) (23038-003,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:7) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:2) (23038-005,Qty:3) (23038-006,Qty:3) (23038-006,Qty:3) (23038-006,Qty:5), Wrong Part (23038-002,Qty:2) (23038-004,Qty:2) (23038-005,Qty:1), Miswired (23038-002,Qty:1) (23038-003,Qty:1), Improper Fit (23038-004,Qty:1), Improper Energy Resp (23038-005,Qty:1)
	6.6%	Unknown (23038-001,Qty:1) (23038-002,Qty:1) (23038-002,Qty:4) (23038-004,Qty:2) (23038-005,Qty:1) (23038-005,Qty:1) (23038-006,Qty:1)
	5.3 <b>%</b> 1.1 <b>%</b>	Weak (23038-004, Qty:3)
	0.9%	Corroded (23038-002,Qty:1) (23038-004,Qty:1)
	0.7%	Burned/Charred (23038-004,Qty:1) (23038-005,Qty:1)
	0.6%	No Output (23038-002,Qty:1)
	0.6%	Burred (23038-002, Qty:1)
	0.4%	Electrical Pwr Loss (23038-004, Qty:1)
	0.45	Fused (23038-004, gty:1)
	0.49	Inoperative (23038-005,Qty:1)
	Dist. 45.3% 32.3% 7.1% 4.8% 3.7% 3.4% 3.4%	Dist. Dist. 45.3% 24.7% 32.3% 17.6% 7.1% 3.9% 4.8% 2.6% 3.7% 2.0% 3.4% 1.9% 3.4% 1.9% 3.4% 1.9% 3.4% 1.9% 3.4% 1.9% 3.4% 1.9% 0.6% 0.6% 0.6% 0.4%

FM	D-91			Failure Distribution Summaries 3-13
Part Desc		Norm Dist.	Fail Dist.	Data Source(s)/Details
Ligh	nt,Electric,Fix Cracked/Fractured	42.0%	41.5%	Sources:1 Cracked (25464-000,Qty:34)
	Broken	37.0%	36.6%	Broken (25464-000,Qty:30)
	Lamp Failure	7.4	7.3%	Burned Out Or Defective Lamp, (25464-000,Qty:6)
	Worn	6.24	6.1%	Worn, Chaffed, Frayed, or Torn (25464-000,Qty:5)
	Corroded	2.58	2.4%	Corroded Mild/Moderate (25464-000,Qty;2)
	Contact Failure	2.5*	2.41	Contact/Conn Defect (25464-000,Qty:2)
	Loose	2.5%	2.4	Loose, Damaged, or Missing Har (25464-000, Qty:2)
	Other (<\$3) Drift		1.2% 1.2%	Fails to Tune or Drifts (25464-000,Qty:1)
	t,Electric,Fix,Ground Broken	73.64	73.6%	Sources:1 Broken (25464-000,Qty:106)
	Corroded	13.9%	13.94	Corroded Mild/Moderate (25464-000,Qty:20)
	Cracked/Fractured	7.6%	7.6%	Cracked (25464-000,Qty:11)
	Worn	1.4%	1.4%	Worn, Chaffed, Frayed, or Torn (25464-000,Qty:2)
	Loose	1.4%	1.4%	Loose,Damaged,or Missing Har (25464-000,Qty:2)
	Binding/Sticking	1.4	1.4*	Binding Stuck or Jammed (25464-000,Qty:2)
	Lamp Failure	0.74	0,7%	Burned Out Or Defective Lamp, (25464-000,Qty:1)
-	t,Emerg. Light Assy Broken	50.0%	33.34	Sources:1 Wire Harness Damaged - Broken/Damaged (25101-000,Qty:2)
	Worn	25.0%	16.7%	Worn - Inop/Unserviceable (25101-000,Qty:1)
	Wire Failure	25.0%	16.7%	Wire Harness Damaged - Inop/Unserviceable (25101-000,Qty:1)
	Induced		16.7%	Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1)
	Unknown		16.7%	Unknown (25101-000,Qty:1)
	Rail Assembly Broken	55.6%	43.5%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:7), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:2)
	Loose	27.84	21.78	Worn - Loose (25101-000,Qty:5)
,	Worn	11.14	8.74	Worn Out (25101-000,Qty:1), No Failure - Worn Out (25101-000,Qty:1)
1	Excessive Play	5.64	4.34	Worn ~ Excessive Play (25101-000,Qty:1)
	Induced	*****	21.74	Caused By Other Failure-Broken/Damaged (25101-000,Qty:1), Improper Maintenance - Out Of Adjustment (25101-000,Qty:3), Lack Of Maintenance - Out Of Adjustment (25101-000,Qty:1)

irt Failure	Norm		Data
sc. Mode/Mech	Dist.	Dist.	Source(s)/Details
quid Crystal Disp Dim Rows	33.3%	33.34	Sources:1 Dim Rows (25014-000,Qty:44)
IC Failure	18.94	18.9%	Integrated Circuit, Blank Display (25014-000,Qty:9), Integrated Circuit, Improper Characters (25014-000,Qty:16)
Flickering Rows	16.74	16.78	Flickering Rows (25014-000,Qty:22)
Manufacturing Defects	15.24	15.2%	Miscellaneous Manufacturing Defects (25014-000,Qty:20)
Zebra Strip	12.1*	12.14	Zebra Strip, Flashing Dots (25014-000,Qty:5), Zebra Strip, Missing or Dim Columns (25014-000,Qty:11)
Missing Rows	3.8%	3.9%	Missing Rows (25014-000,Qty:5)
ck,Traveling Broken	76.5%	61.9%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:3) (25101-000,Qty:8), Vibration - Broken/Damaged (25101-000,Qty:14)
Cracked/Fractured	23.5%	19.0%	Cracked/Split-Inop/Unserviceable (25101-000,Qty:1), Cracked Weld-Broken/Damaged (25101-000,Qty:1), Cracked (25101-000,Qty:1) (25101-000,Qty:2), Vibration - Cracked (25101-000,Qty:3)
Induced		16.7%	Caused By Other Failure-Broken/Damaged (25101-000,Qty:4), Caused By Other Failure-Worn Out (25101-000,Qty:1), Lack Of Maintenance - Broken/Damaged (25101.000,Qty:1), Stolen - Missing (25101-000,Qty:1)
Unknown		2.4	Unknown (25101-000,Qty:1)
inette			Sources:1
Broken			Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:3)
Bent/Dented/Warped			Unknown - Collapsed/Bent (25101-000,Qty:1)
Worn	16.7%		No Failure - Worn Out (25101-000, Qty:1)
Induced		14.3%	Improper Maintenance - Broken/Damaged (25101-000,Qty:1)
ignatron Gassing	60.0%	30.0%	Sources:2 Gassing (24993-000,30.0%)
Window Failure	40.0%	20.0%	Window Puncturing (24993-000,20.0%)
Induced		40.0%	Cathode Degradation (Resulting Form Arcing) (24993-000,40.0%), Failure or Degradation of the Magnetic Circuit (22540-000,NR), Degradation in Tube Operation (22540-000,NR)
Unknown		10.0%	Unknown (24993-000,10.0%)
Other Seal/Gasket Failure		0.0% NR	Deterioration of Seal (22540-000,NR)
Cracked Envelope		NR	Puncture or Crack in the Envelope (22540-000,NR)

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FMI	<b>)-91</b>			Failure Distribution Summaries	3-133
Part Desc	Failure . Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
Manii	fold Dpened	73.5%	73.5%	Sources:1. Open (24992-000,73.5%)	
c	Closed	23.5%	23.54	Close (24992-000,23.5%)	
1	Loaking	3.0%	3.0%	Leak (24992-000,3.0%)	
1	anical Filter (Summary) Jeaking	53.7% 19.9%			
1	Loss of Control Improper Output Clogged/Clogging	19.94			
	anical Filter Leaking	53.8%	34.0%	Sources:5 Internal Leak (24992-000,8.8%), External Leak (24992-000,74.5%), Leaking (20609-000,Qty:428)	
1	Improper Output	19.8%	12.5%	Improper Source Output (23038-002,Qty:1)	
I	Loss of Control	19.8%	12.5%	Control Inoperative (23038-002,Qty:1)	
c	logged/Clogging	6.6%	4.28	Clogged (24992-000,16.7%)	
τ	Jnknown		21.7%	Unknown (20609-000,Qty:243) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:2)	
c	Other (<%6) Degraded Operation		15.1% 3.6%	Weak (23038-004,Qty:1)	
	No Operation		3.6%	Inoperative (23038-004, Qty:1)	
	Noisy		3.6%	Noisy (23038-004,Qty:1)	
	Cracked/Fractured		3.34	Cracked/Fractured (20609-000,Qty:106), Fatigue Cracks-Cyclic Flow (25036-000,NR)	
	Broken		0.5%	Broken (20609-000, Qty:17)	
	Out of Spec.		0.5%	Out of Tolerance (20609-000,Qty:16)	
	Burst/Ruptured		<0.1%	Ruptured (20609-000,Qty:2)	
	Pent/Dented/Warped		<0.1%	Warped (20609-000, Qty:1)	
	Worn		<0.1	Worn Out (20609-000,Qty:1)	
	Channeling		NR	Channeling-High Differential Pressures (25036-000,NR), Channeling-Cyclic Flow (25036-000,NR)	
	Media Migration		NR	Media Migration-Vibration (25036-000,NR), Media Migration-Cyclic Flow (25036-000,NR), Media Migration-Col Starts (25036-000,NR)	ld
	Disintegration		NR	Disintegration-Cold Starts (25036-000,NR), Disintegration-Embrittlement (25036-000,NR), Disintegration-High Differential Pressures (25036-000,NR)	)

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3-134 Part	Failure Distribution Sun Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source (s) /Details
	ical Filter, Hydraulic, Fuel t of Spec.	44.4	42.1	Sources:1 Out of Specification (20609-000,Qty:8)
In	proper Flow	33.3%	31.6%	Improper Flow (20609-000,Qty:6)
Le	aking	22.24	21.1%	Leaking (20609-000, Qty:4)
Un	iknown	a, # 4 7 a a	5.34	Unknown (20603-000,Qty:1)
	ism Percussion orn	100.0%	66.7%	Sources:1 Worn Out (25101-000,Qty:1), Worn - Worn Out (25101-000,Qty:2), Worn - Found In TI/PMCS/Insp (25101-000,Qty:1), Worn - Inop/Unserviceable (25101-000,Qty:1), Worn - Misfire (25101-000,Qty:1)
Un	known		22.2	Unknown (25101-000,Qty:1) (25101-000,Qty:1)
In	duced	***	11.1%	Stolen - Missing (25101-000,Qty:1)
-	<sup>,</sup> Device,Storage Device,Elec known			Sources:1 Unknown (24997-000,NR)
Ot	ner Parameter Change		100.0% NR	I.C. Memory: Parameter change (24997-000,NR)
	Functional Fault		NR	I.C. Memory: Functional fault (24997-000,NR)
	Open Circuit		NR	I.C. Memory : Open Circuit (24997-000,NR)
	Surface Defects		NR	Discs: Abrasion of Disc Surface (24997-000,NR)
	Disc Failure		NR	Discs: Transport & Movement Damage (24997~000,NR)
	Noise Distortion		NR	Magnetic Tape: Noise distortion (24997-000, NR)
	Broken		NR	Magnetic Tape: Breakage (24997-000, NR)
	Worn		NR	Magnetic Tape: Wear (24997-000,NR)
	(Summary)			
	oken ntaminated	17.18		
	Output ift	16.0% 15.4%		
Se	al/Gasket Failure	12.64		
-	urious/False Operation aned	11.74		
eter Dr:	ift	26.18		Sources:7 Drift (24992-700,58.8%), Fluctuates/Unstable (23038-005,Qty:2), Resistance Drift in Shunt or Series Resistance (22540-000,NR)
Li	nit Unadjuctable	20.0%		Unable To Adjust Lim (23038-004,Qty:1) (23038-004,Qty:6), Unable To Ajust Lim (23038-005,Qty:1)
	prious/False Operation	18.24	9.18	Faulty Reading (23038-003,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2),

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Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	(continued) oken	13.8%	6.94	Broken (23038-003,Qty:1) (23038-005,Qty:1) (23038-005,Qty:6)
Op	ened	11.74	5.9%	Open (24992-000,29.4%), Open Coil Winding (22540-000,NR)
No	Output	10.2%	5.1%	No Output (23038-003,Qty:2), Inoperative (23038-005,Qty:1)
Un	known		33.1%	Unknown (22540-000,NR) (23038-003,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1) (23038-004,Qty:3) (23038-005,Qty:1) (23038-005,Qty:4) (23038-006,Qty:1)
In	duced		1.34	<pre>Improper Energy Resp (23038-005,Qty:1), Improper Adjustment (23038-005,Qty:1), Handling (24417-000,NR), Vendor Defects (24417-000,NR)</pre>
OL	her (<\$8) Shorted		15.5% 4.6%	Clog - Short (24992-000,11.8%), Short Or Grounded (23038-003,Qty:1), Shorted Coil Winding (Partial) (22540-000,NR), Shorted Coil Winding (22540-000,NR), Short/Open Shunt Series Resistance (22540-000,NR)
	Loss of Control		4.2%	Control Inoperative (23038-003,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1)
	Incorrect Voltage		2.7%	Incorrect Voltage (23038-005,Qty:1) (23038-005,Qty:3)
	Cracked/Fractured		1.3%	Cracked (23038-005,Qty:1) (23038-005,Qty:1)
	Out of Adjustment		1.3	Out Of Adjustment (23038-004, Qty:1)
	Degraded Output		0.7%	Low Performance (23038-005, Qty:1)
	Brittle		0.7%	Brittle (23038-005,Qty:1)
	Electrical Overstress		NR	Electrical Overstress (24417-000,NR)
	Machanical Overstress		NR	Mechanical Overstress (24417-000,NR)
	Spring Failure		NR	Spring Relaxation (22540-000,NR)
	Diode Failure		NR	Leaky Rectifier Diode (22540-000,NR), Short/Open Rectifier Diodes (22540-000,NR)
	Bearing Failure		NR	Bearing Wear or Dirty Bearing (22540-000,NR)
	Bent/Dented/Warped		NR	Bent or Broken Pointer (22540-000,NR)

Meter,Flow Degraded Output	100.0%	Sources:1 55.5% High Reading (Catastrophic) (24992-000,89.1%)
Induced		44.5% High Reading (Degraded) (24992-000,71.5%)

Meter, Moving Coil No Output	70.08	Sources:1 70.0% No Reading (24990-000,70.0%)
Drift	30.00	30.0% Drift (24990-000,30.0%)

		Dow	nloaded	from http://www.everyspec.com	
3-136	Failure Distribut	ion Summaries			
Part	Failure	Norm	Fail	Data	
Desc.	Mode/Mech	Dist.	Dist.	Source(s)/Details	

Meter, Multimeter Drift

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Sources:1 100.0% 100.0% Fluctuates/Unstable (23038-001,Qty:1) FMD-91

Meter,Potentiometer Opened	33.3%	Sources:1 33.3% Open (24994~000,33.3%)
Shorted	16.7%	16.7% Short (24994-000,16.7%)
Arcing/Sparking	16.7%	16.7% Arc (24994-000,16.7%)
Drift	16.7%	16.7% Drift (24994-000,16.7%)
Unstable Operation	16.7%	16.7% Unstable (24994-000,16.7%)

Meter, Potentiometer, Position Sensor Contaminated

Sources:1

100.0% 100.0% Noisy-Internal Contamination (25001-000,Qty:1)

Meter,Potentiometer,Rotary Out of Spec.	40.0%	Sources:1 21.5% Out of Tolerance (20609-000,Qty:62)
Broken	32.9%	17.78 Broken (20609-000,Qty:51)
Morn	14.8%	8.0% Worn Out (20609-000, Qty:23)
Opened	8.4%	4.5% Opened (20609-000, Qty:13)
Noisy	3,9%	2.1% Noisy (20609-000,Qty:6)
Unknown		38.2% Unknown (20609-000,Qty:29) (20609-000,Qty:81)
Other (<\$4) Corroded	Φα και - 10 και <b>Φ</b> 10	8.0% 1.7% Corroded (20609-000,Qty:5)
Contaminated		1.4% Contaminated (20609-000,Qty:4)
Burned/Charred		1.4% Burned (20609-000, Qty:4)
Binding/Sticking		1.4% Binding (20609-000,Qty:4)
No Operation		0.7% No Operation (20609-000,Qty:2)
Intermittent Operation		0.7% Intermittent (20609-000,Qty:2)
Out of Adjustment		0.3% Out of Adjustment (20609-000, Qty:1)
Arcing/Sparking		0.3% Arcing (20609-000, Qty:1)

Meter,Ruggedized Seal/Gasket Failure	Sources:1 100.0% 75.0% Catastrophic-Opens, Glass Breakage, Open Seals- (24993-000,75.0%)
Induced	25.0% Degradation (Accuracy Friction, Damping) (24993-000,25.0%)

FMD-	-91			Failure Distribution Summaries 3-1
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
•	Thermometer coken	130.0%	50.0%	Sources:1 Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Inaccurate (25101-000,Qty:1)
Ir	nduced		50.C%	Fell Off Or Lost - Missing (25101-000,Qty:1), Missing (25101-000,Qty:1)
	Time,Elapsed Operation	44.4%	44.4%	Sources:2 Inoperative-Lifted Substrate Bond Wire (10722-000,Qty:2), Non-Functional (10722-000,Qty:1), Ceased Incrementing (10722-000,Qty:1)
ĿW	re Failure	22.2	22.2	Strained Wire (Tensile Failure) In A Coil (10722-000,Qty:2)
Nc	o Movement	22.2%	22.28	Stopped Incrementing-Broken Lens (10722-000,Qty:1), No Indicator Movement (10722-000,Qty:1)
Op	bened	11.14	11.1%	Coil Open-Tensile Failure (10722-000,Qty:1), Test Console Intermittently Open (12702-000,NR), Mag Wheel Coil Open in Number 2 Position (12702-000,NR)
Ur	known		<0.1%	Unknown (12702-000,NR) (12702-000,NR) (12702-000,NR) (12702-000,NR) (12702-000,NR) (12702-000,NR) (12702-000,NR)
Ot	her Out of Regulation		0.0% NR	12 Volt Regulator-Out of Regulation (12702-000, NR)
	Transformer Failure		NR	Transformer, T-1, Open (12702-000,NR)
	Winding Failure		NR	ETM Winding Open (12702-000, NR) (12702-000, NR)
	Shorted		NR	Q-2 Transistor Shorted (12702-000,NR)
	Mag Wheel Failure		NR.	Mag Wheel (12702-000, NR), Mag Wheel Har.gs Up (12702-000, NR)
	Contaminated		NR	Dirty Encoder Mask (12702-000,NR)
	Loose		NR	Course Heading Pointer Loose (12702-000, NR)

Mater, Vertical Speed Spurious/False Operation	37.5%	Sources:1 25.0% Faulty Reading (23038-001,Qty:6)
Drift	18.84	12.5% Fluctuates/Unstable (23038-001,Qty:3)
Shorted	18.8%	12.5% Shorted Or Grounded (23038-001, Qty:3)
Lamp Failure	12.5%	8.3% Light Bulb Failure (23038-001, Qty:2)
Connection Failure	6.3%	4.2% Connection Defective (23038-001, Gty:1)
Incorrect Voltage	6.34	4.2% Incorrect Voltage (23038-001,Qty:1)
Unknown		33.3% Unknown (23038-001,Qty:8)

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Part	Failure	Norm	Fail	Data
	Mode/Mech	Dist.		Source(s)/Details
Micros She	yn orted	100.0%	100.0%	Sources:1 1.1 Kilohm Short From Secondary Winding To Case (10722-000,Qty:1)
	ave,Phase Shifter Output	100.0%	100.0%	Sources:1 No Output (25015-000,10.0%), Incorrect Output (25015-000,90.0%)
	ave,Polarizer ange in Polariz.	100.0%	100.0%	Sources:1 Change in Polarization -very low failure rate- (25015-000,100.0%)
	ficrowave ode Failure	100.0%	100.0%	Sources:1 Diode Fails creates Power Loss of Intermediate Frq (25015-000,10.0%), Diode Fails - Power decrease & High insertion loss (25015-000,90.0%)
	ficrowave,Electrical Nuced		<0.1%	Sources:1 Burnout (24417-001,NR)
Oth	er Seal/Gasket Failure			Seal Failure (24417-001,NR)
	Worn		NR	Tube Wearout (24417-001, NR)
	or,Microwave Is of Power	90.0%	90.0%	Scurces:1 Schottky Diode Failure, Power Loss (25015-000,90.0%)
No	Output	10.0	10.0%	Schottky Diode Failure, No Ouptut (25015-000,10.0%)
	or,Pulse Width ctrical Overstress	100.0%	100.0%	Sources:1 Overstress (10722-000,Qty:1)
	Frequency Standard Operation	50.0%	50.0%	Sources:1 Emitter Q3 Open Inoperative-External Overstress (10722-000,Qty:1)
654	ft In Frequency	50.0%	50.0%	Shift In Frequency (10722-000, Qty:1)

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	D-91				Failure Distribution Summaries	3-13
E a s		. Ye Jech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
Mod		Amp Board Distortion	100.0%	100.04	Sources:1 Output Distortion-Open Resistor Termination. (10722-000,5.0%)	
Mod	ule,Sola Cracked	r Cell /Fractured	33.6%	33.6%	Sources:1 Cracked cells (24997-000,37.1%)	
	Delamin	ation	27.7	27.7%	Delamination of equipment (24997-000,30.6%)	
	Interco	nnect Failure	25.0%	25.0%	Interconnections (24997-000,27.6%)	
	Dielect	ric Breakdown	8.24	8.2%	Dielectric breakdown - shorts (24997-000,9.1%)	
	Corrode	d	5.5%	5.54	Corrosion (24997-000,6.1%)	
Modi	ule, Torq Shorted	ue Bridge	100.0%	100.0%	Sources:1 Pins 2 And 6 Shorted (10722-000,Qty:1)	
Moto	Fails D Mechani Electri Bearing Winding	ator Set (Summary) uring (peration cal Failure cal Failure Failure Failure g Brush Failure	33.2% 22.1% 17.2% 12.3% 12.3% 3.1%			
Moto		auor Set cal Failure	56.34	36.0%	Sources:1 Mechanical Failure (24996-000,36.0%)	
	Electri	cal Failure	43.8%	28.0%	Electrical Failure (24996-000,28.0%)	
	Ünknown			36.0%	Unknown (24996-000,36.0%)	
Moto		ator Set, Diesel uring Operation	50.0%	14.0%	Sources:1 Catastrophic-Fails While Running (18175-000,14.0%)	
	Out of	Spec.	50.0%	14.0%	Degraded - Out Of Spec (18175-000,14.0%)	
	Unknown			72.0%	Unknown (18175-000,72.0%)	
loto		ator Set, Diesel, AC uring Operation	94.8%	66.0%	Sources:1 Catastrophic-Fails While Running (18175-000,NR) (18175-000,14.0%) (18175-000,14.0%) (18175-000,100.0%) (18175-000,100.0%) (18175-000,100.0%) (18175-000,100.0%) (18175-000,100.0%)	
	Degrade	d Operation	5.0%	3.54	Degraded (18175-000,14.0%) (18175-000,14.0%)	
	Fails t	o Start	0.24	0.1%	Catastrophic-Fails To Start and Run (18175-000,1.0%)	

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Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Generator Set, Drive nding Failure	44.48	20.0%	Sources:] Winding Failures (24993-000,20.0%)
Be	aring Failure	44.4*	20.0%	Bearing Failures (24993-000,20.0%)
sı	ipring Brush Failure	11.18	5.0%	Slipring Brushes, and Commutators (24993-000,5.0%)
Un	known		55.0%	Unknown (24993-000,55.0%)
	Generator Set,Electric,DC ils to Run,After Start	52.8%	19.0%	Sources:1 Catastrophic-Fails Once Started (18175-000,19.0%)
Fa	ils to Start	30.6%	11.0%	Catastrophic-Fails To Start (18175-000,11.0%)
De	graded Operation	16.7%	6.0%	Degraded (18175-000,6.0%)
Un	ik nown	*****	64.0%	Unknown (18175-000,64.0%)
Mount Br	oken	59.1%	54.2%	Sources:1 Broken/Damaged (25101-000,Qty:3) (25101-000,Qty:4) (25101-000,Qty:6)
Ex	cessive Play	36.4%	33.3%	Internal Failure - Excessive Play (25101-000,Qty:5), No Failure - Excessive Play (25101-000,Qty:2), Excessive Play (25101-000,Qty:1)
Lo	050	4.5%	4.2*	Internal Failure - Loose (25101-000,Qty:1)
In	duced	يە ھەرىز _ رە ھە	8.3%	Caused By Other Failure-Broken/Damaged (25101-000,Qty:2)
Nut Lo	ose	100.0%	100.0%	Sources:1 Loose (25101-000,Qty:1)
Nut,Lo Co	cking rroded	50.0%	33.34	Sources:1 Corroded-Fnd In TI/PMSC/INSP (25101-000,Qty:1)
Se	ized	50.0%	33.34	Improper - Seized (25101-000,Qty:1)
In	duced		33.3*	Improper Maintenance - Broken/Damaged (25101-000,Qty:1)
•	crometer t of Adjustment	100.0%	100.0%	Sources:1 Out Of Adjustment - Inaccurate (25101-000,Qty:2)
Nut,Pla	ain ose	100.05	100.05	Sources:1 Loose (25101-000,Qty:1)

T TATE	-91			Failure Distribution Summaries 3-14
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source (s) /Details
	lain, Hexagon 2086	100.0%	60.0%	Sources:1 Loose Nut(s) - Out Of Synch (25101-000,Qty:1), Vibration - Loose (25101-000,Qty:1), Loose Bolt(s) (25101-000,Qty:1)
Ir	nduc <b>e</b> d		40.0%	Fell Off Or Lost - Missing (25101-000,Qty:1), Vibration - Missing (25101-000,Qty:1)
	lain,Round So <b>se</b>	58.3%	53.8%	Sources:1 Loose (25101-000,Qty:1), Vibration - Loose (25101-000,Qty:3), Loose Nut(s) - Excessive Play (25101-000,Qty:1), Loose Nut(s) - Abnormal Operation (25101-000,Qty:2)
Ex	cessive Play	25.0%	23.14	Oversize - Excessive Play (25101-000,Qty:1), Unknown - Excessive Play (25101-000,Qty:1), Excessive Play (25101-000,Qty:1)
Cu	it of Adjustment	8.34	7.7%	Out Of Adjustment - Inop/Unserviceable (25101-000,Qty:1)
Wo	orn	8.34	7.78	Worn - Inaccurate (25101-000,Qty:1)
Ir	nduced		7.74	Improper Maintenance - Broken/Damaged (25101-000,Qty:1)
•	lottea pose	100.0%	<del>6</del> 6.7%	Sources:1 Loose Nut(s) - Abnormal Operation (25101-000,Qty:2)
In	nduced		33.3%	Lack Of Maintenance - Fnd In TI/PMCS/INSP (25101-000,Qty:1)
	pecial bo <b>se</b>	80.0%	80.0%	Sources:1 Out Of Adjustment - Loose (25101-000,Qty:1), Loose Nut(s) - Excessive Play (25101-000,Qty:2), Loose Nut(s) - Loose (25101-000,Qty:1)
Ex	cessive Play	20.0%	20.0%	Excessive Play (25101-000,Qty:1)
Nut,Wh Lo	eel ose	100.0%	16.7%	Sources:1 Loose Nut(s) - Abnormal Operation (25101-000, Qty:1)
In	duced		83.34	<pre>Improper Maintenance - Worn Out (25101-000,Qty:1), Lack Of Maintenance - Loose Bolt(s) (25101-000,Qty:1), Lack Of Maintenance - Broken/Damaged (25101-000,Qty:1), Overtorqued - Broken Bolt(s) (25101-000,Qty:1), Overtorqued - Broken/Damaged (25101-000,Qty:1)</pre>
Nut,Wi In	ng duced		100.0%	Sources:1 Fell Off Or Lost - Missing (25101-000,Qty:1), Lack Of Maintenance - Missing (25101-000,Qty:1)

3-142	Failure Distribution	Summaries			FMD-91
Part Desc.	Failure Mode/Mech		Fail Dist.	Data Source(s)/Details	
	hot Explosive igh Pot and IR	40.4	37.24	Sources:1 High - Pot and IR (24992-000,37.3%)	
I	gnition Failure	22.0	20.34	Ignition Failure (24992-000,20.3%)	
o	utput Failure	13.5	12.5%	Output Failure (24992-000,12.5%)	
м	echanical Failure	9.0%	8.34	Mechanical Failure (24992-000,8.3%)	
L	eaking	8.4*	7.8%	Leak (24992-000,7.8%)	
S	hort - Open	5.6%	5.24	Short - Open (24992-000,5.2%)	
с	ontact Failure	1.14	1,0%	Contact Failure (24992-000,1.0%)	
U	nknown		6.8%	Unknown (24992-000,6.8%)	
I	nduced		1.0%	Burnout (24992-000,1.0%)	

Optical, Prism Cracked/Fractured	50.0%	Sources:1 33.3% Vibration - Cracked (25101-000,Qty:1), Cracked/Split-Inop/Unserviceable (25101-000,Qty	y:1)
Loose	25.0%	16.7% Part Missing/Loose - Inaccurate (25101-000,Qty:	:1)
Out of Adjustment	25.0*	16.7% Out Of Adjustment - Inaccurate (25101-000,Qty:1	.)
Induced		33.3% Abnormal Operation (25101-000,Qty:1), Dropped - Broken/Damaged (25101-000,Qty:1)	•

Optical, Prism, Assembly Loose	40.0%	16.7%	Sources:1 Internal Failure - Loose (25101-000,Qty:1), Part Missing/Loose - Inop/Unserviceable (25101-000,Qty:1)
Seal/Gasket Failure	20.04	8.34	Seals Worn - Loose (25101-000,Qty:1)
Out of Adjustment	20.04	8.34	Out Of Adjustment - Inaccurate (25101-000,Qty:1)
Aged/Deteriorated	20.04	8.3*	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
Induced		41.7%	Internal Failure - Inaccurate (25101-000,Qty:5)
Unknown		16.7%	Unknown (25101-000,Qty:1) (25101-000,Qty:1)

Optoelectronic Dev., Fiber Optic Unknown		<0.1*	Sources:1 Unknown (24997-000,NR)
Other Worn	******		Connectors:Mach. Problems-Mismating & Wear (24997-000,NR)
Mechanical Failure		NR	Connectors:Mech. Problems-Optical Losses (24997-000,NR)
Cable Failure		NR	Cable: (Breaking or Fracture) (24997-000,NR), Cable: (Optical Losses) (24997-000,NR)

1410	-91			Failure Distribution Summaries 3-		
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details		
-	lectronic Dev.,LED Dened	70.0%	70.0%	Sources:2 High Z (24991-000,70.0%)		
S	norted	30.0%	30.0%	Low Z (24991-000,30.0%)		
I	nduced		<0.18	Degradation in Their Optical Power (25037-000,NR)		
	lectronic Dev.,Fhotovoltaid		33.6%	Sources:1 Cracked Cells (25014-000,Qty:117)		
Er	ncapsulant Delamination	24.2%	22.1%	Encapsulant Delamination (25014-000, Qty: 77)		
Ir	nterconnect Failure	22.6	20.7%	Interconnect Fractures (25014-000,Qty:64), Exposed Interconnects (25014-000,Qty:8)		
D	lelectric Breakdown	9.7%	8.9%	Dielectric Breakdown (25014-000, Qty: 31)		
Ca	orroded	6.6%	6.0%	Wire and Terminal Corrosion (25014-000,Qty:21)		
Ir	nduced	******	8.6%	Unsoldered Interconnects (25014-000,Qty:30)		
-	ectronic Dev.,Sensor mened	50.0%	50.0%	Sources:2 High Z (24991-000,50.0%)		
sh	orted	50.0%	50.0%	Low Z (24991-000,50.0%)		
Ot	her Degraded Operation		0.0% NR	Non-recoverable Dark Current Degradation (25037-000,NR), Junction Degradation (25037-000,NR), Localized Breakdown (25037-000,NR)		
	Contaminated		NR	Mobile Ion Contamination (25037-000,NR), Oxide Contamination (25037-000,NR)		
	ator, Microwave, Fixed Output	80.04	80.0%	Sources:1 No Output (25015-000,80.0%)		
Re	duced Output			Power Reduction (25015-000, 10.0%)		
Sh	ift In Frequency			Untuned Frequency (25015-000,10.0%)		
	ator, Microwave, VCO Output	80.04	80.0%	Sources:1 No Output (25015-000,80.0%)		
Sh	ift In Frequency	15.0%	15.0%	Untuned Frequency (25015-000,15.0%)		
Re	duced Output	5.04	5.0%	Power Reduction (25015-000,5.0%)		

art esc	t Failure c. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	illator, Microwave, YIG		·	Sources:1
	No Output	80.0%	80.0%	No Output (25015-000,80.0%)
	Shift In Frequency	15.0%	15.0%	Untuned Frequency (25015-000,15.0%)
	Reduced Output	5.0%	5.0%	Power Reduction (25015-000,5.0%)
ad,	,Cushioning Aged/Deteriorated	100.0%	100.0%	Sources:1 Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1)
ane	el,Control Unknown		<0.1%	Sources:1 Unknown (24996-000,NR)
aw]	l Broken	45.5%	45.5%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:3)
	Worn	27.3%	27.3%	Worn Out (25101-000,Qty:3)
	Excessive Play	18.2*	18.2%	Internal Failure - Excessive Play (25101-000,Qty:1), Worn - Excessive Play (25101-000,Qty:1)
	Loose	9.1%	9.14	Worn - Loose (25101-000,Qty:1)
	Assembly Broken	65.0%	14.6%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:1), Broken/Separated - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:3) (25101-000,Qty:4)
	Loose	15.0%	3.4	Stolen - Loose (25101-000,Qty:1), Loose (25101-000,Qty:1) (25101-000,Qty:1)
	Bent/Dented/Warped	5.0%	1.19	Collapsed/Bent (25101-000,Qty:1)
	Corroded	5.0%	1.1*	Corroded-Corroded (25101-000,Qty:1)
	Worn	5.0%	1.18	Worn - Inaccurate (25101-000,Qty:1)
	Out of Adjustment	5.0%	1.1%	Out Of Adjustment - Inaccurate (25101-000,Qty:1)
	Induced		71.9%	Caused By Other Failure-Inop/Unserviceable (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:2) (25101-000,Qty:4) (25101-000,Qty:7) (25101-000,Qty:1), Fell Off Or Lost - Found In TI/PMCS/Insp (25101-000,Qty:1), Item Abuse/Neglect - Missing (25101-000,Qty:1) (25101-000,Qty:1), Stolen - Missing (25101-000,Qty:2) (25101-000,Qty:3) (25101-000,Qty:6) (25101-000,Qty:7), Wrong Part - Found In TI/PMCS/Insp (25101-000,Qty:1), Fell Off Or Lost - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Improper Installation - Locked (25101-000,Qty:1), Missing (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:7), No Failure - Missing (25101-000,Qty:1), Safety Wire/Key Failure - Inop/Unserviceable (25101-000,Qty:1), Caused By Other Failure-Missing (25101-000,Qty:1)
	Unknown		5.64	Unknown (25101-000, gty:1) (25101-000, gty:2)

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Part Desc		Norm Dist.	Fail Dist.	Data Source(s)/Details
	Assembly (continued) Unknown (continued)		ang dining ang dining	(25101-000, Qty:2)
	Mechanical Broken	33.34	15.4%	Sources:1 Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Out Of Synch (25101-000,Qty:1)
I	Loose	16.78	7.7%	Vibration - Loose (25101-000,Qty:1)
F	Excessive Play	16.74	7.78	Part Missing/Loose - Excessive Play (25101-000,Qty:1)
1	Aged/Deteriorated	16.78	7.7%	Deteriorated/Aged - Broken Bolt(s) (25101-000,Qty:1)
5	Spring Failure	16.78	7.7%	Pring Weak - Inop/Sluggish Breech (25101-000,Qty:1)
	Induced		53.8%	<pre>Improper Maintenance - Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:1) (25101-000,Qty:1), Stolen - Missing (25101-000,Qty:1), Fell Off Or Lost - Inaccurate (25101-000,Qty:1), Fell Off Or Lost - Inop/Unserviceable (25101-000,Qty:1)</pre>
	Mechanical, Breech Induced		100.0%	Sources:1 Fall Off Or Lost - Missing (25101-000,Qty:1)
	Mechanical,Cotter Broken	77.8%	28.0%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:3), Broken/Separated-Missing (25101-000,Qty:1) (25101-000,Qty:1)
2	Aged/Deteriorated	22.2*	8.0%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:2)
:	Induced		64.0%	Lack Of Maintenance - Loose (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:7), Improper Installation - Missing (25101-000,Qty:1), Stolen - Missing (25101-000,Qty:1), Improper Maintenance - Missing (25101-000,Qty:1), Missing (25101-000,Qty:1) (25101-000,Qty:1), Item Abuse/Neglect - Missing (25101-000,Qty:1), Caused By Other Failure-Missing (25101-000,Qty:1), Fell Off Or Lost - Fnd In TI/PMSC/INSP (25101-000,Qty:1)
	Mechanical,Firing Norn	50.0%	50.0%	Sources:1 Worn - Incp/Unserviceable (25101-000,Qty:2)
F	Bent/Dented/Warped	25.0%	25.0%	Warped/Bent - Misfire (25101-000,Qty:1)
	lisfire			Misfire (25101-000, Qty:1)

art	Failure	Norm	Fail	Data
<b>88</b> C			Dist.	
	Mechanical, Grooved, Headed Broken	100.04	25.0%	Sources:1 Broken/Separated - Inaccurate (25101-000,Qty:1)
:	Induced		75.0%	Fell Off Or Lost - Missing (25101-000,Qty:1) (25101-000,Qty:1), Improper Maintenance - Missing (25101-000,Qty:1)
	Mechanical,Quick Release Broken	96.8 <b>%</b>	62.54	Sources:1 Broken/Damaged (25101-000,Qty:3) (25101-000,Qty:9), Broken/Separated-Locked (25101-000,Qty:2), Broken/Separated - Inop/Unserviceable (25101-000,Qty:12), Broken/Separated - Broken/Damaged (25101-000,Qty:4)
F	Bearing Failure	3.24	2.1%	Bearing Failure-Inop/Unserviceable (25101-000,Qty:1)
ι	Jnknown		18.8%	Unknown (25101-000, gty:2) (25101-000, gty:7)
1	Induced	24 KG 40 KG 40 KG	16.7%	Fell Off Or Lost - Missing (25101-000,Qty:3), Item Abuse/Neglect - Inop/Unserviceable (25101-000,Qty:1), Stolen - Missing (25101-000,Qty:1), Fell Off Or Lost - Inop/Unserviceable (25101-000,Qty:3)
	Mechanical,Shear Broken	100.0%	62.0%	Sources:1 Broken/Damaged (25101-000,Qty:3) (25101-000,Qty:16) (25101-000,Qty:84)
1	Induced		38.0%	Caused By Other Failure-Broken/Damaged (25101-000,Qty:62), Caused By Other Failure-Broken Bolt(s) (25101-000,Qty:1)
	Mechanical,Spring Broken	44.1%	30.0%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Broken/Separated - Inop Man Elevation (25101-000,Qty:1), Broken/Separated - Binding/Sticking (25101-000,Qty:1), Broken/Separated - Broken/Damaged (25101-000,Qty:2), Broken/Separated - Inop/Unserviceable (25101-000,Qty:2), Broken/Separated - Abnormal Operation (25101-000,Qty:1) (25101-000,Qty:1), Broken/Separated - Inop Man Traverse (25101-000,Qty:1) (25101-000,Qty:2), Vibration - Broken/Damaged (25101-000,Qty:1)
M	lo Operation	26.5%	18.0%	<pre>Inop/Sluggish Breech (25101-000,Qty:1), Inop Man Elevation (25101-000,Qty:1), Fell Off Or Lost - Inop Man Elevation (25101-030,Qty:1), Fell Off Or Lost - Inop Man Traverse (25101-000,Qty:1) (25101-000,Qty:4), Inop Man Traverse (25101-000,Qty:1)</pre>
I	JOC <b>30</b>	20.6%	14.0%	Part Missing/Loose - Locked (25101-000,Qty:1), Part Missing/Loose (25101-000,Qty:1), Worn - Loose (25101-000,Qty:1), Loose Screw(s) - Broken/Damaged (25101-000,Qty:1), Part Missing/Loose - Broken/Damaged (25101-000,Qty:1), Part Missing/Loose - Inop Man Traverse (25101-000,Qty:1), Vibration - Loose (25101-000,Qty:1)
W	lorn	8.84	6.0%	Worn - Inop Man Traverse (25101-000,Qty:1), Worn - Noisy (25101-000,Qty:1), Wron - Inop/Unserviceable (25101-000,Qty:1)
I	induced		22.0	Fell Off Or Lost - Inop/Unserviceable (25101-000, Cty:1) (25101-000, Qty:1), Improper Install - Excessive Play (25101-000, Qty:1), Improper Maintenance - Abnormal Operation (25101-000, Qty:1), Vibration - Missing (25101-000, Qty:1) (25101-000, Qty:1) (25101-000, Qty:1), Wrong Part -

FMI	FMD-91			Failure Distribution Summaries 3		
Part Desc		Norm Dist.	Fail Dist.	Data Source(s)/Details		
	Mechanical,Spring (continued) Induced (continued)			Binding/Sticking (25101-000,Qty:1), Wrong Part - Inop Man Traverse (25101-000,Qty:1), Caused By Other Failure-Inop Man Traverse (25101-000,Qty:2)		
(	Other (<\$4) Out of Adjustment		20100	Out Of Adjustment - Inop/Inserviceable (25101-000,Qty:1)		
	Aged/Deteriorated		2.0%	Deteriorated/Aged - Inop Man Elevation (25101-000,Qty:1)		
	Cut/Scarred/Punctured		2.0%	Cut-Inop Man Traverse (25101-000,Qty:1)		
	Binding/Sticking		2.0%	Internal Failure - Binding/Sticking (25101-000,Qty:1)		
	Excessive Vibration		2.0%	Vibration - Abnormal Operation (25101-000,Qty:1)		
	Mechanical,Straight Morn	57.1%	22.2	Sources:1 Worn - Inop/Unserviceable (25101-000,Qty:4)		
1	Broken	14.3%	5.6%	Broken/Damaged (25101-000, Qty:1)		
1	Misfire	14.3%	5.6%	Vibration - Misfire (25101-000,Qty:1)		
1	Loose	14.3%	5.6%	Part Missing/Loose - Found In TI/PMCS/Insp (25101-000,Qty:1)		
	Induced		61.1%	Fell Off Or Lost - Missing (25101-000,Qty:1) (25101-000,Qty:2), Improper Install - Missing (25101-000,Qty:2), Improper Install - Misfire (25101-000,Qty:2), Improper Maintenance - Missing (25101-000,Qty:1), Improper Maintenance - Misfire (25101-000,Qty:1), Missing (25101-060,Qty:1), Vibration - Missing (25101-000,Qty:1)		

Mechanical,Straight,Headed Broken	40.0%	Sources:1 33.3% Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1)
Worn	20.0%	16.7% Worn - Inop/Unserviceable (25101-000,Qty:1)
Aged/Deteriorated	20.0%	16.7% Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
Loose	20.0%	16.7% Part Missing/Loose - Missing (25101-000,Qty:1)
Induced		16.7% Vibration - Missing (25101-000,Qty:1)

Pin Mechanical,Straight,Thread Broken	100.0%	Sources:1 50.0% Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:2)
Induced		50.0% Vibration - Missing (25101-000,Qty:3)

art Failure	Norm	Fail	Data
esc. Mode/Mach	Dist.	Dist.	Source(s)/Details
in Mechanical, Susp Lock Induced		100.0%	Sources:1 Safety Wire/Key Fail - Missing (25101-000,Qty:2), Fell Off Or Lost - Missing (25101-000,Qty:1), Missing (25101-000,Qty:1)
in Mechanical, Tapered Broken	100.0%	36.4%	Sources:1 Broken/Damaged (25101-000,Qty:4)
Induced		54.5%	Fell Off Or Lost - Inop/Unserviceable (25101-000,Qty:2), Vibration - Missing (25101-000,Qty:2), Wrong Part - Excessive Play (25101-000,Qty:1), Wrong Part - Fnd In TI/PMCS/INSP (25101-000,Qty:1)
Unknown		9.1%	Unknown (25101-000,Qty:1)
ipe, Rigid, Metal Unknown		<0.14	Sourc <b>es:1</b> Unknown (24996-000,NR)
Other Leaking		100.0% NR	Leaks (24996-000, NR)
Burst/Ruptured		NR	Ruptures (24996-000, NR)
Fitting Failure		NR	Failure of Fitting (24996-000,NR)
Piston Assembly Seized	75.0%	60.04	Sources:1 Seized/Frozen - Inop/Unserviceable (25101-000,Qty:2), Seized/Frozen - Seized (25101-000,Qty:1)
Binding/Sticking	25.0%	20.0%	Internal Failure - Binding/Sticking (25101-000,Qty:1)
Induced		20.04	Caused By Other Failure-Locked (25101-000,Qty:1)
Piston,Body Bent/Dented/Warped	42.9	37.51	Sources:1 Warped/Bent - Binding/Sticking (25101-000,Qty:2), Warped/Bent - Locked (25101-000,Qty:1)
Seized	42.9%	37.54	Seized/Frozen - Inop/Unserviceable (25101-000,Qty:1), Seized/Frozen - Binding/Sticking (25101-000,Qty:1), Seized/Frozen - Abnormal Operation (25101-000,Qty:1)
Broken	14.3%	12.5%	Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Induced		12.54	Lack Of Lubrication - Locked (25101-000,Qty:1)
iston, Indicator Leaking	85.7%	75.0%	Sources:1 No Failure - Leaking Hydaulic Oil (25101-000,Qty:11), Leaking Hydraulic Oil (25101-000,Qty:1)
Out of Adjustment	14.3	12.5%	Out Of Adjustment - Out Of Synch (25101-000,Qty:2)
Unknown		6.34	Unknown (25101-000,Qty:1)
Induced		6.3%	Improper Adjustment - Out Of Synch (25101-000, Qty:1)

FMD-91			Failure Distribution Summaries 3-14
Part Failuce Desc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Piston, Linear Binding/Sticking	100.0%	100.0%	Sources:1 Binding/Sticking (25101-000,Qty:1)
Pivot Loose	100.0%	20.0%	Sources:1 Loose (25101-000,Qty:1)
Induced		80.0%	Item Abuse/Neglect - Missing (25101-000,Qty:2), Stolen - Missing (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:1)
Plate,Locking Assembly Aged/Deteriorated	100.0%	100.0%	Sources:1 Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
Platform Assembly Bent/Dented/Warped	80.0%	50.0%	Sources:1 Collapsed/Bent (25101-000,Qty:1), Warped/Bent - Fnd In TI/PMSC/INSP (25101-000,Qty:3)
Broken	20.0%	12.5%	Broken/Damaged (25101-000, Qty:1)
Unknown		25.0%	Unknown (25101-000, Qty:2)
Induced		12.5%	Abnormal Operation (25101-000,Qty:1)
Platform Assembly,Lock/Pivot Broken	100.0%	100.0%	Sources:1 Broken/Damaged (25101-000,Qty:2)
Platform Agsembly,Locking Broken	100.3%	100.0%	Sources:1 Broken/Damaged (25101-000,Qty:1), Poor Design - Broken/Damaged (25101-000,Qty:7)
Plug Loose	41.7%	35.7%	Sources:1 Loose Nut(s) - Excessive Play (25101-000,Qty:4), Loose
Excessive Play	33.34	28.6%	(25101-000,Qty:1) Excessive Play (25101-000,Qty:1) (25101-000,Qty:1)
•	-	·	(25101-000,Qty:1) (25101-000,Qty:1)
Broken	8.3%	7.18	Broken/Damaged (25101-000, Gty:1)
Worn	8.3%	7.14	Worn - Inop/Unserviceable (25101-000,Qty:1)
Corroded	8.3%	7.18	Corroded-Seized (25101-000,Qty:1)
Unknown		14.3%	Unknown (25101-000, Qty:1) (25101-000, Qty:1)

	Norm	Fail	Data
Desc. Mode/Mach	Dist.		Source(s)/Details
lug,Expansion			Sources:1
Worn	50.00	44.4%	Worn - Leaking Fluid (25101-000,Qty:3), Worn - Leaking Hydraulic Oil (25101-000,Qty:1)
Leaking	25.08	22.28	Leaking Fluid (25101-000,Qty:2)
Broken	12.5%	11.14	Broken/Separated-Missing (25101-000,Qty:1)
Bent/Dented/Warped	12.5%	11.18	Warped/Bent - Leaking Fluid (25101-000, Qty:1)
Unknown		11.10	Unknown (25101-000, gty:1)
lug,Machine Thread			Sources:1
Broken	50.0%	17.44	Broken/Damaged (25101-000,Qty:3), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Loose	12.54	4.34	Loose Nut(s) - Missing (25101-000,Qty:1)
Shorted	12.5%	4.3	Grounded/Shorted - Broken/Damaged (25101-000,Qty:1)
Out of Adjustment	12.5%	4.31	Out Of Adjustment - Inaccurate (25101-000,Qty:1)
Leaking	12.5	4.3	No Failure - Leaking Hydraulic Oil (25101-000,Qty:1)
Induced			Fell Off Or Lost - Missing (25101-000,Qty:4), Improper Installation - Missing (25101-000,Qty:2), Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Improper Installation - Stripped (25101-000,Qty:1), Missing (25101-000,Qty:2), Lack Of Maintenance - Missing (25101-000,Qty:3), Stclen - Missing (25101-000,Qty:1), Vibration - Missing (25101-000,Qty:1)
lug, Muzzle Aged/Deteriorated	100.0%	27.8	Sources:1 Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:4), Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
Induced		66.7%	Missing (25101-000,Qty:1) (25101-000,Qty:9), Stolen - Missing (25101-000,Qty:2)
Unknown		5.61	Unknown (25101-000,Qty:1)
ug,Pipe Stripped	60.00		Sources:1
	00,04	3.04	Stripped (25101-000,gty:1) (25101-000,gty:1) (25101-000,gty:1)
Seal/Gasket Failure	20.0	1.34 :	Seals Worn - Leaking Hydraulic Oil (25101-000,Qty:1)
Broken	20.0%	1.34 1	<pre>Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)</pre>
Induced			<pre>Improper Maintenance - Stripped (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:1) (25101-000,Qty:2), Operation Error - Stripped (25101-000,Qty:5), Overtorqued - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:15), Improper Maintenance - Binding/Sticking (25101-000,Qty:1), Improper Maintenance - Fnd In T/PMCS/INSP (25101-000,Qty:1), Overtorqued - Inop/Unserviceable (25101-000,Qty:2), Overtorqued - Stripped (25101-000,Qty:10), Overtorqued - Fnd In TI/PMCS/INSP (25101-000,Qty:1), Improper Installation - Stripped (25101-000,Qty:1)</pre>

Part Failure Desc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
Plunger Loose	31.3%	31.34	Sources:1 Worn - Loose (25101-000,Qty:5)
Worn	25.0%	25.0%	Worn - Inaccurate (25101-000,Qty:2), Worn - Fnd In TI/PMCS/INSP (25101-000,Qty:2)
Excessive Play	25.0*	25.0%	Worn - Excessive Play (25101-000,Qty:4)
Binding/Sticking	12.5	12.5%	Worn - Binding/Sticking (25101-000,Qty:2)
Shaft Frozen	6.3%	6.34	Shaft Frozen - Inop/Unserviceable (25101-000,Qty:1)
Plunger Assembly Excessive Play	50.0%	50.0%	Sources:1 Worn - Excessive Play (25101-000,Qty:4)
Loose	37.5%	37.5%	Worn - Loose (25101-000,Qty:3)
Degraded Output	12.5	12.5%	Internal Failure - Abnormal Operation (25101-000,Qty:1)
Plunger,Detent Worn	28.6%	22.2%	Sources:1 Worn Out (25101-000,Qty:1), Worn - Found In TI/PMCS/Insp (25101-000,Qty:1)
Binding/Sticking	28.6%	22.2*	No Failure - Binding/Sticking (25101-000,Qty:1), Improper Adjustment - Binding/Sticking (25101-000,Qty:1)
Broken	14.3%	11.1%	Broken/Damaged (25101-000,Qty:1)
Bent/Dented/Warped	14.3	11.18	Warped/Bent - Inop/Sluggish Breech (25101-000,Qty:1)
Corroded	14.3%	11.14	Corroded-Seized (25101-000,Qty:1)
Induced		22.2%	Lack of Maintenance - Binding/Sticking (25101-000,Qty:2)
Plunger,Firing Bent/Dented/Warped	100.0%	66.7%	Sources:1 Warped/Bent - Binding/Sticking (25101-000,Qty:2)
Induced		33.31	Improper Maintenance - Collapsed/Bent (25101-000,Qty:1)
Pneumatic, Actuator (Summary) Spurious Closing Spurious Opening	54.2% 45.8%		
Pneumatic, Actuator Instrument Spurious Closing	54.7%	41.4%	Sources:1 Catastrophic-Spurious Closing (18175-000,41.0%) (18175-000,41.0%)
Spurious Opening	45.3%	34.34	Catastrophic-Spurious Opening (18175-000,34.0%) (18175-000,34.0%)
Induced		24.2%	Degraded - Premature Or Delayed Actuation (18175-000,24.0%) (18175-000,24.0%)

rt	Failure	Norm	Fail	Data
8C.	Mode/Mech	Dist.	Dist.	Source(s)/Details
	tic, Actuator Instrumer			Sources:1
Sp	urious Closing	54.7%	41.4%	Catastrophic-Spurious Closing (18175-000,41.0%)
Sp	urious Opening	45.3%	34.34	Catastrophic-Spurious Opening (18175-000,34.0%)
In	duced		24.2%	Degraded - Premature Or Delayed Actuation (18175-000,24.0%
	tic,Actuator Instrumer urious Closing			d PositionerSources:1 Catastrophic-Spurious Closing (18175-000,41.0%)
•	-			,
Sp	urious Opening	45.3%	34.3%	Catastrophic-Spurious Opening (18175-000,34.0%)
In	duced		24.2%	Degraded - Premature Or Delayed Actuation (18175-000,24.0%
	tic,Actuator Instrumen Drious Closing			-PneumaticSources:1 Catastrophic-Spurious Closing (18175-000,41.0%)
Spi	urious Opening	45.3%	34.3%	Catastrophic-Spurious Opening (18175-000,34.0%)
-	duced			Degraded - Premature Cr Delayed Actuation (18175-000,24.0%
Spu	tic,Actuator Instrumen prious Closing prious Opening duced	52.0%	39.0% 36.0%	Sources:1 Catastrophic-Spurious Closing (18175-000,39.0%) Catastrophic-Spurious Opening (18175-000,36.0%) Degraded - Premature Or Delayed Actuation (18175-000,25.0%)
	ic,Diaphragm Spring O Drious Opening			Sources:1 Catastrophic-Spurious Opening (18175-000,47.0%) (18175-000,47.0%)
Spi	trious Closing	48.9%		Catastrophic-Spurious Closing (18175-000,45.0%) (18175-000,45.0%)
Inc	luced		8.0%	Degraded - Premature Or Delayed Actuation (18175-000,8.0%) (18175-000,8.0%)
	cic,Double Acting Pist		A1 04	Sources:1
-	rious Closing	50.0%		Catastrophic-Spurious Closing (18175-000,41.0%)
Spu	rious Opening	50.0%	41.0%	Catastrophic-Spurious Opening (18175-000,41.0%)

FMD-		······		Failure Distribution Summaries 3-15
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
		Piston, Actuator, T		
sp	ourious Opening	100.04	73.04	Catastrophic-Spurious Opening (18175-000,73.0%)
In	nduced		27.0%	Degraded - Fremature Or Delayed Actuation (18175-000,27.0%)
	tic,Double Acting purious Opening			ng CompositeSources:1 Catastrophic-Spurious Opening (18175-000,73.0%)
In	duced		27.0%	Degraded - Premature Or Delayed Actuation (18175-000,27.0%)
		Piston, Actuator, T		
sp	ourious Opening	50.94	28.04	Catastrophic-Spurious Cpening (18175-000,28.0%) (18175-000,28.0%)
Sp	ourious Closing	49.1%	27.0%	Catastrophic-Spurious Closing (18175-000,27.0%) (18175-000,27.0%)
In	duced		45.0%	Degraded - Premature Or Delayed Acutation (18175-000,45.0%) (18175-000,45.0%)
	tic,Single Acting purious Opening			ng CompositeSources:1 Catastrophic-Spurious Opening (18175-000,28.0%)
sp	urious opening	30.34	20.05	(18175-000, 28.0%)
Sp	ourious Closing	49.5%	27.5%	Catastrophic-Spurious Closing (18175-000,27.0%) (18175-000,28.0%)
In	duced		44.5%	Degraded - Premature Or Delayed Actuation (18175-000,44.0%) (18175-000,45.0%)
neuma Sp	tic,Single Acting purious Closing	Piston,Open/Close 53.0%		eSources:1 Catastrophic-Spurious Closing (18175-000,47.0%) (18175-000,48.0%) (18175-000,48.0%)
Sp	uricus Opening	47.0%	42.3%	Catastrophic-Spurious Opening (18175-000,42.0%) (18175-000,42.0%) (18175-000,43.0%)
In	duced		10.0%	Degraded - Premature Or Delayed Actuation (18175-000,10.0%) (18175-000,10.0%) (18175-000,10.0%)
oles,	Wood oken	A1 74	<b>30</b> 4#	Sources:2
	oxen ternal Rotting			Split or Broken (24996-000,25.0%) (24997-000,25.0%) Internal Rotting (24996-000,22.0%) (24997-000,22.0%)
	chanical Damage		14.8%	Mechanical Damage from Climate Causes(Wind, Ice) (24996-000,13.0%), Mechanical damage from climatic causes(Wind, Ice) (24997-000,13.0%)
Ind	duced	100 44 45 45 45 45 45		Damage from Other Environmental Factors (24996-000,28.0%), Damage from other environ.factors(Vehicle damage) (24997-000,28.0%)

3-154 Failure Distribution Summaries FMD-9					
Part Failure	Norm	Fail	Data		
Desc. Mode/Mach			Source(s)/Details		
Post,Electrical Loose	100.0%	100.0%	Sources:1 Loose (25101-000,Qty:1)		
Power Supply (Summary) No Output Fails To Transfer	25.7% 18.1%				
Incorrect Voltage Distribution System Malfunctic Generation System Malfunction Degraded Operation Connector Failure	16.6% n 14.3% 12.7% 6.8% 5.8%				
Power Supply Incorrect Voltage	25.9%	23.4%	Sources:2 Incorrect Voltage (24996-000,50.0%), Incorrect voltage (24997-000,50.0%)		
No Output	25.9%	23.4%	Failure to Supply Voltage (24996-000,50.0%), Failure to supply voltage (24997-000,50.0%)		
Distribution System Malfunctio	on 11.9%	10.8%	Distribution system malfunction (24997-000,43.0%)		
Connector Failure	10.8%	9.78	Specifically( Board Connectors) (24996-000,44.8%)		
Generation System Malfunction	10.5%	9.5%	Generation system malfunction (24997-000,38.0%)		
Plastic Op Amps & Diodes Failu	are 9.8	\$ 8.8\$	Specifically( Plastic op amps & diodes) (24996-000,40.7%)		
Transmission Sys. Failure	5.3%	4.8%	Transmission system malfunction (24997-000,19.0%)		
Unknown		4.2%	Unknown (24996-000,19.4%)		
Other (<\$5) Capacitor Failure		5.5% 3.2%	Specifically( Small Capacitors) (24996-000,14.8%)		
Potentiometer Failure		2.2%	Specifically( Potentiometers) (24996-000,10.3%)		
Battery Failure		NR	Batteries (24996-000,NR)		
Switching Circuit Failure		NR	Switching Circuits (24996-000,NR)		
Inverter Circuit Failure		NR	Inverter Circuits (24996-000,NR)		

Power Supply, Public Utilities		Sources:1
Distribution System Malfunction	n 53.1%	53.1% Distribution System Malfunction (24996-000,43.0%)
Generation System Malfunction	46.9%	46.9% Generation System Malfunction (24996-000,38.0%)
- 1		
Other		0.0%
Transmission Sys. Failure		NR Transmission System Malfunction-19 (24996-000, NR)

Part Desc.	Failure Mode/Mach	Norm	Fail Dist.	Failure Distribution Summaries         3-15           Data         Source (a) /Details
			Dist.	
	Supply,Uninterruptable ails To Transfer	47.18	40.0%	Sources:2 Catastrophic-Fails To Transfer (18175-000,40.0%)
No	o Output	35.3%	30.0%	Catastrophic-No Output (18175-000,30.0%)
De	egraded Operation	17.64	15.0%	Degraded (18175-000,15.0%)
Ur	nknown	afi uli ay ani biking	15.0%	Unknown (18175-000,15.0%)
Ot	ther Inverter Circuit Failure	400000	0.0% NR	Inverter circuits (24997-000,NR)
	Switching Circuit Failure		NR	Switching circuits (24997-000,NR)
	Battery Failure		NR	Batteries (24997-000,NR)
	Supply,Uninterruptable,Sing ails To Transfer			InverterSources:1 Catastrophic-Fails To Transfer (18175-000,40.0%)
	Output			Catastrophic-No Output (18175-000, 30.0%)
	graded Operation			Degraded (18175-000,10.0%)
	known			Unknown (18175-000,20.0%)
	Supply,Uninterruptable,Three alls To Transfer	66.7%		Catastrophic-Fails To Transfer (18175-000,40.0%)
				• • • • • • • • • • • • • • • • • • • •
	graded Operation	33.3%		Degraded (18175-000,20.0%)
Un			13.0¥ 0.0%	Degraded (18175-000,20.0%)
Un Ot	known her		13.0% 0.0% NR	Degraded (18175-000,20.0%) Unknown (18175-000,9.0%)
Un Ot recip El	known her No Output itator,Electrical,Pollution	 Control 75.0%	13.0% 0.0% NR 75.0%	Degraded (18175-000,20.0%) Unknown (18175-000,9.0%) Catastrophic-No Output (18175-000,NR) Sources:1
Un Ot El Me	known her No Output itator,Electrical,Pollution ectrical Failure	 Control 75.0% 25.0%	13.0% 0.0% NR 75.0% 25.0%	Degraded (18175-000,20.0%) Unknown (18175-000,9.0%) Catastrophic-No Output (18175-000,NR) Sources:1 Electrical Failures (24996-000,75.0%)
Un Ot El Me Tecip Me	her No Output Pitator,Electrical,Pollution ectrical Failure chanical Failure itator,Equipment,Pollution C	Control 75.0% 25.0%	13.0% 0.0% NR 75.0% 25.0%	Degraded (18175-000,20.0%) Unknown (18175-000,9.0%) Catastrophic-No Output (18175-000,NR) Sources:1 Electrical Failures (24996-000,75.0%) Mechanical Failures (24996-000,25.0%)
Un Ot El Me Co:	her No Output itator,Electrical,Pollution sctrical Failure chanical Failure itator,Equipment,Pollution C chanical Failure	Control 75.0% 25.0% ontrol 36.9% 20.2%	13.0% 0.0% NR 75.0% 25.0% 31.0%	Degraded (18175-000,20.0%) Unknown (18175-000,9.0%) Catastrophic-No Output (18175-000,NR) Sources:1 Electrical Failures (24996-000,75.0%) Mechanical Failures (24996-000,25.0%) Sources:1 Mechanical Malfunction (24996-000,31.0%)
Un Ot El Me Co: Elo	her No Output ditator,Electrical,Pollution ectrical Failure chanical Failure itator,Equipment,Pollution C chanical Failure rroded	Control 75.0% 25.0% ontrol 36.9% 20.2%	13.0% 0.0% NR 75.0% 25.0% 31.0% 17.0% 16.0%	Degraded (18175-000,20.0%) Unknown (18175-000,9.0%) Catastrophic-No Output (18175-000,NR) Sources:1 Electrical Failures (24996-000,75.0%) Mechanical Failures (24996-000,25.0%) Sources:1 Mechanical Malfunction (24996-000,31.0%) Corrosion and Erosion (24996-000,17.0%)
Un Ot recip El Me Co: Eld Slu	her No Output ditator,Electrical,Pollution ectrical Failure chanical Failure itator,Equipment,Pollution C chanical Failure rroded actrical Failure	Control 75.0% 25.0% ontrol 36.9% 20.2% 19.0%	13.0% 0.0% NR 75.0% 25.0% 31.0% 17.0% 16.0%	Degraded (18175-000,20.0%) Unknown (18175-000,9.0%) Catastrophic-No Output (18175-000,NR) Sources:1 Electrical Failures (24996-000,75.0%) Mechanical Failures (24996-000,25.0%) Sources:1 Mechanical Malfunction (24996-000,31.0%) Corrosion and Erosion (24996-000,17.0%) Elwctrical Malfunction (24996-000,16.0%)

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art	Failure	Norm	Fail	Data
esc.	Mode/Mech	Dist.		Source(s)/Details
	med Packing, Telescope, Pan 1 ed/Deteriorated		100.0%	Sources:1 Deteriorated/Aged - Internal Moisture (25101-000,Qty:1)
	d Wiring Assy ened	35.8%	33.34	Sources:3 Opens-Excessive Axial Force On Pins (10722-000,Qty:1), Path Open-Plating Voids In Barrel Metal (10722-000,Qty:1)
Qp	en Plated Through Hole	20.0%	18.6%	Printed Wire Board / Solder Joints (18504-021,38.0%), Failures (Reliability) Open PT holes (24997-000,NR), Failures (Reliability) Dielectric breakdwn/LowI.R. (24997-000,NR)
Sh	orted	17 <b>.9%</b>	16.7%	Intra Layer Short-Organic Contamination (10722-000,Qty:1), Manufacturing Defects(Quality) Short circuits (24997-000,NR)
IC	Failure	12.1%	11.34	Integrated Circuits (18504-021,23.0%)
Re	sistor Failure	5.8%	5.4%	Resistors (18504-021,11.0%)
5 <b>e</b>	miconductor Failure	5.34	4.9%	Semiconductors (18504-021,10.0%)
Ca	pacitor Failure	3.2*	2.98	Capacitors (18504-021,6.0%)
Un	known		5.9%	Unknown (18504-021,12.0%)
Oti	her (<%2) Connector Failure		0.9% 0.9%	Connectors (18504-021,1.9%)
	Manufacturing Defects		NR	Manufacturing Defects(Quality) Line uniformity (24997-000,NR), Manufacturing Defects(Quality) Missing lands (24997-000,NR)
	Open Circuit		NR	Manufacturing Defects(Quality) Open circuits (24997-000,NR)
	Fatigue		NR	Failures (Reliability) Open circuit (Fatigue) (24997-000,NR)
	Mechanical Damage		NR	Failures (Reliability) Mechanical damage (24997-000,NR)
	r,High Speed Failure	31.18	10.4%	Sources:1 Dafective IC (19542-000,10.5%)
Mot	or Failure	29.34	9.8%	Motor & Roller Are Defective (19542-000,0.9%), Motor Defective (19542-000,1.8%), Motor Jammed (19542-000,0.9%), Motor Not Working Properly (19542-000,1.8%), Motor Shorted (19542-000,0.9%), Ribbon Motor Inoperative (19542-000,0.9%), Stepper Motor Defective (19542-000,1.8%), Stepper Motor Is Inoperative (19542-000,0.9%)
Bel	lt Failure	18.6%	6.24	Belt Is Slipping (19542-000,0.9%), Timing Belt & Fulley Worn Out (19542-000,0.9%), Timing Belt Broken (19542-000,1.8%), Timing Belt Damaged & Worn Out (19542-000,0.9%), Timing Belt Worn Out (19542-000,1.8%)
Shc	orted	10.7%	3.64	AC Input Shorted (19542-000,0.9%), AC Input Shorted Under Load (19542-000,0.9%), Over Current, Shorted (19542-000,1.8%)
Tra	nsistor Failure	10.4%	3.5%	Defective Transistor (19542-000,3.5%)
Unk	nown		33.0%	Unknown (19542-000,0.9%) (19542-000,32.5%)
Ind	luced		3.5%	Parts Missing (19542-000,3.5%)
	mer (<\$6)		30 14	

art BSC.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Take-up Reel Failure		2.7%	Problem With Take Up (19542-000,0.9%), Take Up Reel Latch Is Inoperative (19542-000,1.8%)
	Out of Adjustment		2.78	Roller Pressure is Low - Needs Adjustment (19542-000,0.9%), Roller Pressure Needs Ajustment (19542-000,0.9%), Top Roller Pressure Needs Adjustment (19542-000,0.9%)
	Loose		2.6%	Loose Pulley (19542-000,2.6%)
	Sensor Failure		1.8%	Defective Sensor (19542-000,1.8%)
	Paper Feed Sys. Failure		1.8%	Paper Feed Not Working (19542-000,1.8%)
	Other		1.8%	Paper Spindle Tension Low (19542-000,1.8%)
	Bent/Dented/Warped		1.84	Print Fingers Bent (19542-000,1.8%)
	Ribbon Worn		1.8	Ribbon Worn Out (19542-000,1.8%)
	Potentiometer Failure		0.9%	Defective Potentiometer (19542-000,0.9%)
	Mechanical Failure		0.9%	Feeding Mechanism Needs Repair (19542-000,0.9%)
	Hammer Blower Failure		0.9%	Hammer Blower Noisy (19542-000,0.9%)
	Mechanical Damage		0.9%	Hammer Driver Damaged (19542-000,0.9%)
	Broken		0.9%	Hammer Head Broken (19542-000,0.9%)
	Ribbon Skewing		0.9%	Has Ribbon Skewing Problem (19542-000,0.9%)
	Bearing Failure		0.9%	Bearings Worn Out. Requires Replacement (19542-000,0.9%)
	Needs Replacement		0.9%	Needs Overhaul (19542-000,0.9%)
	Wire Failure		0.9%	Needs Wire Replacement (19542-000,0.9%)
	Jammed/Stuck		0.9%	Paper Feeding Mechanism Jammed (19542-000,0.9%)
	Paper Spindle Failure		0.9%	Paper Spindle Rotation Slow (19542-000,0.9%)
	Pully Failure		0.9%	Pulley Broken (19542-000,0.9%)
	Resistor Failure		0.9%	Resistor R-35, Is Open (19542-000,0.9%)
	Switch Failure		0.94	Ribbon Worn Out & Bad Switch (19542-000,0.9%)
	Transformer Failure		0.95	Transformer Has Open Lead (19542-000,0.9%)

Printer, Low Speed Blown Fuse	66.64	Scurces:1 33.4% Fuse Blown Out (19542-000,33.3%)
IC Failure	33.44	16.7% Defective IC (19542-000,16.7%)
Other (<\$10) Capacitor Failure		49.9% 8.3% Defective Capacitor (19542-000,8.3%)
Relay Failure		8.3% Defective Relay (19542-000,8.3%)
Switch Failure		8.3% Defective Switch (19542-000,8.3%)
Tear Bar Failure		8.3% Tear Bar Broken (19542-000,8.3%)
Line Feed Failure		8.3% Terminal Will Not Line Feed (19542-000,8.3%)
Transformer Failure		8.3% Transformer Shorted (19542-000,8.3%)

art	Failure	Norm	Fail	Data
BSC.	Mode/Mech	Dist.		Source(s)/Details
	r,Plotter,Digital,X-Y			Sources:1
Mec	chanical Failure	59.0%	59.0%	Mechanical (24997-000,59.0%)
Ele	actronic Circuit Failure	41.04	41.0%	Electronics (24997-000,41.0%)
alley				Sources:1
Wor	ſŊ	100.0%	77.8%	Eue To Excessive Use (19542-000,33.3%), Worn Out (19542-000,44.4%)
Unk	nown		22.2%	Unknown (19542-000,22.2%)
ump (S	Summary)			
	king Operation	55.0% 13.6%		
Sho	orted	12.9%		
	nl/Gasket Failure graded Operation	9.48 9.18		
209	<b>F-</b>			
up				Sources:8
Lea	king	58.94	30.4*	Leak (24990-000,50.0%) (24994-000,25.6%), Leaking (20609-000,Qty:877) (24992-000,53.0%)
No	Operation	16.5%	8.5%	No Transmission (24990-000,50.0%), No Operation (20609-000,Qty:82), Catastrophic-Fails While Running (18175-000,6.0%)
Sho	rted	14.28	7.3%	Short (24994-000,51.3%)
Sea	l/Gasket Failure	10.3%	5.34	Cylinder Seals (24996-000,55.0%)
Unk	nown		24.84	Unknown (18175-000,92.0%) (19542-000,7.1%) (19542-000,28.6%) (20609-000,Qty:11) (20609-000,Qty:449) (24996-000,39.0%) (25036-000,NR)
Ind	uced		3.1	Defective Component (19542-000,21.4%)
	er (<%6) Out of Adjustment		20.6% 3.5%	Needs Adjustment (19542-000,7.1%), Out of Adjustment (20609-000,Qty:420)
1	Degraded Operation		3.34	Low Pressure (19542-000,14.3%), Output Pressure Very Low (19542-000,7.1%), Degraded (18175-000,2.0%)
1	Worn		3.24	Worn Out (20609-000, Qty: 533)
1	Bearing Failure		3.0%	Bearings (24996-000,31.0%)
	Opened		2.68	Open (24994-000,18.0%)
1	Mechanical Failure		1.5%	Case Failure (24996-000,15.0%)
(	Chack Valve Failure		1.0%	Defective Check Valve (19542-000,7.1%)
1	High Current		1.0%	Has High 10N Current (19542-000,7.1%)
I	Drift		0.7%	Drift (24994-000,5.1%)
C	Cooling Failure		0.7%	Cooling (24996-000,7.5%)
1	Intermittent Operation		<0.1	Intermittent (20609-000,Qty:4)
T	Loss of Lubrication		<0.1%	Loss of Lubrication (20609-000,Qty:2)

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art	91 Failure	Norm	Fail	Failure Distribution Summaries 3-1
esc.	Mode/Mech			Source(s)/Details
•	continued)			
Ot	her (continued) Burned/Charred		<0.1%	Burned (20609-000, Qty:1)
	Fatigue		NR	Material Fatigue (25036-000,NR)
	Corroded		NR	Corrosion (25036-000,NR)
	Cavitation		NR	Cavitation (25036-000, NR)
Fa De	entrifugal (Summary) ils During Operation graded Operation ils to Start	51.1% 33.1% 15.8%		
	entrifugal ils to Start	74.6%	33.34	Sources:1 Catastrophic-Does Not Start (18175-000,100.0%)
De	graded Operation	16.4%	7.3%	Degraded (18175-000,8.0%) (18175-000,14.0%)
Fa	ils During Operation	9.0%	4.0%	Catastrophic-Fails While Running (18175-000,5.0%) (18175-000,7.0%)
Un	known		55.3%	Unknown (18175-000,79.0%) (18175-000,87.0%)
	entrifugal,Boric Acid Transf graded Operation	er 60.0%	22.0%	Sources:1 Degraded (18175-000,8.0%) (18175-000,25.0%) (18175-000,33.0%)
Fa	ils During Operation	40.0%	14.7%	Catastrophic-Fails While Running (18175-000,2.0%) (18175-000,9.0%) (18175-000,33.0%)
Un	known		63.3%	Unknown (18175-000,34.0%) (18175-000,66.0%) (18175-000,90.0%)
	entrifugal,Boron Injection ils During Operation	74.3%	17.3%	Sources:1 Catastrophic-Fails While Running (18175-000,1.0%)
<b>D</b> -	mundad Omayakian	25.78	6 00	(18175-000,2.0%) (18175-000,49.0%) Degraded (18175-000,3.0%) (18175-000,7.0%) (18175-000,8.0%)
	graded Operation known			Unknown (18175-000, 48.0%) (18175-000, 7.0%) (18175-000, 8.0%) (18175-000, 91.0%)

Degraded Operation		Sources: 31.0% Degraded (18175-000,31.0%)
Fails During Operation	32.64	15.0% Catastrophic-Fails While Running (18175-000,15.0%)
Unknown	*****	54.0% Unknown (18175-000,54.0%)

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Part Desc.	Failure	Norm	Fail	Data	
		Dist.	Dist.	Source(s)/Details	
	Centrifugal, Circulating Water ails During Operation		14.0%	Sources:1 Catastrophic-Fails While Running (18175-000,14.0%)	
De	graded Operation	17.6%	3.0%	Dograded (18175-000,3.0%)	
Un	nknown		83.0%	Unknown (18175-000,83.0%)	
	Centrifugal,Condenser Syraded Operation	70.8%	8.5 <del>%</del>	Sources:1 Degraded (18175-000,7.0%) (18175-000,10.0%)	
Fa	ails During Operation	29.24	3,54	Catastrophic-Fails While Running (18175-000,2.0%) (18175-000,5.0%)	
Un	nknown		88.0%	Unknown (18175-000,88.0%) (18175-000,88.0%)	
	Centrifugal, Condenser, Booster Agraded Operation		26.0%	Sources:1 Degraded (18175-000,15.0%) (18175-000,37.0%)	
Fa	ils During Operation	8.8%	2.5%	Catastrophic-Fails While Running (18175-000,5.0%)	
Un	ıknown		71.5%	Unknown (18175-000,58.0%) (18175-000,85.0%)	
	Centrifugal, Condenser, Circula Agraded Operation		38.0%	Sources:1 Degraded (18175-000,38.0%) (18175-000,38.0%)	
Fa	ils During Operation	29.6%	16.0%	Catastrophic-Fails While Running (18175-000,16.0%) (18175-000,16.0%)	
Un	known		46.0%	Unknown (18175-000,46.0%) (18175-000,46.0%)	
				Sources:1	
	Centrifugal, Condenser, Motor Agraded Operation	62.3%	27.0%	Degraded (18175-000,4.0%) (18175-000,18.0%) (18175-000,59.0%)	
De					
De Fa	graded Operation	37.78	16.34	(18175-000,59.0%) Catastrophic-Fails While Running (18175-000,12.0%)	
De Fa Un Pump, C	graded Operation ails During Operation sknown Sentrifugal, Control Rod, Drive	37.78	16.3% 56.7%	(18175-000,59.0%) Catastrophic-Fails While Running (18175-000,12.0%) (18175-000,18.0%) (18175-000,19.0%) Unknown (18175-000,23.0%) (18175-000,70.0%) (18175-000,77.0%) Sources:1	
De Fa Un Pump, C De	ngraded Operation Ails During Operation Uknown	37.78	16.3% 56.7% 74.0%	(18175-000,59.0%) Catastrophic-Fails While Running (18175-000,12.0%) (18175-000,18.0%) (18175-000,19.0%) Unknown (18175-000,23.0%) (18175-000,70.0%) (18175-000,77.0%)	

FMD-91				Failure Distribution Summaries 3-1
Part Dusc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Centrifugal, Cooling ails During Operation	100.0%	100.0%	Sources:1 Catastrophic-Fails While Running (18175-000,100.0%)
	Centrifugal,Cooling,Water agraded Operation	40.4%	9.0%	Sources:1 Degraded (18175-000,1.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,8.0%) (18175-000,33.0%)
F	ails During Operation	38.5%	8.6%	Catastrophic-Fails While Running (18175-000,2.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,18.0%) (18175-000,25.0%)
F	ails to Start	21.2%	4.7%	Catastrophic-Fails To Start (18175-000,33.0%)
U	nknown		77.7%	Unknown (18175-000,34.0%) (18175-000,67.0%) (18175-000,77.0%) (18175-000,89.0%) (18175-000,92.0%) (18175-000,92.0%) (18175-000,93.0%)
	Centrifugal,Reactor Building egraded Operation		14.0%	Sources:1 Degraded (18175-000,14.0%)
F	ails During Operation	17.6%	3.0%	Catastrophic-Fails While Running (18175-000,3.0%)
U	nknown		83.0%	Unknown (18175-000,83.0%)
	Centrifugal,Reactor Feedwater ails During Operation		12.3%	Sources:1 Catastrophic-Fails While Running (18175-000,5.0%) (18175-000,9.0%) (18175-000,23.0%)
D	egraded Operation	43.1%	9.34	Degraded (18175-000,1.0%) (18175-000,2.0%) (18175-000,25.0%)
U	nknown		78.3%	Unknown (18175-000,52.0%) (18175-000,89.0%) (18175-000,94.0%)
	Centrifugal,Residual Heat Rem egraded Operation		15.0%	Sources:1 Degraded (18175-000,7.0%) (18175-000,16.0%)
Fe	ails During Operation	49.34	14.6%	(18175-000,16.0%) (18175-000,16.0%) (18175-000,20.0%) Catastrophic-Fails While Running (18175-000,6.0%) (18175-000,10.0%) (18175-000,10.0%) (18175-000,16.0%) (18175-000,31.0%)
Ur	nk nown		70.4%	Unknown (18175-000,62.0%) (18175-000,68.0%) (18175-000,70.0%) (18175-000,74.0%) (18175-000,78.0%)
	Centrifugal,Salt Water Injecti ils During Operation	on 82.8 <b>%</b>	24.0%	Sources:1 Catastrophic-Fails While Running (18175-000,24.0%)
De	graded Operation	17.2%	5.0%	Degraded (18175-000,5.0%)

3-162 Part Desc.	Failure Distribution Surr Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source (s) /Details
	Sentrifugal, Service ils During Operation	88.4%	53.5%	Sources:1 Catastrophic-Fails While Running (18175-000,7.0%) (18175-000,100.0%)
De	graded Operation	11.6%	7.0%	Degraded (18175-000,14.0%)
Ur	hknown	~ ** <b>** = = =</b>	39.5%	Unknown (18175-000,79.0%)
	Centrifugal, Service, Alternat.	-	12.0%	Sources:1 Dagraded (18175-000,12.0%)
Fa	ils During Operation	47.8%	11.0%	Catastrophic-Fails While Running (18175-000,11.0%)
Ur	known		77.0%	Unknown (18175-000,77.0%)
	Centrifugal, Service, Booster Igraded Operation	55.6%	31.3%	Sources:1 Degraded (18175-000,25.0%)
Fa	ils During Operation	44,48	25.0%	Catastrophic-Fails While Running (18175-000,20.0%)
Ur	iknown		43.8%	Unknown (18175-000,35.0%)
	Centrifugal, Service, Continuo Igraded Cperation		16.0%	Sources:1 Degraded (18175-000,16.0%)
Fa	ils During Operation	23.8%	5.0%	Catastrophic-Fails While Running (18175-000,5.0%)
Un	iknown	<b></b>	7 <b>9.0%</b>	Unknown (18175-000,79.0%)
	entrifugal,Service,Salt Wate ils During Operation		100.0%	Sources:1 Catastrophic-Fails While Running (18175-000,100.0%)
• •	entrifugal, Service, Standby ils During Operation	57.1%	57.1%	Sources:1 Catastrophic-Fails While Running (18175-000,100.0%) (18175-000,100.0%) (18175-000,100.0%) (18175-000,100.0%)
Fa	ils to Start	42.9%	42.9%	Catastrophic-Does Not Start (18175-000,100.0%) (18175-000,100.0%), Catastrophic-Fails To Start (18175-000,100.0%)
	entrifugal, Service, Water ils During Operation	64.8%		Sources:1 Catastrohic-Fails While Running (18175-000,73.0%), Catastrophic-Fails While Running (18175-000,12.0%) (18175-000,31.0%) (18175-000,33.0%)
De	graded Operation	35.24	18.0%	Degraded (18175-000,15.0%) (18175-000,20.0%) (18175-000,22.0%) (18175-000,24.0%)
Űn	known		48.94	Unknown (18175-000,45.0%) (18175-000,54.0%) (18175-000,57.0%) (18175-000,64.0%)

Part	Failure	Norm	Fail	Data	
Desc.		Dist.			
Pump, C	Centrifugal, Steam Gen Feed			Sources:1	
Fa	ails During Operation	60.4%	21.3%	Catastrophic-Fails While Running (18175-000,11.0%) (18175-000,16.0%) (18175-000,37.0%)	
De	agraded Operation	39.6%	14.0%	Degraded (18175-000,13.0%) (18175-000,14.0%) (18175-000,15.0%)	
Ur	nknowri		64.7%	Unknown (18175-000,50.0%) (18175-000,69.0%) (18175-000,75.0%)	
	Centrifugal,System Composite agraded Operation	80.08	16 08	Sources:1 Degraded (18175-000,16.0%)	
	ails During Operation	20.0%		Catastrophic-Fails While Running (18175-000,4.0%)	
Un	nknown		80.0%	Unknown (18175-000,80.0%)	
	Hydraulic (Summary) eaking	64.4%			
Cr	acked/Fractured	9.5%			
	nproper Flow Disy	7.0% 6.6%			
No	Operation	5.1%			
	nt of Spec. Intermittent Operation	4.0% 3.6%			
	Nydraulic, Centrifugal Paking	58.8%	51.4%	Sources:1 Leaking (20609-000,Qty:151)	
No	Operation	12.1%	10.5%	No Operation (20609-000, Qty: 31)	
Cr	acked/Fractured	9.7%	8.5%	Cracked/Fractured (20609-000,Qty:25)	
No	isy	7.8%	6.8%	Noisy (20609-000,Qty:20)	
Ou	t of Spec.	7.0%	6.1%	Out of Specification (20609-000,Qty:18)	
Im	proper Flow	4.78	4.18	Improper Flow (20609-000,Qty:12)	
Ot	her (<\$4) Intermittent Operation		12.6%	Intermittent (20609-000,Qty:8)	
	Displaced		2.75	Displaced (20609-000, Qty:8)	
	Unstable Operation		1.78	Unstable (20609-000,Qty:5)	
	Excessive Vibration		1.7%	Vibrating (20609-000,Qty:5)	
	Overheated		0.7%	Overheated (20609-000, Qty: 2)	
	Seized		0.75	Seized (20609-000, Qty:2)	
	Spurious/False Operation		0.7%	False Response (20609-000, Qty:2)	
	Out of Adjustment		0.3%	Out of Adjustment (20609-000,Qty:1)	
	Stuck Open		0.3%	Stuck Open (20609-000,Qty:1)	
	Corroded		0.3	Corroded (20609-000,Qty:1)	
	Contaminated		0.3%	Contaminated (20609-000,Qty:1)	

3-164 Failure Distribution Su				FMD-9
Part Failure Desc. Mode/Mech	Norm Dist.	Fail Dist.	Datà Source(s)/Details	
ump, Hydraulic, Centrifugal (con	tinued)			**************************************
Other (continued) Breach		0.3%	Breach (20609-000,Qty:1)	
Pump,Hydraulic,Gear			Sources:1	
Leaking <sup>.</sup>	100.0%	100.0%	Leaking (20609-000,Qty:266)	
Pump,Hydraulic,Impeller			Sources:1	
Leaking	. •		Leaking (20609-000, Qty:9)	
Noisy	-15.44		Noisy (20609-000,Qty:2)	
Ereach	7.7%	7.7%	Breach (20609-000,Qty:1)	
No Operation	7.7%	7.7%	No Operation (20609-000, Cty:1)	
ump, Hydraulic, Manual Leaking	53.94	53.9%	Sources:1 Leaking (20609-000,Qty:41)	
Improper Flow	46.18	46.1	Improper Flow (20609-000,Qty:35)	
Pump, Hydraulic, Fiston			Sources:1	
Cracked/Fractured			Cracked/Fractured (20609-000, Qty:44)	
Noisy			Noisy (20609-000,Qty:25)	
Intermittent Operation			Intermittent (20609-000,Qty:17)	
Out of Spec.	10.4%		Out of Specification (20609-000,Qty:11)	
No Operation	4.78	4.4	No Operation (20609-000,Qty:5)	
Improper Flow	3.84	3.54	Improper Flow (20609-000, Qty:4)	
Other (<\$3) Unstable Operation		7.0% 1.8%	Unstable (20609-000,Qty:2)	
Leaking		1.8%	Leaking (20609-000, Qty:2)	
Out of Adjustment		0.9%	Out of Adjustment (20609-000, Qty:1)	
Spurious/False Operation		0.9%	False Response (20609-000, Qty:1)	
Displaced		0.9%	Displaced (20609-000,Qty:1)	
Breach		0.94	Breach (20609-000, gty:1)	

FMD-				Failure Distribution Summaries 3-16
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	ydraulic, Piston, Axial termittent Operation	50.08	50.08	Sources:1 Intermittent (20609-000,Qty:1)
	uck Closed			Stuck Closed (20609-000,Qty:1)
00		50.04	50.04	
	ydraulic,Piston,Radial aking	50.0%	50.0%	Sources:1 Leaking (20609-000,Qty:1)
No:	isy	50.0%	50.0%	Noisy (20609-000,Qty:1)
	ositive Displacemen (Summary			
	graded Operation ils During Operation	68.8% 31.2%		
	ositive Displacemen ils During Operation	94.1%	8.0%	Sources:1 Catastrophic-Fails While Running (18175-000,7.0%) (18175-000,9.0%)
Deg	graded Operation	5.9%	0.5%	Degraded (18175-000,1.0%)
Unk	nown		91.5%	Unknown (18175-000,90.0%) (18175-000,93.0%)
Deg	lls During Operation graded Operation known	90.0% 10.0%	1.0%	Catastrophic-Fails While Running (18175-000,9.0%) Degraded (18175-000,1.0%) Unknown (18175-000,90.0%)
ump, Po	ositive Displacemen, Service,	Continuc		Sources:1
Deg	raded Operation	81.9%	34.7%	Degraded (18175-000,14.0%) (18175-000,45.0%) (18175-000,45.0%)
Fai	ils During Operation	18.1%	7.7%	Catastrophic-Fails When Running (18175-000,10.0%), Catastrohic-Fails While Running (18175-000.10.0%), Catastsrophic-Fails While Running (18175-000,3.0%)
Unk	nown		57.7%	Unknown (18175-000,45.0%) (18175-000,45.0%) (18175-000,83.0%)
	t Fire Contrl of Adjustment	26.34		Sources:2 Loose Clamp(s) - Out Of Adjustment (25101-000,Qty:1), Out Of Adjustment - Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:1), Vibration - Out Of Adjustment (25101-000,Qty:1), Out Of Adjustment (25101-000,Qty:1) (25101-000,Qty:3), Out Of Adjustment - Out Of Adjustment (25101-000,Qty:1), Loose Screw(s) - Out Of Adjustment (25101-000,Qty:1)
Bro	ken	23.78		Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:2), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)

art Failure esc. Mode/Mech	Norm Dist.	Fail Dist.	Data Scurce(s)/Details
adrant Fire Contrl (continued) Excessive Play	21.1	14.3%	Excessive Play (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Poor Design - Excessive Play (25101-000,Qty:4)
Worn	10.5%	7.18	Worn/Stripped - Out Of Adjustment (25101-000,Qty:1) (25101-000,Qty:1), Worn - Out Of Adjustment (25101-000,Qty:1), Worn - Out Of Synch (25101-000,Qty:1)
Out of Synch.	10.5%	7.1%	<pre>Internal Failure - Out Of Synch (,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Vibration - Out Of Synch (25101-000,Qty:1), Out Of Synch (25101-000,Qty:1)</pre>
Seal/Gasket Failure	7.9%	5.4%	Seals Worn - Leaking Hydaulic Oil (25101-000,Qty:1), Seals Worn - Binding/Sticking (25101-000,Qty:2), Seals Worn - Corroded (,Qty:1), Seals Worn - Seized (,Qty:1)
Induced		10.7%	<pre>Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Improper Adjustment - Inaccurate (25101-000,Qty:1), Item Abuse/Neglect - Out Of Synch (25101-000,Qty:1), Improper Adjustment - Out Of Synch (25101-000,Qty:1)</pre>
Unknown		3.6%	Unknown (25101-000,Qty:1) (25101-000,Qty:1)
Other (<%6) Lamp Failure		17.9% 3.6%	Internal Failure - Inop Fire Control Light (25101-000,Qty:2)
Skipping		3.6%	<pre>Skips (25101-000,Qty:2), Internal Failure - Skips (,Qty:1), Worn - Skips (,Qty:1)</pre>
No Operation		1.8%	Part Struck/Damaged - Inop Fire Control Light (25101-000,Qty:1), Poor Design - Inop/Unserviceable (,Qty:1
Moisture Intrusion		1.8%	Internal Moisture (25101-000,Qty:1)
Binding/Sticking		1.8%	Gears Binding - Seized (25101-000,Qty:1)
Cracked/Fractured		1.8%	Cracked/Split-Inop Fire Conrol Light (25101-000,Qty:1)
Loose		1.8%	Loose Wire(s) - Inop Fire Control Light (25101-000,Qty:1)
Bearing Failure		1.8%	Bearing Failure - Excessive Play (25101-000,Qty:1)
il & Plate Assy			Sources:1

Broken	100.0%	88.9% Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:15)
Induced		11.14 Improper Maintenance - Collapsed/Bent (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:1)

Rail Assembly Broken	100.0%	Sources:1 75.0% Broken/Damaged (25101-000,Qty:2), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Induced		25.0% Improper Install - Broken Damaged (25101-000,Qty:1)

FMD-91		·	Failure Distribution Summaries 3-16
Part Failure Desc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
Rear Traverse Assy Binding/Sticking	100.0%	100.0%	Sources:1 Binding/Sticking (2510)-000,Qty:1)
Recoil Cylinder Assy Contaminated	75.0%	75.0%	Sources:1 Contaminated (25101-000,Qty:3)
Cracked/Fractured	25.0%	25.0%	Cracked/Split-Contaminated (25101-000,Qty:1)
Recorder,Cassette,Tape Reel Unknown		<0.1%	Sourc <b>es:2</b> Unknown (24996-000,NR) (24997-000,NR)
Other Intermittent Operation		100.0% NR	Distorted or Intermittent Output (24996-000, NR)
Incorrect Drive Speed		NR	Incorrect Drive Speed (24996-000,NR), Incorrect drive speed (24997-600,NR)
No Operation		NR	Failure to Operate (24996-000,NR), Failure to operate (24997-000,NR)
Output Distortion		NR	Distorted or intermittent output (24997-000, NR)
Recticle Slide Assy Cracked/Fractured	100.0%	100.0%	Sources:1 Vibration - Cracked (25101-000,Qty:1)
Recup Cyl Head Assy Leaking	66.7%	66.7%	Sources:1 Leaking Hydraulic Oil (25101-000,Qty:4)
Broken	16.7%	16.7%	Part Struck/Damaged - Fnd In TI/PMCS/INSP (25101-000,Qty:1)
Seal/Gasket Failure	16.7%	16.7%	Seals Worn - Leaking Hydraulic Oil (25101-000,Qty:1)
Reflector Broken	100.0%	100,0%	Sources:1 Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
legulator Closed	20.7%	14.4%	Sources:2 Closed (24994-000,28.8%)
Opened	20.7%	14.4%	Open (24994-000,28.8%)
No Output	20.0%	13.9%	Loss Electrical Pwr (23038-001,Qty:3), No Output (23038-001,Qty:2)
Leaking	19.84	13.84	External Leak (24994-J00,27.5%)
Degraded Output	10.74	7.5%	Insufficient Output (24994-000,14.9%)
Incorrect Voltage	8.0%	5.6%	Incorrect Voltage (23038-001,Qty:2)
Unknown		16.7%	Unknown (23038-001,Qty:6)
Induced		2.8%	Caused By Other Dev. (23038-001,Qty:1)

Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
Ot	ther (<\$5) Spurious/False Operation			Faulty Reading (23038-001,Qty:1)
	Out of Adjustment		2.8%	Out Of Adjustment (23038-001,Qty:1)
	Duift		2.8	Drifts (23038-001,Qty:1)
	Incorrect Current		2.84	Incorrect Current (23038-001,Qty:1)
Ir Co Sh Fa	(Summary) Intermittent Operation Intact Failure Norted Inis to Close Igh Contact Resistance	26.1% 22.7% 18.8% 18.0% 14.5%		
telay Co	ontact Failure	27.14	12.9%	Sources:18 Abnormally High Contact Resistance (25016-000,NR), Contact (24990-000,90.0%), Contact Chatter (24992-000,5.7%), Contact Resistance (24992-000,1.4%), Contact Failures (24993-000,75.0%), Contact Defective (23038-002,Qty:1) (23038-003,Qty:1), Contact/Conn Defect (23038-004,Qty:1) (23038-004,Qty:1), Normally Closed Contacts Were Intermittent (10722-000,Qty:1), Overstressed Contacts (24417-001,NR)
A	uminum Migration	16.6%	7.9%	Open-Op. Coil (25000-000,Qty:1) (25000-000,Qty:1), Coil (24990-000,10.0%), Coil Open (24992-000,8.6%), Coil Unstable (24992-000,48.5%), Coil Drift (24992-000,12.8%), Open Coils (24417-001,NR) (24993-000,5.0%), High Coil Resist-Vire Insul. Damaged During Windin (10722-000,Qty:1), Open Coil Wire-Appears To Be Cut; Process Flaw (10722-000,Qty:1), Intermittent Open Coil (10722-000,Qty:1)
Hi	gh Contact Resistance	15.9%	7.6%	Open-Op. Contacts (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:5) (25000-000,Qty:7) (25000-000,Qty:10), Open-General (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:6) (25000-000,Qty:20) (25000-000,Qty:20) (25000-000,Qty:3), Parameter Drift-High Contact Resistance (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:7) (25000-000,Qty:4) (25000-000,Qty:56), Open-Open Contacts (25000-000,Qty:2) (25000-000,Qty:56), Open-Open Contacts (25000-000,Qty:2) (25000-000,Qty:3), Contact Arc (24992-000,3.6%), Contact Open (24992-000,13.6%), Open (17867-000,Qty:4) (17867-000,Qty:7) (23038-001,Qty:1) (23038-002,Qty:1), Opened (20609-300,Qty:1), Open Contacts (24417-001,NR)
In	termittent Operation	12.1*		Intermittent-Noise (25000-000,Qty:2) (25000-000,Qty:10) (25000-000,Qty:22) (25000-000,Qty:90), Intermittent-Bounce (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:4), Intermittent-Miss (25000-000,Qty:2) (25000-000,Qty:4), Intermittent-Miss (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3), Intermittent-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:4) (25000-000,Qty:7) (25000-000,Qty:2)

irt	Failure	Norni	Fail	Data
180.		Dist.	Dist.	
lav	(continued)			
	termittent Operation (con	tinued)		
				(25000-000,Qty:8) (25000-000,Qty:9) (25000-000,Qty:10), Intermittent (17867-000,Qty:5) (17867-000,Qty:10) (20609-000,Qty:83) (23038-002,Qty:1)
Sh	lorted	10.54	5.0%	<pre>Short-Sh. Contacts (25000-000,Qty:1) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:8) (25000-000,Qty:1), Short-Dielectric Strength (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:5) (25000-000,Qty:3) (23038-002,Qty:1) (23038-002,Qty:4) (25000-000,Qty:3) (23038-002,Qty:1) (23038-002,Qty:4) (25000-000,Qty:3) (25000-000,Qty:5), Short-Shorted Contacts (25000-000,Qty:3) (25000-000,Qty:6), Short-Shorted Coil (25000-000,Qty:3) (25000-000,Qty:6), Short-Shorted Coil (25000-000,Qty:4), Contact Short Circuit (25016-000,NR), Contact Short (24992-000,2.2%), Coil Short (24992-000,3.6%), Short/Grounded (23038-001,Qty:1) (23038-002,Qty:2), Grounded Electricall (23038-001,Qty:1), Short Or Grounded (23038-001,Qty:1), Shorted Or Grounded (23038-001,Qty:1) (23038-003,Qty:2) (23038-002,Qty:4) (23038-004,Qty:3), Shorted Or Ground (23038-002,Qty:1), Grounded Electrically (23038-003,Qty:1), Short-Drooping/Shorting Leadiwre (10722-000,Qty:1)</pre>
Lo	ss of Control	9.5%	4.5%	Control Inoperative (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:2) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:5) (23038-002,Qty:7) (23038-003,Qty:1) (23038-003,Qty:6) (23038-004,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1) (23038-006,Qty:2) (23038-006,Qty:7)
Sp	urious Opening	8.3%	3.9%	Catastrophic-Spurious Open (18175-000,59.0%)
Uni	known		22.5%	Unknown (10722-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (18175-000,17.0%) (20609-000,Qty:1) (20609-000,Qty:62) (20609-000,Qty:284) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:2) (23038-001,Qty:2) (23038-001,Qty:2) (23038-002,Qty:1) (23038-002,Qty:2) (23038-002,Qty:1) (23038-002,Qty:4) (23038-002,Qty:2) (23038-002,Qty:4) (23038-002,Qty:4) (23038-002,Qty:2) (23038-002,Qty:36) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:2) (23038-003,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:2) (23038-005,Qty:1) (23038-006,Qty:7) (23038-006,Qty:8) (23038-006,Qty:10) (24993-000,20.0%) (25000-000,Qty:8) (25000-000,Qty:9)
Ind	duced			Abnormal Operate Time (25016-000,NR), Weak/Low Performance (17867-000,Qty:1), Missing (23038-001,Qty:1) (23038-001,Qty:3) (23038-002,Qty:1) (23038-002,Qty:1), Caused By Other Dev (23038-002,Qty:1), Improper Energy Resp (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1), Caused By Other Dev. (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-003,Qty:1) (23038-003,Qty:2) (23038-002,Qty:1) (23038-006,Qty:2), Maintenance Error (23038-002,Qty:1), Polarity Reversed (23038-003,Qty:1), Damaged For Test Pur (23038-003,Qty:1), Wrong Part (23038-004,Qty:1), Defective (25027-000,Qty:1) (25027-000,Qty:1), High Inrush Current (24417-001,NR), High Inrush Coil Current (Inductive Kick) (24417-001,NR)
Ctł	ner (<\$4) Broken		19.8 <b>%</b> 2.0%	Broken/Damaged (17867-000,Qty:1), Broken (23038-002,Qty:2) (23038-003,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1)

ert	Failure Mode/Mech	 Fail Dist.	Data Source(s)/Details
	(continued)	 	
	her (continued)		(23038-004,Qty:2) (23038-005,Qty:1)
	Degraded Operation	1.68	Degraded (18175-000,24.0%) (20609-000,Qty:4)
	Connection Failure		Electrical Conn Def (23038-006, Qty:4) (23038-006, Qty:9)
	Lamp Failure		No Indicating Light (23038-001, Qty:2) (23038-002, Qty:2),
		1.50	Light Bulb Failure (23038-002, Qty:4) (23038-003, Qty:1) (23038-005, Qty:1)
	Seal Failure	1.24	Saal Leak (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:7) (25000-000,Qty:16) (25000-000,Qty:18) (25000-000,Qty:20) (25000-000,Qty:29) (25000-000,Qty:29) (25000-000,Qty:59)
	Incorrect Voltage	1.1	Incorrect Voltage (23038-002,Qty:1) (23038-002,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1)
	Jammed/Stuck	0.9%	Hang-up (25016-000,NR), Arm Stuck (17867-000,Qty:1), Latch Up-Shorted/Cracked FET Die (10722-000,Qty:1)
	No Output	0.8%	No Output (23038-002,Qty:2) (23038-003,Qty:1) (23038-003,Qty:1) (23038-005,Qty:1)
	Loss of Power	0.7%	Electrical Pwr Loss (23038-002,Qty:1) (23038-003,Qty:2) (23038-006,Qty:1), Power Loss (23038-006,Qty:3)
	Fails to Open	0.7%	Failure to Open Circuit (25016-000,NR), Normally Open Contacts Were Welded Together (10722-000,Qty:1)
	Burned/Charred	0.6%	Burned/Charred (23038-003,Qty:3), Burned (20609-000,Qty:31)
	Arcing/Sparking	0.6%	Arcing (20609-000, Qty:5) (23038-001, Qty:3)
	No Operation	0.6%	No Operation (20609-000,Qty:19) (25016-000,NR), Inoperative (23038-002,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1)
	Unstable Operation	0.5%	<pre>Fluctuates, Unstable (23038-001,Qty:1), Fluctuates (23038-002,Qty:1) (23038-002,Qty:2), Unstable (23038-003,Qty:1)</pre>
	Spurious/False Operation	0.4%	Faulty Reading (23038-006,Qty:3), False Response (20609-000,Qty:10)
	Audio Fault/Failure	0.4%	Audio Faulty (23038-002, Qty:1) (23038-006, Qty:3)
	Out of Adjustment	0.4%	Out Of Adjustment (23038-002,Qty:1) (23038-002,Qty:1), Adjustment Improper (23038-004,Qty:1)
	Contaminated	0.4%	Dirty (23038-001,Qty:1) (23038-002,Qty:1), Contaminated (20609-000,Qty:15), Contamination (13933-000,NR) (24417-001,NR)
	Corroded	0.4%	Corrosion (25000-000,Qty:12), Corroded (23038-004,Qty:1)
	Improper Output	0.3%	<pre>Improper Source Output (23038-002,Qty:1) (23038-002,Qty:3) (23038-003,Qty:1)</pre>
	Insulation Resistance Drift	0.3%	Parameter Drift-Insulation Resistance (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:6) (25000-000,Qty:14)
	Burred	0.34	Burred (23038-001, Qty:1) (23038-002, Qty:1)

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Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	<u>3-17</u>
alay	(continued)				
Õt	her (continued)			(23038-002, Qty:1)	
	Insulation Failure		0.34	Insulation Breakdown (23038-00 Qty:1)	
	Fails to Start		0.34	Starting Stall (23038-004,Qty:1)	
	Loose		0.34	Loose (23038-004,Qty:1)	
	Binding/Sticking		0.3	Sticky (23038-001,Qty:1), Binding (20609-000,Qty:10)	
	Overheated		0.2	Overheating (23038-002,Qty:2), Overheated (20609-000,Qty:19)	
	Stuck Open		0.28	Stuck Open (20609-000,Qty:30)	
	Drop Out Volt. Drift		0.24	Parameter Drift-Drop Out Voltage (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:7) (25000-000,Qty:17)	
	Parameter Drift		0.2	Parameter Drift-General (25000-000,NR) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:5) (25000-000,Qty:6) (25000-000,Qty:9) (25000-000,Qty:10)	
	Mechanical Damage		0.1%	Mechanical Damage (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:9)	
	Drift		0.14	Drift (20609-000,Qty:17)	
	Out of Spec.		0.14	Out of Tolerance (20609-000,Qty:3), Out of Specification (20609-000,Qty:10)	
	Cracked/Fractured		<0.1%	Cracked/Fractured (20609-000,Qty:12)	
	Stuck Closed		<0.1%	Stuck Closed (20609-000, Gty:10)	
	Worn		<0.1%	Worn Out (20609-000,Qty:9)	
	Noisy		<0.1%	Noisy (20609-000, Qty:8)	
	Contact Chatter			Excessive Contact Bounce (25016-000,NR), Chatter (25016-000,NR), Chattering (23038-002,Qty:1)	
	Delta Op. Time Drift		<0.1%	Parameter Drift-Delta Operate Time (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2)	
	Delta R Drift		<0.1%	Parameter Drift-Delta R (25000-000,Qty:1)	
	Degraded Contact		NR	Poor Contact Alignment (24417-001,NR)	
	Spring Failure		NR	Loss of Resiliency in Springs (24417-001, NR)	

Rel	ay,Composite Degraded Operation	100.0%	Sources:1 26.0% Degraded (18175-000,26.0%)
	Unknown		74.0% Unknown (16175-000,15.0%) (18175-000,59.0%)

Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source (s) /Details	
		D18C.	DISC.	· · · ·	
	Composite, Auxilitary Durious/False Operation	80.0%	40.0%	Sources:1 Catastrophic-Spurious Operation (18175-000,80.0%)	
De	graded Operation	20.04	10.0%	Degraded (18175-000,10.0%) (18175-000,10.0%)	
Ur	iknown	*****	50.0%	Unknown (18175-000,10.0%) (18175-000,10.0%) (18175-000,80.0%)	
	Composite,Control urious/False Operation	66.3%	57.0%	Sources:1 Catastrophic-Spurious Operation (18175-000,57.0%)	
De	graded Operation	33.7%	29.0%	Degraded (18175-000,29.0%)	
Ur	known		14.0%	Unknown (18175-000,14.0%)	
glay, De	Composite,Protective graded Operation	52.3%	35.5%	Sources:1 Degraded (18175-000,29.0%) (18175-000,37.5%) (18175-000,40.0%)	
Sp	urious/False Operation	47.7%	32.34	Catastrophic-Spurious Operation (18175-000,40.0%) (18175-000,57.0%)	
Un	known		32.21	Unknown (18175-000,14.0%) (18175-000,20.0%) (18175-000,25.0%) (18175-000,37.5%)	
	Contact Operation	90.0%	90.04	Sources:1 Fail To Operate (24990-000,90.0%)	
	ils to Open			Fail To Release (24990-000,10.0%)	
	Contact,N.C. ils to Close	89.0%	89.0%	Sources:1 Contacts Failed Closed (24991-000,89.0%)	
	ils to Open			Contacts Failed Open (24991-000,11.0%)	
	Contact,N.O. ils to Open	89.0%	89.0%	Sources:1 Contacts Failed Open (24991-000,89.0%)	
Fa	ils to Close	11.0%	11.0%	Contacts Failed Closed (24991-000,11.0%)	
	Contactors,Sele oken	66.7%	66.7%	Sources:1 Broken (25464-000,Qty:2)	
Bi	nding/Sticking	33.3*	33.3%	Binding Stuck or Jammed (25464-000,Qty:1)	

	91			Failure Distribution Summaries 3-1
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Relay, Ir	DPDT ntermittent Operation	33.34	33.34	Sources:1 Intermittent Latch-up (10722-000,Qty:1)
Op	ened .	33.34	33,34	Intermittent Open-Fractured Contact (10722-000,Qty:1)
Oŗ	en Coil	33.3%	33.34	Open In Coil Winding-Corrosion Of Wire (10722-000,Qty:1)
	Electromagnetic, Latching, DE itermittent Operation		100.0%	Sources:1 Post Random Switching Failures-Broken Coil Leads (25001-000,Qty:2), Post Randon Switching Failures (25001-000,Qty:1)
	Electromechanical,Armature rroded	25.5%	25.54	Sources:1 Contact Corrosion (25038-000,6.5%) (25038-000,19.0%)
Co	il Failure	23.5%	23.54	Opened Coil (25038-000,8.5%), Unstable Coil (25038-000,15.0%)
Co	ntaminated	18.0%	18.0%	Contact Contamination (25038-000,18.0%)
Bi	nding/Sticking	9.0%	9.0%	Binding, Jamming (25038-000,9.0%)
Sp	oring Failure	9.0%	9.0%	Spring Fatigue (25038-000,9.0%)
Fa	ulty Contact	8.0%	8.0%	Poor Contact Alignment (25038-000,8.0%)
Co	ntact Failure	7.0%	7.0%	Contact Welding (25038-000,7.0%)
	Electromechanical,Latching ntaminated	37.5%	37.5%	Sources:2 Hung Up In The Reset State-Foreign Contamination (10722-000,Qty:3)
Op	ened	30.0%	30.0%	Open (24994-000,60.0%)
sh	orted	20.0%	20.0%	Short (24994-000,40.0%)
Co	ntact Failure	12.5%	12.5%	Intermittent Contact (10722-000,Qty:1)
Ot	her Drift		0.0% NR	Drift (24994-000,NR)
	Electromechanical,Latching, ened		100.0%	Sources:1 Open (10722-000,Qty:1)
	Electromechanical,Mercury W ntact Failure		100.0%	Sources:2 Contacts In An Incorrect State (10722-000,Qty:1)
Ot	her Latch üp		0.0% NR	Latch-Up-Mercury Becomes Solid (13933-000,NR)

art	Failure	Norm	Fail	Data
esc.	Mode/Mach	Dist.	Dist.	Source(s)/Details
	Power ils to Close	58.5%	57.0%	Sources:2 Failure of N/O Contacts to Close (24996-000,57.0%), Failure of N/O contacts to close (24997-000,57.0%)
Op	en Coil	19.74	19.2	Open Ccil (24996-000,19.2%) (24997-000,19.2%)
Fa	ils to Open	19.75	19.24	Failure of N/C Contacts to Open (24996-000,19.2%), Failure of N/C contacts to open (24997-000,19.2%)
Sh	orted	2.1	2.0%	Short Across Contacts (24996-000,2.0%), Short across contacts (24997-000,2.0%)
Un	known	****	2.68	Unknown (24996-000,2.6%) (24997-000,2.6%)
elay, Bi	SPDT nding/Sticking	100.0%	100.0%	Sources:1 Sticking-ARC Pitting On Normally Open Contacts (10722-000,Qty:2)
elay, Sh	SPST ort <b>e</b> d	100.0%	100.0%	Sourcos:1 Contacts Shorted-Contamination (10722-000,Qty:1)
	Signal,Low Power orted	34.2%	30.5 <b>%</b>	Sources:2 Specifically: (Shorts) (24996-000,41.5%)
Op	en Coil	32.94	29.41	Specifically: (Open Circuit Coil (24995-000,40.0%)
Med	chanical Failure	19.3%	17.34	Specifically: (Mechanical Failure) ) (24996-000,23.5%)
Co	ntact Failure	13.6%	12.1%	<pre>Specifically: (Intermittent or high res. contacts) (24996-000,16.5%)</pre>
Unl	known		10.78	Unknown (24996-000,14.5%)
Oti	her		0.0%	
	Fails to Open		NR	Fail to open N/C contact (24996-000,NR) (24997-000,NR)
	Fails to Close		NR	Fail to close N/O contact (24996-000,NR) (24997-000,NR)
	Solenoid ift	32.2	20.0%	Sources:5 Fluctuates, Unstable (23038-003,Qty:1)
Loi	ss of Control	21.5	13.3%	Control Inoperative (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1)
Sho	orted	12.6	7.8%	Short Or Grounded (23038-001, Qty:3), Short (20609-000, Qty:1)
Uni	stable Operation	11.5%	7.1	Unstable (20609-000, Qty:16), Intermittent (20609-000, Qty:5)
Loc	)\$e	10.78	6.7%	Loose (23038-004, Qty:1)
Cri	acked/Fractured	6.24	3.9 <b>%</b>	Broken/Fractured (23038-001,Qty:1), Cracked/Fractured (20609-000,Qty:4)
Bir	nding/Sticking	5.40	3.3%	Sticky (23038-005,Qty:1)
Uni	nown		22.04	Unknown (20609-000, Qty:1) (23038-001, Qty:1)

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Dart 7	Failure	Now	Fail	Data
	Allure Aode/Mach	Norm Dist.	Dist.	
	plenoid (continued) nown (continued)			
UNKI	iown (continued)			(23038-001,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1)
Indu	uced		2.5%	Caused By Other Dev. (23038-001,Qty:1)
	ar (<%5) Stuck Closed		13.3% 2.7%	Stuck Closed (20609-000,Qty:8)
1	Incorrect Voltage		2.5%	Incorrect Voltage (23038-001,Qty:1)
c	Dut of Spec.		2.0%	Out of Specification (20609-000,Qty:6)
c	Out of Adjustment		2.0%	Out of Adjustment (20609-000,Qty:6)
9	purious/False Operation		1.4%	False Response (20609-000,Qty:4)
s	tuck Open		1.0%	Stuck Open (20609-000,Qty:3)
S	eized		1.0%	Seized (20609-000,Qty:3)
N	loisy		0.7%	Noisy (20609-000,Qty:2)
	olid State of Spec.	62 5 <b>8</b>	50.08	Sources:3 Out of Specification (20609-000,Qty:1)
Open				Open (23038-005, Qty:1)
-	able Operation			Unstabled (23038-005,Qty:1)
	oded			Corroded (23038-005,Qty:1)
Unkn				Unknown (23038-005, Qty:2)
Indu	ced			Operating Temperatures Exceeding Thyristor Rating (22540-000,NR), Transients from the Switched Load (22540-000,NR), Steeply Rising Load Voltages (22540-000,NR)
Oth <b>e</b> F	r atigue		0.0% NR	Mechani cal Fatigue due to Thermal Cycling (22540-000,NR)
	itchgear ious/False Operation	66.3%	57.0%	Sources:1 Catastrophic-Spurious Operation (18175-000,57.0%)
Degr	aded Operation			Degraded (18175-000,29.0%)
Unkn	own		14.0%	Unknown (18175-000,14.0%)
	me Delay			Sources:1
-	ious/False Operation			False Response (20609-000,Qty:4)
NO O	peration	33.38	53.34	<pre>Stuck Closed (20609-000, Qty:1), No Operation (20609-000, Qty:2)</pre>
Degr	aded Operation	11.18	11.14	Degraded (20609-000, Gty:1)
Out	of Adjustment	11.14	11.18	Out of Adjustment (20609-000,Qty:1)

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-176 art	Failure Distribution Summ	Norm	Fail	Data
esc.	Mode/Mech	Dist.	Dist.	Source(s)/Details
	Time Delay,Protective Control purious/False Operation	66.7%	60.0%	Sources:1 Catastrophic-Spurious Operation (18175-000,60.0%)
De	graded Operation	33.3%	30.0%	Degraded (18175-000,30.0%)
Un	known		10.0%	Unknown (18175-000,10.0%)
laciet	or, Alumina, Ceramic			Sources:1
	bened	66.3%	66.3%	Open-Electrical Overstress (25027-000,Qty:53)
Ch	ange in Value	33.8%	33.8%	Change in Value-Electrical Overstress (25027-000,Qty:27)
	or,Fixed (Summary)	51.0%		
-	ened tft	29.1%		
	ange in Resistance	7.08		
	roken	5.4%		
	orted	4.0%		
Me	chanical Failure	3.24		
	or,Fixed mened	77.28	59.4%	Sources:8 High 2 (24991-000,90.0%), Open (17867-000,Qty:1)
				(17867-000,Qty:1) (17867-000,Qty:4) (24417-001,NR) (24992-000,80.0%) (24992-000,100.0%), Open-Electrical Overstress (25027-000,Qty:1), Intermittent Open-Bound Open Due To Contamination (10722-000,Qty:1), Opened-Workmanship Flaw (10722-000,Qty:1), Open-External Overstress (10722-000,Qty:1), Electrically Open (10722-000,Qty:11), Wirewound: Open circuit (24997-000,60.0%)
Ch	ange in Resistance	9.9%	7.6%	Out Of Tolerance (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:3), Resistor Net Value Snift-Dent In Met/Film Resistor (10722-000,Qty:3), Decrease in Resistance-Overstress (10722-000,Qty:1), Composition:Resistance change (24997-000,NR), Films: Resistance change (24997-000,NR), Wirewound: Resistance change (24997-000,20.0%)
Br	oken	5.9%	4.5%	Broken (25464-000,Qty:202)
Sh	orted	5.2%	4.0%	Low Z (24991-000,10.0%), Short (17867-000,Qty:1) (17867-000,Qty:2) (24417-001,NR) (24992-000,10.0%), Wirewound: Shorts (24997-000,10.0%)
Me	chanical Failure	1.9%	1.4%	Wirewound: Mech. fail & other (24997-000,10.0%)
In	lduced		10.2%	Performance Variatio (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:2) (17867-000,Qty:3), Burned (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:2), Wrong Value (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1), Add Limit Resistor (17867-000,Qty:1), Reselect (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:2), Weak/Low Performance (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:3), Offset (17867-000,Qty:1), Wrong Part (17867-000,Qty:1) (17867-000,Qty:1), Composition:Quality defects

FMD-	-91			Failure Distribution Summaries	3-177
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	or,Fixed (continued) hnown		9.28	Unknown (17867-000,Qty:1) (17867-000,Qty:1) (25464-000,Qty:397)	<u> </u>
Ot	her (<%2) Connection Failure			Detachment Of Lead-In Pins At Internal Resistor (10722-000,Qty:1)	
	Lead Damage		0.7%	Lead Fracture-Board Flexing During Vibration (10722-000,Qty:1)	
	Drift		U.5%	Drift (24992-000,5.0%), Fails to Tune or Drifts (25464-000,Qty:2), Fluctuates, Unstable or Errati (25464-000,Qty:6)	
	Binding/Sticking		0.5%	Binding Stuck or Jammed (25464-000,Qty:21)	
	Leaking		0.4%	Leak (24992-000,5.0%)	
	Intermittent Operation		0.3%	Intermittent (17867-000,Qty:1) (17867-000,Qty:1)	
	Cracked/Fractured		0.2%	Cracked (25464-000,Qty:7)	
	Loose		0.1%	Loose Solder Connect (17867-000,Qty:1)	
	Noisy		0.1%	Noisy (17867-000,Qty:1)	
	Burst/Ruptured		<0.1%	Burst or Ruptured (25464-000,Qty:2)	
	Change in Capac.		<0.1%	Capacitance Incorrect (25464-000,Qty:2)	
	High Volt. or Standing Wave	l	<0.1%	High Voltage or Standing Wave (25464-000,Qty:1)	
	Change in Value		NR	Radical Departure from Initial Characteristics (24417-001,NR)	

Resistor, Fixed, Carbon & Metal Film Opened	80.0%	Sources:1 80.0% Open Circuits (24993-000,80.0%)
Contaminated	20.0%	20.0% Change Of Value (24993-000,20.0%)

Resistor, Fixed, Carbon Film Drift	51.1% 49.5	Sources:1 Parameter Drift-Intermittent (25000-000,Qty:1), Parameter Drift-Delta R (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:5) (25000-000,Qty:13) (25000-000,Qty:19) (25000-000,Qty:50), Parameter Drift-Insulation Resistance (25000-000,Qty:2)
Opened	48.98 47.49	Open-General (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:84)
Unknown	3.14	Unknown (25000-000, Qty:6)

art	Failure	Norm	Fail	Data
	Mode/Mech			Source(s)/Details
	or,Fixed,Composition ift	57.0%	47.61	Sources:9 Parameter Drift-Delta R (25000-000,Qty:3) (25000-000,Qty:6) (25000-000,Qty:25) (25000-000,Qty:32) (25000-000,Qty:45) (25000-000,Qty:114) (25000-000,Qty:471), Drift (24990-000,50.0%) (24994-000,75.0%), Change Of Value (24993-000,95.0%), Change Of Value -output spec- (24997-000,92.0%)
Op	ened	26.54	22.1	Open (24990-000,50.0%) (24994-000,25.0%) (25000-000,Qty:201) (25016-000,NR), Open-Intermittent or Noisy (25000-000,Qty:12), High Z (24991-000,80.0%), Open Circuit (24997-000,1.0%)
Мо	isture Intrusion	6.7%	5.6%	Moisture Intrusion (25038-000,45.0%)
Br	oken	6.0%	5.0%	Broken (25027-000,Qty:1) (25027-000,Qty:1)
Le	ad Defects	3.78	3.1%	Lead defects (25038-000,25.0%)
In	duced		7.5%	Burned (25027-000, Qty:1) (25027-000, Qty:2)
Un	known	****	1.8%	Unknown (24993-000,5.0%) (25000-000,Qty:92)
Oti	her (<%4) Shorted		7.2 <b>%</b> 2.6%	Short (24994-000,NR) (25000-000,Qty:8), Low Z (24991-000,20.0%)
	Contaminated		1.9%	Contaminated (25038-000,15.0%)
	Non-uniform Resistance Ma	aterial	1.9%	Non-uniform Comp. Material (25038-000,15.0%)
	Electrical Noise		0.9%	Electrical noise (24997-000,7.0%)
	Change in Resistance		NR	Decreased Resistance-with life (25016-000,NR)
	or,Fixed,Film ened	52.2%	51.2%	Sources:7 Open-Defect in Film Path (25016-000,NR), Open (24990-000,50.0%) (25027-000,Qty:1) (25027-000,Qty:1) (25027-000,Qty:1), High Z (24991-000,81.0%), Open-Tear In The Foil Interconnect Ribbon (10722-000,Qty:1)
Dr	ift	31.8%	31.24	Drift (24990-000,50.0%), Resistance High-Traces Of Chlorine Found Inside (10722-000,Qty:3), Moisture Ingression (25038-000,31.0%)
Fi.	lm Imperfections	5,1%	5.0%	Film Imperfections (25038-000,25.0%)
Sul	bstrate Defects	5.1%	5.0%	Substrate defects (25038-000,25.0%)
Sh	orted	3.94	3.84	Low Z (24991-000,19.0%)
Lea	ad Damage	1.94	1.9%	Lead termination (25038-000,9.5%)
Ind	duced		1.9%	Film Material Damage (25038-000,9.5%)
Oti	her Change in Resistance		0.0% NR	Increase in Resistance-Unstable Film (25016-000,NR), Change in resistance values (24997-000,NR)
	Intermittent Operation		NR	Intermittent or open circuit (24997-000, NR)
	Load Defects		ND	Lead failure (24997-000, NR)

				Failure Distribution Summaries 3-1
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	or, Fixed, Film, Metal lift	4C.0%	40.0	Sources:2 Drift (24994-000,80.0%)
Cha	ange in Resistance	31.8%	31.8%	Change In Value-Silver Particle Bridging Kerf (10722-000,Qty:1), High Out Of Spec Resistance-Cracked Path (10722-000,Qty:1), Resistance Shift (10722-000,Qty:2), Erratic Increase In Resistance (10722-000,Qty:1), Increased In Value (10722-000,Qty:1), Resistance Shifted High (10722-000,Qty:1)
Ope	ned	28.24	28.2%	Open (24994-000,20.0%), Open-Chemical Corrosion (10722-000,Qty:1), Opened-Mechanical Damage/Overstress (10722-000,Qty:1), Intermittent Open-Solder Joint (10722-000,Qty:1), Open-Chlorine Contamination (10722-000,Qty:1)
Oth	er Shorted		0.0% NR	Short (24994-000,NR)
	r,Fixed,Wire Wound aned	50.0%	48.8%	Sources:5 Open (24990-000,90.0%) (24992-000,33.3%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:6) (25000-000,Qty:10) (25000-000,Qty:14) (25000-000,Qty:36), Open-Nichrome Wire Broke At Nickel Tab Weld (10722-000,Qty:1)
Dri	ft	20.3%	19.8%	Parameter Drift-Insulation Resistance (25000-000, Qty:1) (25000-000, Qty:5) (25000-000, Qty:87), Parameter Drift-Delta R (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:2) (25000-000, Qty:2) (25000-000, Qty:5) (25000-000, Qty:6) (25000-000, Qty:7) (25000-000, Qty:8) (25000-000, Qty:9) (25000-000, Qty:9) (25000-000, Qty:8) (25000-000, Qty:10) (25000-000, Qty:20) (25000-000, Qty:22) (25000-000, Qty:29), Drift (24992-000, 33.3%)
Wir	e Failure	10.7%	10.4%	Wire Imperfection (25038-000,10.0%) (25038-000,22.0%), Wire Insulation Flow (25038-000,20.0%)
Sho	rted	6.9%	6.8%	<pre>Short+ Dielectric Strength (25000-000,Qty:2), Short- Short (25000-000,Qty:1) (25000-000,Qty:1), Short (24990-000,10.0%) (24992-000,16.7%), Intrawinding Insulation Breakdown (25038-000,6.0%)</pre>
Cor	roded	6.6%	6.4%	Corrosion (25038-000,10.0%) (25038-000,22.0%)
Mec	hanical Failure	3.4%	3.3%	Mecnanical (24992-000,16.7%)
Lea	d Defects	2.18	2.0%	Lead Pefects (25038~000,10.0%)
Unk	nown		0.8%	Unknown (25000-000, Qty:6) (25000-000, Qty:9)
	er (<%3) Mechanical Damage		1.6%	Mechanical Damage (25000-000,Qty:1) (25000-000,Qty:8) (25000-000,Qty:10)
1	Seal Failure		0.34	Seal Leakage (25000-000,Qty:6)

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Part	Failure	Norm	Fail	Data
Desc.		Dist.	Dist.	Source(s)/Details
	or,Fixed,Wire Wound,Power ened	57.5*	57.5%	Sources:5 Open-Bad Weld (25016-000,NR), Open-Corrusion of the Resistance Wire (25016-000,NR), High Z (24991-000,81.0%), Open (24994-000,20.0%), Open Circuit (24996-000,60.0%) (24997-000,60.0%)
Dr.	i žt	25.0%	25.0%	Change in Resistance -excessive with life- (25016-000,NR), Drift (24994-000,80.0%), Excessive Resistance Change (24997-000,20.0%)
Me	chanical Failure	10,0%	10.0%	Mechanical Failure and Other (24996-000,20.0%), Mechanical failure and other (24997-000,20.0%)
Ch	ange in Resistance	5.0%	5.0%	Excessive Resistance Change (24996-000,20.0%)
Sh	orted	2.5%	2.5%	Low Z (24991-000,9.0%), Short (24994-000,NR)
	or,Fixed,Wire Wound,Precision ened		50.5%	Sources:3 Open-Bad Welds (25016-000,NR), High Z (24991-000,71.0%), Open (24994-000,30.0%)
Dr	ift	32.5%	32.5%	Drift (24994-000,65.0%)
Sh	orted	17.0%	17.0%	Low Z (24991-000,29.0%), Shore (24994-000,5.0%)
Oti	her Change in Resistance		0.0% NR	Change in Resistance-Unstable Wire (25016-900,NR), Change in Resistance-Poor Processing (25016-000,NR), Change in Resist-Partial Short From Bad Wire Insul (25016-000,NR)
	or, Network ened	75.0%	61.4%	Sources:2 Open (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:4), High Resistance Or Open In 7 Resistors Of Network (10722-000,Qty:1), Solder Joint Failed-Gold Embrittlement (10722-000,Qty:1)
Bro	oken	9.7%	8.0%	Broken/Damaged (17867-000,Qty:1) (17867-000,Qty:1) (17867-300,Qty:1) (17867-000,Qty:3), Broked/Damaged (17867-000,Qty:1)
Int	termittent Operation	8.3%	6.8%	Intremittent (17867-000,Qty:1), Intermittent (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1)
Sho	orted	6.9%	5.78	Short (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:3)
Ind	duced		15.9%	Performance Variatio (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:1) (17867-000,Qty:2) (17867-000,Qty:4), Weak/Low Ferformance (17867-000,Qty:1) (17867-000,Qty:1)
Unk	known		2.3	Unknown (17867-000,Qty:1) (17867-000,Qty:1)

TATP-	MD-91 Failure Distribution Summaries				
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	-
	or, Thermistor ened	53.7%	52.4%	Sources:5 High Z (24991-000,67.0%), Open (24992-000,50.0%) (24994-000,30.0%), Open Circuits (24993-000,95.0%), Lead Termination Defect (25038-000,20.0%)	<del></del>
Dr	-ift	18.5%	18.04	Drift (24992-000,25.0%) (24994-000,63.0%)	
Sł	orted	12.98	12.64	Low Z (24991-000,33.0%), Short (24992-000,25.0%) (24994-000,5.0%)	
Mo	isture Intrusion	6.6%	6.44	Moissture Intrusion (25038-000,32.0%)	
Me	chanical Failure	6.24	6.0%	Body Anomalies (25038-000,30.0%)	
No	n-uniform Resistance Materia	1 2.28	2.1%	Non-uniform Resistance Material (25038-000,10.5%)	
Ur	iknown		2.5	Unknown (24993-000,5.0%) (24994-000,NR) (25038-000,7.5%)	
	or,Trimpot,Carbon Film gh Contact Resistance	100.0%	100.0%	Sources:1 High 2 (24991-060,100.0%)	
Ot	her Shorted		0.05 NR	Low Z (24991-000, NR)	
In Dr Hi Sp Sb	wened itermittent Operation iff .gh Contact Resistance ourious/False Operation iorted chanical Failure	51.3% 12.0% 9.2% 8.7% 8.6% 6.1% 4.0%			
	or, Variable wened	57.3%		Sources:3 Open-Open Element.s (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3), Open-Open Wiper (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:5) (25000-000,Qty:23) (25000-000,Qty:25), Open-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:5) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:10) (25000-000,Qty:11) (25000-000,Qty:5) (25000-000,Qty:19) (25000-000,Qty:19) (25000-000,Qty:23) (25000-000,Qty:2), Open (24990-000,40.0%), Open Condition-Mechanical Overstress (10722-000,Qty:6)	
In	termittent Operation	23.3*	23.2%	<pre>Intermittent (24990-000, 60.0%) (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:2) (25000-000, Qty:13) (25000-000, Qty:17), Intermittent-Noise (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:2) (25000-000, Qty:2) (25000-000, Qty:3) (25000-000, Qty:3) (25000-000, Qty:6) (25000-000, Qty:7) (25000-000, Qty:16)</pre>	
Dr	ift	13.9	13.84	Parameter Drift-Delta R (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:6) (25000-000,Qty:7) (25000-000,Qty:9) (25000-000,Qty:1) (25000-000,Qty:14) (25000-000,Qty:18), Parameter Drift-Insulation Resistance (25000-000,Qty:1)	L)

Part -	Failure	Norm	Fail	Data
	Mode/Mech	Dist.	Dist.	Source(s)/Details
	or, Variable (continued)			
Dr	ift (continued)			(25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:10)
				(25000-000, Qty:33), Parameter Drift-High Contact Resistance
				(25000-000, Qty:4), Parameter Drift-General
				(25000-000,Qty:37) (25000-000,Qty:164)
Se	al Failure	3.1%	3.1%	Seal Leakage (25000-000,Qty:1) (25000-000,Qty:2)
				(25000-000, Qty: 71)
Sh	orted	1.5%	1.5%	Short-Short Elements (25000-000,Qty:6), Short-Dielectric
				Strength (25000-000, Qty:1) (25000-000, Qty:2), Short
				(25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:6) (25000-000,Qty:14)
Me	chanical Damage	0.8%	0.8%	Machanical Damage (25000-000, Qty:1) (25000-000, Qty:1)
				(25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:4)
Un	known	يى بى بى بى ب	0.4%	Unknown (25000-000,gty:1) (25000-000,gty:4) (25000-000,gty:5)
				(25000-000, QCY:5)
	or, Variable, Composition			Sources:3
Spi	urious/False Operation	33.34	31.74	Erratic Operation (24993-000,95.0%)
0p	ened	18.6%	17.78	High Z (24991-000,53.0%)
	nh Control Bandatanat	16.04	16.04	Company - 125038-000 48 08
MI	gh Contact Resistance	10.04	10.04	Corresion (25038-000,48.0%)
Sh	orted	16.5%	15.7%	Low Z (24991-000,47.0%)
Mo	isture Intrusion	9.84	9.34	Moisture Intrusion (25038-000,28.0%)
Wij	per Movement	3.0%	2.84	Wiper Movement (25038-000, 8.5%)
Bi	nding/Sticking	2.14	2.0%	Binding, Jamming (25038-000,6.0%)
In	duced	<b>مە ھە ئار دە ھا</b>	1.5%	Burnout of Resistive Element (25038-000,4.5%)
Oti	her (<\$3)		3.34	
	Insulation Failure		1.78	Insulation Failure (24993-000,5.0%)
	Connection Failure		1.74	Terminal Defect (25038-000,5.0%)
	or, Variable, Potentioneter	67 04	£7 04	Sources:1
	gh Contact Resistance			High Z (24991-000,67.0%)
Sh	orted .	33.0%	33.04	Low Z (24991-000,33.0%)
	or, Variable, Trimmer			Sources:1
	aned	56.8%	46.0%	Open Circuit (24997-000,46.0%)
Me	chanical Failure	28.44	23.0	Machanica) failure (24997-000,23.0%)
Dr:	ift	14.8%	12.0%	Parameter Change (24997-000,12.0%)

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<sup>7</sup> MD-91				Failure Distribution Summaries	
	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
Resistor, Variable, Wire Wound Opened 52.7		52.74	46.1%	Sources:4 High Z (24991-000,61.0%), Open Circuits (24993-000,40.0%), Open (24417-001,NR)	
Spu	rious/False Operation	21.04	18.3%	Erratic Operation (24993-000,55.0%)	
Cor	ntaminated	13.0%	11.4%	Contamination (24417-001,NR) (25038-000,25.0%), Contamination Bridging (25038-000,6.5%)	
Jan	med/Stuck	7.0%	6.21	Jamming of Lead Screw Assembly (24417-001,NR), Jamming, Stripping (25030-000,17.0%)	
Ins	mulation Failure	6.24	5.44	Insulation Breakdown (25038-000,15.0%)	
	ner (<45) Noisy	*=====	12.5 <b>%</b> 3.4%	Noise (25038-000,9.5%)	
	Worn		3.4%	Slider Wear (24417-001,NR), Wiper Arm Wear (25038-000,9.5%)	
	Seal/Gasket Failure		3.4%	Seal Defects (25038-000,9.5%)	
	Change in Value		1.78	Change of Value (24993-000,5.0%), Radical Departure from Initial Characteristics (24417-001,NR)	
	Breakdown to Earth		0.5%	Catastrophic-Breakdown To Earth-Inter (24991-000,1.0%)	
	Reduced Cross Sect. Area		NR	Reduced Cross Sectional Area (24417-001, NR)	
	Stripped		NR	Stripping of Threads of Lead Screw Assembly (24417-001,NR)	
	Shorted		NR	Short (24417-001,NR)	

Resistor, Variable, Wire Wound, P Opened		Sources:1 70.0% Open Circuits (24993-000,70.0%)
Excessive Noise	26.3	25.0% Excessive Noise (24993-000,25.0%)
Unknow		5.0% Unknown (24993-000,5.0%)

Resistor, Varistor	Sources:1
Opened	100.0% 95.0% Open Circuits (24993-000,95.0%)
Unknown	5.0% Unknown (24993-000,5.0%)

Resolver, Rotor Opened

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Sources:1 100.0% 100.0% Phase 32X Magnet Wire Open-Mechanical Overstress (10722-000,Qty:1), Open Windings (10722-000,Qty:3), Open-Magnet Wire Overstress/Fractured Ext Low Pad (10722-000,Qty:1)

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Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	er,Servomechanism known		<0.1	Sourcea:1 Unknown (24417-001,NR)
	er,Starter ortæd	50.0%	50.0%	Sources:1 Short-Tensile Fracture (10722-000,Qty:2), Core Short-Reuse Of Previously Wound Core (10722-000,Qty:1)
Op	ened	50.0%	50.0%	Open-Fatigue Fracture (10722-000,Qty:1) (10722-000,Qty:1), Open Magnet Wire At Slot 73-Mechanical Overstress (10722-000,Qty:1)
Retain Lo	er ose	77.3%	65.4%	Sources:1 Loose (25101-000,Qty:2) (25101-000,Qty:3) (25101-000,Qty:6), Loose Screw(s) - Loose (25101-000,Qty:1), Out Of Adjustment - Loose (25101-000,Qty:1), Vibration - Loose (25101-000,Qty:1) (25101-000,Qty:2), Loose Screw(s) - Excessive Play (25101-000,Qty:1)
Ex	cessive Play	22.7	19.2%	Excessive Play (25101-000,Qty:5)
In	duced		15.4%	<pre>Improper Installation - Loose (25101-000,Qty:3), Improper Maintenance - Loose (25101-000,Qty:1)</pre>
	er Piston Assy rroded	100.0%	100.0%	Sources:1 Corroded-Broken/Damaged (25101-000,Qty:1)
	er,Optical El duced		100.0%	Sources:1 Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1)
Reticl In	e duced		100.0%	Sources:1 Lack Of Maintenance (25101-000,Qty:1)
Retrac Br	tor øken	50.0%	40.0%	Sources:1 Broken/Damaged (25101-000,Qty:2)
Ag	ed/Deteriorated	50.0%	40.0%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:2)
Un	known	<b>.</b>	20.0%	Unknown (25191-000,Qty:1)
Ring Lo	C <b>3</b> 0	75.0%	60.0%	Sources:1 Loose Screw(s) - Loose (25101-000, Qty:1), Loose Screw(s) - Excessive Play (25101-000, Qty:1), Loose Bolt(s) - Excessive Play (25101-000, Qty:1)
Ou	t of Adjustment	25.04	20.01	Out Of Adjustment - Inaccurate (25101-000,Qty:1)
				Improper Installation - Inop/Unserviceable

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FMD-91			Failure Distribution Summaries 3-1
Part Failure Desc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Ring Yoke Assembly Loose	100.0%	100.0%	Sources:1 Worn - Loose (25101-000,Qty:1)
Ring,Retaining Broken	47.4%	16.1%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1), Broken/Separated-Misfire (25101-000,Qty:1), Broken/Separated-Missing (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:3)
Loose	31.6%	10.7%	Out Of Adjustment - Loose (25101-000,Qty:6)
Worn	10.5%	3.6%	Worn Out (25101-000,Qty:1), Worn - Inop Man Traverse (25101-000,Qty:1)
Binding/Sticking	5.3%	1.8%	Loose Screw(s) - Binding/Sticking (25101-000,Qty:1)
Aged/Deteriorated	5.3%	1.8%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
Induced		64.3%	<pre>Improper Maintenance - Loose (25101-000,Qty:1), Improper Install - Inop/Sluggish Breech (25101-000,Qty:1), Item Abuse/Neglect - Missing (25101-000,Qty:1), Stolen - Missing (25101-000,Qty:1) (25101-000,Qty:1), Missing (25101-000,Qty:2) (25101-000,Qty:4), Fell Off Or Lost - Missing (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:3) (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Fell Off Or Lost - Fnd In TI/PMCS/INSP (25101-000,Qty:1) (25101-000,Qty:1), Improper Maintenance - Missing (25101-000,Qty:1) (25101-000,Qty:2)</pre>
Unknown		1.8%	Unknown (25101-000, Qty:1)
ing,Slip Opened	100.0%	100.0%	Sources:1 Wire Pulled Loose During The Strip & Tin Operation (10722-000,Qty:2), Open Circuits-Intergranular Cracking (10722-000,Qty:1)
ing,Stop Out of Adjustment	100.0%	100.0%	Sources:1 Out Of Adjustment - Inaccurate (25101-000,Qty:1)
ivet,Solid Loose	100.0%	66.7%	Sources:1 Loose (25101-000,Qty:2), Loose Screw(s) - Missing (25101-000,Qty:1), Worn - Loose (25101-000,Qty:1)
Unknown		33.3%	Unknown (25101-000, Qty:2)
od Broken	80.0%	72.7%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:5)
Loose	10.0%	9.1%	Part Missing/Loose - Fnd In TI/PMCS/INSP (25101-000,Qty:1)
Aged/Deteriorated	10.0%	9.1%	Deteriorated/Aged - Internal Moisture (25101-000,Qty:1)
Induced		9.1%	Fell Off Or Lost - Missing (25101-000, gty:1)

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art	Failure	Norm	Fail	Data
	Mode/Mach			Source(s)/Details
oller Lo	030	40.0%	28.64	Sources:1 No Failure - Loose (25101-000,Qty:1), Worn - Loose (25101-000,Qty:1)
Br	oken	40.0%	28.6%	Broken/Damaged (25101-000,Qty:2)
Ag	ed/Deteriorated	20.0%	14.3%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
In	duced		28.6%	Cannibalization-Missing (25101-000,Qty:1), Lack Of Lubrication - Missing (25101-000,Qty:1)
	Assembly shing Failure	29.24	22.64	Sources:1 Worn Bushing - Worn Out (25101-000,Qty:1) (25101-000,Qty:2), Worn Bushing - Loose (25101-000,Qty:2), Worn Bushing - Excessive Play (25101-000,Qty:1) (25101-000,Qty:1)
Cr	acked/Fractured	25.0%	19.4%	Cracked (25101-000,Qty:1), Cracked/Split-Broken/Damaged (25101-00C,Qty:4), Operator Error - Cracked (25101-000,Qty:1)
Br	oken	16.7%	12.9%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2)
Wo	rn	12.5%	9.78	Worn Out (25101-000,Qty:2), Worn Track Pad(s) (25101-000,Qty:1)
Ag	ed/Deteriorated	8.34	6.5%	Deteriorated/Aged - Deteriorated (25101-000,Qty:1), Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1)
Cu	t/Scarred/Punctured	4.2*	3.24	Cut/Scarred (25101-000,Qty:1)
Ex	cessive Play	4.2*	3.24	Excessive Play (25101-000, Qty:1)
Ind	duced		12.9%	Item Abuse/Neglect - Missing (25101-000,Qty:1), Operator Error - Broken/Damaged (25101-000,Qty:1), Caused By Other Failure-Collapsed/Bent (25101-000,Qty:1), Lack Of Lubrication - Worn Out (25101-000,Qty:1)
Un	known		9.78	Unknown (25101-000,Qty:1) (25101-000,Qty:2)
	Univers Assy cessive Play	100.0%	100.0%	Sources:1 Worn - Excessive Play (25101-000,Qty:1) (25101-000,Qty:1)
	Harness Assy gnal Path Leakage	100.0%	100.0%	Sources:1 Signal Path Leakage-Solder Flux In Connector P4 (10722-000,Qty:1)
-	Switch graded Output	52.6*	50.0%	Sources:4 Bad Output (25027-000,Qty:1)
Cor	ntact Failure	47.4	45.0%	Intermittent Contact (24993-000,90.0%), Intermittent Contact or Variable Contact Res. (24996-000,NR)
Uni	cnown		5.0%	Unknown (24993-000,10.0%)
Oth	er Mechanical Failure	****	0.04 NR	Mechanical Failure (24996-000,NR), Mechanical failure

	MD-91 Failure Distribution Summaries 3-					
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details		
	Switch (continued)	<u>-</u>		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Ot	her (continued)			(24997-000, NR)		
	Opened		NR	Open Circuit (24996-000, NR) (24997-000, NR)		
	Shorted		NR	Short (24996-000, NR) (24997-000, NR)		
	Intermittent Operation		NR	Intermittent contact or variable contact resist. (24997-000,NR)		
	ng Head Assy ose	33.34	25.04	Sources:1 Internal Failure - Loose (25101-000,Qty:1) (25101-000,Qty:1), Worn - Loose (25101-000,Qty:1)		
Ex	cessive Play	33.34	25.04	Internal Failure - Excessive Play (25101-000,Qty:3)		
	t of Synch.	11.1.		Out Of Synch (25101-000,Qty:1)		
Br	oken	11.14	8.34	Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:1)		
St	ripped	11.1%	8.3%	Worn/Stripped - Inop/Unserviceable (25101-000,Qty:1)		
Un	known		25.0%	Unknown (25101-000, Qty:1) (25101-000, Qty:2)		
	Diopter t of Adjustment	100.0%	100.0%	Sources:1 Out Of Adjustment - Inop/Unserviceable (25101-000,Qty:1)		
crew. Lo	O <b>se</b>	66.7%	50.0%	Sources:1 Loose Screw - Inop/Unserviceable (25101-000,Qty:1), Vibration - Loose (25101-000,Qty:1)		
Wo	rn	33.3%	25.0%	Worn - Inop/Unserviceable (25101-000,Qty:1)		
In	duced		25.0%	Vibration - Missing (25101-000,Qty:1)		
crew, Lo	Cap ose	46.4%	30.2%	Sources:1 Vibration - Loose (25101-000, Cty:1) (25101-000, Qty:1), Part Missing/Loose - Missing (25101-000, Qty:1), Loose Bolt(s) (25101-000, Qty:5), Loose Bolt(s) - Leaking Fluid (25101-000, Qty:1), Loose Bolt(s) - Missing (25101-000, Qty:1), Loose Bolt(s) - Loose Bolt(s) (25101-000, Qty:1), Vibration - Loose Screw(s) (25101-000, Qty:2)		
Br	oken	35.74	23.3%	<pre>Part Struck/Damaged - Fnd In TI/PMSC/INSP (25101-000,Qty:1), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1), (25101-000,Qty:1), Broken Bolt(s) (25101-000,Qty:1), Vibration - Broken/Damaged (25101-000,Qty:2), Broken/Separated - Broken Bolt(s) (25101-000,Qty:1), Broken/Separated - Broken/Damaged (25101-000,Qty:1)</pre>		
Le	aking Fluid	7.18	4.78	Vibration - Leaking Fluid (25101-000,Qty:2)		
Out	t of Adjustment	3.6%	2.34	Loose Bolt(s) - Out Of Adjustment (25101-000, Qty:1)		
54.	nding/Sticking	3.64	2.3	Binding/Sticking (25101-000,Qty:1)		

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and Marcal Marcan	N		
art Failure eac. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
crew,Cap (continued) Excessive Vibratio	n <b>3.6</b> %	2.34	Vibration - Inaccurate (25101-000,Qty:1)
Induced		34.94	<pre>Item Abuse/Neglect - Missing (25101-000,Qty:1), Wrong Part - Found In TI/PMCS/Insp (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:1) (25101-000,Qty:2), Lack Of Maintenance - Loose (25101-000,Qty:1) (25101-000,Qty:1), Improper Installation - Loose (25101-000,Qty:1), Lack Of Maintenance - Loose Bolt(s) (25101-000,Qty:1), Lack Of Maintenance - Stripped (25101-000,Qty:1), Lack Of Maintenance - Leaking Fluid (25101-000,Qty:1), Vitration - Missing (25101-000,Qty:2), Wrong Part - Missing (25101-000,Qty:1), Improper Installation - Stripped (25101-000,Qty:1)</pre>
crew, Cap, Socket Broken	50.0%	2.1*	Sources:1 Broken Bolt(s) (25101-000,Qty:1) (25101-000,Qty:1)
Loose	25.0%	1.14	Worn - Loose (25101-000, 2ty:1)
Excessive Vibratio	25.0%	1.14	Vibration - Fnd In TI/PMSC/INSP (25101-000,Qty:1)
Unknown		92.64	Unknown (25101-000, Qty:1) (25101-000, Qty:87)
Induced		3.2%	Overtorqued - Broken Bolt(s) (25101-000,Qty:1), Overtorqued - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1)
crew, Cap, Socket, Head Broken	66.7%	20.0%	Sources:1 Broken Bolt(s) (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:1)
Loose	33.3%	10.0%	Loose Screw(s) - Loose (25101-000,Qty:1)
Induced		70.0%	Lack Of Maintenance - Metal On Mag Plug (25101-000,Qty:1), Overtorqued - Broken/Damaged (25101-000,Qty:1), Wrong Part - Loose (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Improper Maintenance - Missing (25101-000,Qty:1), Vibration - Missing (25101-000,Qty:1) (25101-000,Qty:1)
crew,Collimator Out of Adjustment	100.0%	50.0%	Sources:1 Out Of Adjustment - Inop/Unserviceable (25101-000,Qty:1)
Induced		50.0%	Lack Of Maintenance - Binding/Sticking (25101-000,Qty:1)
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Screw, Front Wedge Fractured

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Sources:1 100.0% 100.0% Screw Fractured-Screw Cross Threaded When Inserted (10722-000, gty:1)

rmu-y	MD-91 Failure Distribution Summaries 3					
	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details		
	nsert, Thread ipped	100.0%	50.00	Sources:1 Stripped (25101-000,Qty:1)		
Ind	uced		50.0%	Overtorqued - Loose (25101-000,Qty:1)		
Screw, M Bro		31.64	15.8%	Sources:1 Broken Bolt(s) (25101-000,Qty:1) (25101-000,Qty:2), Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1)		
Loo	Se	21.1*	10.54	Vibration - Loose (25101-000,Qty:1), Loose Bolt(s) - Inop/Unserviceable (25101-000,Qty:1), Out Of Adjustment - Loose (25101-000,Qty:1), Loose Screw(s) - Inop/Unserviceable (25101-000,Qty:1)		
Wor	n	15.84	7 <b>.9</b> %	Worn - Inop/Unserviceable (25101-000,Qty:1), Worn - Inaccurate (25101-000,Qty:1), Worn - Found In TI/PMCS/Insp (25101-000,Qty:1)		
Str	ippad	10.5%	5.3%	Stripped (25101-000,Qty:1) (25101-000,Qty:1)		
Out	of Adjustment	10.5%	5.3%	Out Of Adjustment - Inop/Unserviceable (25101-000,Qty:1), Out Of Adjustment (25101-000,Qty:1)		
Out	of Synch.	10.5%	5.3%	Out Of Synch (25101-000,Qty:1), Vibration - Out Of Synch (25101-000,Qty:1)		
Ind	uced		44.7*	<pre>Missing (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Fell Off Or Lost - Inop/Unserviceable (25101-000,Qty:1), Vibration - Missing (25101-000,Qty:1) (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Improper Maintenance - Internal Moisture (25101-000,Qty:1), Improper Installation - Inaccurate (25101-000,Qty:1), Improper Alignment - Out Of Adjustment (25101-000,Qty:2), Lack Of Maintenance - Loose (25101-000,Qty:1), Wrong Part (25101-000,Qty:1), Lack Of Maintenance - Metal On Mag Plug (25101-000,Qty:1)</pre>		
Othe	er (<%6) Bent/Dented/Warped		5.3% 2.6%	Warped/Bent - Loose (25101-000,Qty:1)		
1	Binding/Sticking			Vibration - Binding/Sticking (25101-000,Qty:1)		
	alf Locking roded	75.0%	42.9%	Sources:1 Corroded-Broken/Damaged (25101-000,Qty:3)		
Brol	(en	25.04	14.34	Broken/Damaged (25101-000,Qty:1)		
Indu	aced		42.94	Overtorqued - Broken/Damaged (25101-000,Qty:2), Vibration - Missing (25101-000,Qty:1)		

Part Failure		Fail	Data
Desc. Mode/Mech	Dist.	Dist.	Source(s)/Details
Screw,Self Tapping Broken	100.0%	100.0%	Sources:1 Broken/Damaged (25101-000,Qty:1)
Screw,Set Out of Adjustment	36.5%	26.8%	Sources:1 Loose Scraw(s) - Out Of Adjustment (25101-000,Qty:1), Out Of Adjustment - Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:1), Out Of Adjustment - Inaccurate (25101-000,Qty:3) (25101-000,Qty:3) (25101-000,Qty:4), Out Of Adjustment - Inop/Unserviceable (25101-000,Qty:1), Out Of Adjustment - Out Of Adjustment (25101-000,Qty:2), Out Of Adjustment - Out Of Synch (25101-000,Qty:3)
Loose	30.8%	22.5*	<pre>Vibration - Loose (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1), Loose Screw(s) - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:1), Loose (25101-000,Qty:1), Loose Screw(s) - Loose (25101-000,Qty:2), Loose Screw(s) - Fnd In TI/PMCS/INSP (25101-000,Qty:1), Loose Screw(s) - Inaccurate (25101-000,Qty:1), Part Missing/Loose - Inaccurate (25101-000,Qty:1), Vibration - Loose Screw(s) (25101-000,Qty:1), Loose Bolt(s) - Inop/Unserviceable (25101-000,Qty:2), Loose Screw(s) - Excessive Play (25101-000,Qty:1)</pre>
Out of Synch.	25.0%	18.3%	Vibration - Out Of Synch (25101-000,Qty:1), Out Of Synch (25101-000,Qty:4) (25101-000,Qty:8)
Broken	7.7%	5.6%	Broken/Damiged (25101-000,Qty:1) (25101-000,Qty:2), Fell Off Or Lost - Broken/Damaged (25101-000,Qty:1)
Induced		14.1*	Fell Off Or Lost - Missing (25101-000, Gty:1) (25101-000, Qty:1), Improper Install - Missing (25101-000, Qty:1), Improper Maintenance - Broken/Damaged (25101-000, Qty:1), Vibration - Missing (25101-000, Qty:1) (25101-000, Qty:1) (25101-000, Qty:1), Caused By Other Failure-Inop/Unserviceable (25101-000, Qty:1), Overtorqued - Broken/Damaged (25101-000, Qty:1), Improper Maintenance - Missing (25101-000, Qty:1)
Unknown		5 <b>.6%</b>	Unknown (25101-000,Qty:4)
Other (<%3) Worn	*=****	7.0% 1.4%	Worn/Stripped ~ Inaccurate (25101-000, Gty:1)
Excessive Vibration		1.4%	Vibration - Inop/Unserviceable (25101-000,Qty:1)
Seized		1.4%	Seized/Frozen - Inop Man Elevation (25101-000,Qty:1)
Corroded		1.4%	Corroded-Seized (25101-000,Qty:1)
Aged/Deteriorated		1.4%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
crew, Shoulder Loose	46.7%		Sources:1 Vibration - Loose (25101-000,Qty:3), Loose Screw(s) - Fire Extinguishers (25101-000,Qty:1), Loose Screw(s) - Out Of Synch (25101-000,Qty:1), Part Struck/Damaged - Loose (25101-000,Qty:1), Vibration - Loose Screw(s) (25101-000,Qty:1)
Aged/Deteriorated	20.0%		Deteriorated/Aged - Broken Damaged (25101-000,Qty:2), Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1)
Broken	13.34	8.3%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1)

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-MD- Part	Failure	N1	Fail	Failure Distribution Summaries 3-19
esc.		Norm Dist.	Dist.	Data Source(s)/Details
	Shoulder (continued) chanical Damage	13.3%	8.3%	Vibration - Broken/Damaged (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:1)
St	ripped	6.7%	4.2%	Stripped (25101-000,Qty:1)
In	duced		37.5%	Caused By Other Fail - Loose (25101-000,Qty:4), Improper Install - Broken/Damaged (25101-000,Qty:1), Improper Maintenance - Stripped (25101-000,Qty:1), Improper Maintenance - Loose (25101-000,Qty:1), Lack Of Maintenance - Broken/Damaged (25101-000,Qty:1), Overtorqued - Binding/Sticking (25101-000,Qty:1)
	Tapping Guced		100.0%	<pre>Sources:1 Missing (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:1), Lack Of Maintenance - Missing (25101-000,Qty:1) (25101-000,Qty:1), Vibration - Missing (25101-000,Qty:1) (25101-000,Qty:1)</pre>
	Thumb oken	33.3%	20.0%	Sources:1 Broken/Damaged (25101-000,Qty:1)
Lo	ose	33.34	20.0%	Loose Screw(s) - Excessive Play (25101-000,Qty:1)
Ag	ed/Deteriorated	33.3%	20.0%	Deteriorated/Aged - Excessive Play (25101-000,Qty:1)
In	duced		40.0%	<pre>Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Vibration - Missing (25101-000,Qty:1)</pre>
Ag Le Cu Wo	Summary) ed/Deteriorated aking t/Scarred/Punctured rn ose	40.6% 35.9% 16.8% 4.2% 2.5%		
eal Le	aking	50.9%	35.7%	Sources:3 Leak (24992-000,100.0%), Leaking (20609-000,Qty:16) (24992-000,39.0%), Leaking Fluid (25101-000,Qty:1)
Cu	t/Scarred/Punctured	23.8%	16.7%	Ripped/Torn/Cut (20609-000,Qty:143)
Ag	ed/Deteriorated	15.9%	11.2%	Deteriorated (20609-000,Qty:79), Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:2), Deteriorated/Aged - Leaking Fluid (25101-000,Qty:1) (25101-000,Qty:1)
Wo	rn	5.9%	4.2	Worn Out (20609-000,Qty:2) (25101-000,Qty:1), Worn - Leaking Grease (25101-000,Qty:1) (25101-000,Qty:1), Worn - Leaking Hydraulic Oil (25101-000,Qty:2), Worn - Leaking Fluid (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1)
Lo	D <b>50</b>	3.5%	2.5%	Loose (25101-000,Qty:4), Part Struck/Damaged - Loose (25101-000,Qty:1)
In	duced		18.6%	Fell Off Or Lost - Missing (25101-000,Qty:4), Improper Installation - Leaking Nitrogen (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:4), Improper Maintenance - Leaking Fluid (25101-000,Qty:1) (25101-000,Qty:2), Improper Maintenance - Loose (25101-000,Qty:1) (25101-000,Qty:21), Improper

t Failure	Norm	Fail	Data
sc. Mode/Mech	Dist.	Dist.	Source(s)/Details
al (continued)			
Induced (continued)			Maintenance (25101-000,Qty:1), Improper Maintenance - Out Of Adjustment (25101-000,Qty:1), Improper Maintenance - Fnd In TI/PMSC/INSP (25101-000,Qty:1)
Unknown		3.5%	Unknown (20609-000,Qty:6) (20609-000,Qty:20) (25101-000,Qty:1)
Other (<\$4) Seal/Gasket Failure		7.78	Seals Worn - Leaking Fluid (25101-000,Qty:3), Seals Worn -
			Leaking Hydraulic Oil (25101-000, Qty:1)
Cracked/Fractured		1.7%	Cracked/Fractured (20609-000,Qty:15)
Bent/Dented/Warped		1.6%	Distorted (20609-000,Qty:1), Warped/Bent - Leaking Fluid (25101-000,Qty:1), Warped/Bent - Collapsed/Bent (25101-000,Qty:1), Warped/Bent - Fnd In TI/PMCS/INSP (25101-000,Qty:1)
Binding/Sticking		1.0%	Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:1)
Broken		0.7%	Broken (20609-000,Qty:2), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Out of Adjustment		0.5%	Out Of Adjustment (25101-000,Qty:1)
Frayed		0.2%	Frayed (20609-000, Qty:2)

Seal, O-Ring	Sources:1	
Aged/Deteriorated	100.0% 90.0% Material Deterioration (24993-000,	90.0%)
Unknown	10.0% Unknown (24993-000,10.0%)	
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Seal,Oil		Sources:1
Aged/Deteriorated	100.0%	85.0% Material Deterioration (24993-000,85.0%)
Unknown		15.0% Unknown (24993-000,15.0%)

Seat Excessive Play	Sources:1 50.0% 50.0% Part Missing/Loose - Excessive Play (25101-000,Qty:1)	
Loose	50.0% 50.0% Loose Screw(s) - Excessive Play (25101-000,Qty:1)	

Seat,Ball Loose	Sources:1 50.0% 33.3% Lonse (25101-000,Qty:1)
Broken	50.0% 33.3% Broken/Damaged (25101~000,Qty:1)
Induced	33.3% Improper Maintenance - Broken/Damaged (25101-000,Qty:i)

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FM.	D-91			Failure Distribution Summaries 3-193
Part Desc		Norm Dist.	Fail Dist.	Data Source(s)/Details
Sens	or (Summary)			un ja van de la seconda de L
	Degraded Output	45.3%		
	Shorted	18.6%		
	Opened No Operation	10.7% 8.9%		
	Intermittent Operation	8.8%		
	Mechanical Failure	7.6%		
Sens	or.			Sources: 3
	Degraded Output	55.6%	52.0%	Output Too High (23038-001,Uty:1), Degraded - Erratic Output (18175-000,19.0%), Degraded - High Output (18175-000,21.0%), Degraded - Low Output (18175-000,16.0%)
	Opened	19.2%	17.9%	Open (24992-000,50.0%) (24992-000,50.0%) (24992-000,61.2%)
	Shorted	11.7%	10.9%	Short (24992-000,8.5%) (24992-000,40.0%) (24992-000,50.0%)
	No Operation	6.4%	6.0%	Catastrophic-No Change/Output With Change/Input (18175-000,18.0%)
	Zero or Maximum Output	3.9%	3.7%	Catastrophic-Zero Or Maximum Output (18175-000,11.0%)
	Leaking	2.0%	1.9%	External Leak (24992-000,16.7%)
	Resistor Failure	1.2%	1.1%	Open, Resistor (24992-000,10.0%)
	Unknown		5.0%	Unknown (18175-000,15.0%)
	Other (<\$2)		1.5%	

Other (<\$2) Chaffed	1.5% 0.9% Chafy (24952-000,8.0%)
Drift	0.4% Drift (24992-000,3.9%)
Closed	0.2% Closed (24992-000,1.7%)

Sensor,Bistables No Operation	79.4%	27.0%	Sources:1 Catastrophic-No Function With Signal (18175-000,27.0%)
Function Without Signal	20.6%	7.0%	Catastrophic-Functioned Without Signal (18175-000,7.0%)
Unknown		54.0%	Unknown (18175-000,54.0%)
Induced		12.0%	Degraded - Functioned At Improper Signal Level (18175-000,6.0%), Degraded - Premature Cr Delayed Action (18175-000,6.0%)

Sensor, Displacement Zero or Maximum Output	73.24	Sources:1 60.0% Catastrophic-Zero Or Maximum Output (18175-000,60.0%)
Degraded Output	26.8%	22.0% Degraded - Erratic Output (18175-000,11.0%), Degraded - High Output (18175-000,11.0%)
Unknown		19.0% Unknown (18175-000,18.0%)

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art	Failure	Norm	Fail	Data
	Mode/Mach			Source(s)/Details
	Flow/Velocity ro or Maximum Output	31.5	17.0	Sources:1 Catastrophic-Zero Or Maximum Output (18175-000,17.0%) (18175-000,17.0%)
Dec	graded Output	27.8%	15.0%	Degraded - Erratic Output (18175-000,4.0%) (18175-000,4.0%), Degraded - High Output (18175-000,6.0%) (18175-000,6.0%), Degraded - Low Output (18175-000,5.0%) (18175-000,5.0%)
No	Operation	24.18	13.0%	Catastrophic-No Change/Output With Change/Input (18175-000,3.0%) (18175-000,3.0%), Catastrophic-No Function With Signal (18175-000,10.0%) (18175-000,10.0%)
Fui	nction Without Signal	16.7%	9.0%	Catastrophic-Functioned Without Signal (18175-000,9.0%) (18175-000,9.C%)
Uni	known		33.0%	Unknown (18175-000,33.0%) (18175-000,33.0%)
Ind	duced		13.04	Degraded - Functioned At Improper Signal Level (18175-000,10.0%) (18175-000,10.0%), Degraded - Intermittent Operation (18175-000,3.0%) (18175-000,3.0%)
•	Flow/Velocity,Process Swi Operation		27.0%	Sources:1 Catastrophic-No Function With Signal (18175-000,27.0%) (18175-000,27.0%)
Fur	nction Without Signal	46.0%	23.0%	Catastrophic-Functioned Without Signal (18175-000,23.0%) (18175-000,23.0%)
Inc	luced		33.0%	Degraded - Functioned At Improper Signal Level (18175-000,25.0%) (18175-000,25.0%), Degraded - Intermittent Operation (18175-000,8.0%) (18175-000,8.0%)
Uni	nown		17.0%	Unknown (18175-000,17.0%) (18175-000,17.0%)
	Flow/Velocity,Transducer o or Maximum Output	61.2%	41.0%	Sources:1 Catastrophic-Zero Or Maximum Output (18175-000,41.0%)
Deg	raded Output	38.8%	26.0%	Degraded - High Output (18175-000,11.0%), Degraded - Low Output (18175-000,15.0%)
Unk	nown		33.0%	Unknown (18175-000,33.0%)
	Flow/Velocity,Transmitter graded Ousput		24.0%	Sources:1 Degraded - Erratic Output (18175-000,7.0%), Degraded - High Output (18175-000,12.0%), Degraded - Low Output (18175-000,5.0%)
Zer	o or Maximum Output	40.8%	20.0%	Catastrophic-Zero Or Maximum Output (18175-000,20.0%)
No	<b>Ope</b> ration	10.2%	5.0%	Catastrophic-No Change/Output With Change/Input (18175-000,5.0%)

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FMD-91			Failure Distribution Summaries 3
Part Fallure Dosc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(m)/Details
Sensor, Heater Shorted	100.0%	100.04	Sources:1 Inter/Intra Winding Shorts (107.2~000,Qty:3)
Sensor,Heauer,Dig Wiro Failure	100.05	100.0%	Sources:1 Open Gensor Wire-Faulty Weld (10722-000,Qty:1)
Sensor, Humidity Degraded Output	50.7%	34.0%	Scorcest1 Degraded - Erratic Gutput (18175-000,27.0%) (18175-000,27.0%), Degraded - High Output (18175-000,2.0%) (18175-000,2.0%), Degraded - Low Output (18175-000,5.0%) (18175-000,5.0%)
No Operation	29 <b>.9%</b>	20.0%	Catastrophic-No Charge/Output With Change/Input (18175-000,20.0%) (18175-000,20.0%)
Zero or Maximum Output	19.4%	13.0%	Catastrophic-Zero Or Maximum Output (16175-000,13.0%) (18175-000,13.0%)
Unknown	*****	33.0%	Unknown (18175-000,33.0%) (18175-000,33.0%)
ensor, Indicating Control No Operation	60.5%	26.08	Sources:1 Catastrophic-No Function With Signal (18175-000,26.0%) (18175-000,26.0%)
Function Without Signal	39,5%	17.0%	Catastrophic-Functioned Without Signal (18175-000,17.0%) (18175-000,17.0%)
Induced		41.0%	Degraded - Functioned At Improper Signal Level (18175-000,6.0%) (18175-000,6.0%), Degraded - Intermittent Operation (18175-000,27.0%) (18175-000,27.0%), Degraded - Controls But Does Not Indicate (18175-000,8.0%) (10175-000,8.0%)
Unknown		16.04	Unknown (18175-000,16.0%) (18175-000,16.0%)
ensor,Level Degraded Output	35.3%	16.4%	Sources:1 Degraded - Erratic Output (18175-000,9.0%), Degraded - High Output (18175-000,4.0%), Degraded - Low Output (18175-000,5.0%)
No Operation	33.38	15.5%	Catastrophic-No Change/Output With Change/Input (18175-000,5.0%), Catastrophic-No Function With Signal (18175-000,12.0%)
Zero or Maximum Output	21.6%	10.0%	Catastrophic-Zero Or Maximum Output (18175-000,11.0%)
Function Without Signal	9.8%	4.5%	Catastrophic-Functioned Without Signal (18175-000,5.0%)
Unknown		29.18	Unknown (18175-000,32.0%)
Induced		24.54	Degraded - Functioned At Improper Signal Level (18175-000,13.0%), Degraded - Intermittent Operation (18175-000,14.0%)

Part Desc.	Failure Mode/Mech	Norm Dist.		Data Source(s)/Details
		······································		
	;Level,Controller Operation	50.0%	25.0%	Sources:1 Catastrophic-No Function With Signal (18175-000,25.0%)
Fu	nction Without Signal	50.0%	25.0%	Catastrophic-Functioned Without Signal (18175-000,25.0%)
In	duced	*****	50.0%	Degraded - Functioned At Improper Signal Level (18175-000,50.0%)
	,Level,Process Switch Inction Without Signal	50.0%	16.54	Sources:1 Catastrophic-Functioned Without Signal (18175-000,3.0%) (18175-000,30.0%)
No	Operation	50.0%	16.5%	Catastrophic-No Change/Output With Change/Input (18175-000,3.0%), Catastrophic-No Function With Signal (18175-000,30.0%)
In	duced		45.5%	Degraded - Functioned At Improper Signal Level (18175-000,34.0%) (18175-000,35.0%), Degraded - Intermittent Operation (18175-000,11.0%) (18175-000,11.0%)
Uni	known	یوند میں میں میں میں میں میں	21.54	Unknown (18175-000,21.0%) (18175-000,22.0%)
	,Level,Transmitter graded Output	44.9%	22.0%	Sources:1 Degraded - Erratic Output (19175-000,11.0%), Degraded - High Output (18175-000,5.0%), Degraded - Low Output (18175-000,6.0%)
Ze:	rc or Maximum Output	36.74	18.04	Catastrophic-Zero Or Maximum Output (18175-000,18.0%)
No	Operation	18.4%	9.0%	Catastrophic-No Change/Output With Change/Input (18175-000,9.0%)
Un)	known		51.0%	Unknown (18175-000, 51.0%)
	,Meteorological graded Output	49.1%	26.0%	Sources:1 Degraded - Erratic Output (18175-000,18.0%), Degraded - High Output (18175-000,4.0%), Degraded - Low Output (18175-000,4.0%)
Zei	ro or Maximum Output	37.7%	20.0%	Catastrophic-Zero Or Maximum Output (18175-000,20.0%)
No	Operation	13.28	7.0%	Catastrophic-No Change/Output With Change/Input (18175-000,7.0%)
Unl	known	22488	47.0%	Unknown (18175-000,47.0%)
	,Power Supply graded Output	51.0%	25.0%	Sources:1 Catastrophic-Excessive Output (18175-000,1.0%), Catastrophic-Failed To Regulate (18175-000,24.0%)
No	Output	49.04	24.08	Catastrophic-No Output (18175-000,24.0%)
Inc	duced		33.04	Degraded - Over Regulated Voltage (18175-000,4.0%), Degraded - Under Regulated Voltage (18175-000,17.0%), Degraded - Excessive Ripple (18175-000,12.0%)
	know		18.04	Unknown (18173-000, 18.0%)

art Failure	Norm	Fail	Data
esc. Mode/Mech			Source(s)/Details
ensor, Power Transducer Degraded Output	86.0%	86.0%	Sources:1 Degraded - Erratic Output (18175-000,17.0%), Degraded - High Output (18175-000,2.0%), Degraded - Low Output (18175-000,67.0%)
Zero or Maximum Output	14.0%	14.0%	Calastrophic-Zero Or Maximum Output (18175-000,14.05)
ensor,Pressure No Operation	84.8%	19.5%	Sources:1 Catastrophic-No Function With Signal (18175-000,19.0%) (18175-000,20.0%)
Function Without Signal	15.2%	3.54	Catastrophic-Functioned Without Signal (18175-000,3.0%) (18175-000,4.0%)
Induced		57.0%	Degraded - Functioned At Improper Signal Level (18175-000,56.0%) (18175-000,56.0%), Degraded - Intermittent Operation (18175-000,1.0%) (18175-000,1.0%)
Unknown		20.0%	Unknown (16175-000,20.0%) (18175-000,20.0%)
ansor, Pressure, Transmitter Degraded Output	41.24	20.3%	Sources:1 Degraded - Erratic Output (18175-000,8.0%) (18175-000,9.0%) (18175-000,9.0%), Degraded - High Output (18175-000,8.0%) (18175-000,8.0%) (18175-000,8.0%), Degraded - Low Output (18175-000,3.0%) (18175-000,4.0%) (18175-000,4.0%)
Zero cr Maximum Output	33.1	16.3%	Catastrophic-Zero Or Maximum Output (18175-000,9.0%) (18175-000,20.0%) (18175-000,20.0%)
No Operation	24.3	12.0%	Catastrophic-No Change/Output With Change/Input (18175-000,5.0%) (18175-000,10.0%) (18175-000,10.0%), Catastrophic-No Function With Signal (18175-000,11.0%)
Function Without Signal	1.4%	0.7%	Catastrophic-Functioned Without Signal (18175-000,2.0%)
Unknown		44.0%	Unknown (18175-000,34.0%) (18175-000,49.0%) (18175-000,49.0%)
Induced		6.78	Degraded - Functioned At Improper Signal Level (18175-000,19.0%), Degraded - Intermittent Operation (18175-000,1.0%)
ensor,Radiation Degraded Output	54.34	44.0%	Sources:1 Degraded - Erratic Output (18175-000,22.0%) (18175-000,22.0%), Degraded - High Output (18175-000,11.0%) (18175-000,11.0%), Degraded - Low Output (18175-000,11.0%) (18175-000,11.0%)
Zero or Maximum Output	25.9%	21.0%	Catastrophic-Zero Or Maximum Output (18175-000,21.0%) (18175-000,21.0%)
No Operation	19.84	16.0%	Catastrophic-No Change/Output With Change/Input (18175-000,16.0%) (18175-000,16.0%)
Unknown		19.0%	Unknown (18175-000,19.0%) (18175-000,19.0%)

3-198	Failure Distribution S	ummaries		FMD-91
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	r,Recorder Iegraded Output	47.4%	18.04	Sources:1 Degraded - Erratic Output (18175-000,12.0%), Degraded - High Output (18175-000,3.0%), Degraded - Low Output (18175-000,3.0%)
N	o Operation	42.18	16.0%	Catastrophic-No Change/Output With Change/Input (18175-000,16.0%)
z	ero or Maximum Output	10.5%	4.0%	Catastrophic-Zero Or Maximum Output (18175-000,4.0%)
I	nduced		43.0∜	Degraded - No Chart Motion (18175-000,NR) (18175-000,19.0%), Degraded - No Recording (18175-000,24.0%)
U	nknown		19.0%	Unknown (18175-000,19.0%)
	r,Seismic Instrument egraded Output	50.7%	34.0%	Sources:1 Degraded - Erratic Output (18175-000,27.0%), Degraded - High Output (18175-000,2.0%), Degraded - Low Output (18175-000,5.0%)
N	o Operation	29.94	20.0%	Catastrophic-No Change/Output With Change/Input (18175-000,20.0%)
Z	ero or Maximum Output	19.48	13.0%	Catastrophic-Zero Or Maixmum Output (18175-000,13.0%)
U	nknown		33.0\$	Unknown (18175-000,33.0%)
	r,Shock egraded Output	50.7%	34.0%	Sources:1 Degraded - Erratic Output (18175-000,20.0%), Degraded - High Output (18175-000,7.0%), Degraded - Low Output (18175-000,7.0%)
N	o Operation	32.84	22.0	Catastrophic-No Change/Output With Change/Input (18175-000,22.0%)
2	ero or Maximum Output	16.44	11.0%	Catastrophic-Zero Or Maximum Output (18175-000,11.0%)

Unknown ----- 33.0% Unknown (18175-000, 33.0%)

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Sensor, Signal Modifier Degraded Output	74.0%	Sources:1 37.0% Degraded - Erratic Output (18175-000,14.0%), Degraded - High Output (18175-000,14.0%), Degraded - Low Output (18175-000,9.0%)
Zero or Maximum Output	22.08	11.0% Catastrophic-Zero Or Maximum Output (18175-000,11.0%)
No Operation	4.0%	2.0% Catastrophic-No Change/Output With Change/Input (18175-000,2.0%)
Unknown		50.0% Unknown (18175-000,50.0%)

	91			Failure Distribution Summaries 3	
art esc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	,Speed graded Operation	100.0%	50.0%	Sources:1 Degraded (18175-000,50.0%)	
Un	known	<b>4</b> 22422	50.0%	Unknown (18175-000,50.0%)	
	,Speed,Centrifugal Switch Operation	79.8%	35.1%	Sources:1 Catastrophic-No Function With Signal (18175-000,39.0%) (18175-000,40.0%)	
Fu	nction Without Signal	20.2%	8.94	Catastrophic-Functioned Without Signal (18175-000,10.0%) (18175-000,10.0%)	
In	duced		56.0%	Degraded - Functioned At Improper Signal Level (18175-000,25.0%) (18175-000,25.0%), Degraded - Intermittent Operation (18175-000,25.0%) (18175-000,26.0%), Degraded - Functioned At Improper Speed Level (18175-000,25.0%)	
	, Speed, Transducer graded Output	50.0%	50.0%	Sources:1 Degraded - Erratic Output (18175-000,5.0%) (18175-000,5.0%), Degraded - High Output (18175-000,10.0%) (18175-000,10.0%), Degraded - Low Output (18175-000,35.0%) (18175-000,35.0%)	
Zei	ro or Maximum Output	40.0%	40.0%	Catastrophic-Zero Or Maximum Output (18175-000,40.0%) (18175-000,40.0%)	
No	Operation	10.0%	10.04	Catastrophic-No Change/Output With Change/Input (18175-000,10.0%) (18175-000,10.0%)	
	,Temperature ange in Resistance	55.1*	50.0%	Sources:2 Low Resistance Values (10722-000,Qty:1)	
Zei	ro or Maximum Output	20.9%	19.0%	Catastrophic-Zero Or Maximum Output (18175-000,18.0%) (18175-000,58.0%)	
Deç	graded Output	17.18	15.5%	Degraded - Erratic Output (18175-000,10.0%) (18175-000,23.0%), Degraded - High Output (18175-000,8.0%) (18175-000,9.0%), Degraded - Low Output (18175-000,3.0%) (18175-000,9.0%)	
No	<b>Operation</b>	3.9%	3.54	Catastrophic-No Change/Output With Change/Input (18175-000,2.0%) (18175-000,2.0%), Catastrophic-No Function With Signal (18175-000,10.0%)	
Fur	nction Without Signal	3.04	2.84	Catastrophic-Functioned Without Signal (18175-000,11.0%)	
Ind	luced		5.54	Degraded - Functioned At Improper Signal Level (18175-000,17.0%), Degraded - Intermittent Operation (18175-000,5.0%)	
Unk	known		3.8%	Unknown (18175-000,15.0%)	

Part	Failure	Norm	Fail	Data
Desc,		Dist.		Bata Source(s)/Details
	, Temperature, Element Transdu ro or Maximum Output		65.04	Sources:1 Catastrophic-Zero Or Maximum Output (18175-000,65.0%)
	graded Output			Degraded - Erratic Output (18175-000,19.0%), Degraded -
				High Output (18175-000,6.0%), Degraded - Low Output (18175-000,8.0%)
No	• Operation	2.0%	2.0%	Catastrophic-No Change/Output With Change/Input (18175-000,2.0%)
	,Temperature,Process Switch nction Without Signal	54.3	19.0%	Sources:1 Catastrophic-Functioned Without Signal (18175-000,19.0%)
No	Operation	45 79	16.05	(18175-000,19.0%) Catastrophic-No Function With Signal (18175-000,16.0%)
10	0001000	40174	10.04	(18175-000, 16.0%)
In	duced		65.0%	Degraded - Functioned At Improper Signal Level (18175-000,50.0%) (18175-000,50.0%), Degraded - Intermitten Operation (18175-000,15.0%) (18175-000,15.0%)
	,Temperature,Transmitter graded Output	49.4	41.0%	Sources:1 Degraded - Erratic Output (18175-000,14.0%) (19175-000 15 0%) Depended With Output (19175-000 23 0%)
				(18175-000,15.0%), Degraded - High Output (18175-000,23.0%) (18175-000,24.0%), Degraded - Low Output (18175-000,3.0%) (18175-000,3.0%)
2e:	ro or Maximum Output	42.28	35.0%	Catastrophic-Zero Or Maximum Output (18175-000,35.0%) (18175-000,35.0%)
No	Operation	8.4%	7.0%	Catastrophic-No Change/Output With Change/Input (18175-000,7.0%) (18175-090,7.0%)
Unl	known		17.0%	Unknown (18175-000,17.0%) (18175-000,17.0%)
	, Totalizer	42.04		Sources:1
De	graded Output	43.85	31.84	Degraded - Erratic Output (18175-000,19.0%), Degraded - High Output (18175-000,11.0%), Degraded - Low Output (18175-000,5.0%)
No	<b>Operat</b> ion	35.0%	25.5%	Catastrophic-No Change/Output With Change/Input (18175-000,18.0%), Catastrophic-No Change/Output With Change/Time (18175-000,10.0%)
Zei	ro or Maximum Output	21.34	15.5%	Catastrophic-Zero Or Maximum Output (18175-000,17.0%)
Unl	(nown		27.3%	Unknown (18175-000,30.0%)
	Transducer graded Output	52.2	52.24	Sources:2 Incorrect Output (24996-000,52.0%), Incorrect output
Int	ermittent Operation	22.18	22.1 <b></b>	(24997-000, 52.0%) Intermittent (24996-000, 22.0%) (24997-000, 22.0%)
4114	chanical Failure			Mechanical Failure (24996-000,19.0%), Mechanical failure
Mec				(24997-000, 19.0%)

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FMD-				Failure Distribution Summaries 3-
Part Desc,	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Detaile
	,Trangducer/Transmit Operation	42.9	30.0	Sources:1 Printer Inoperative (19542-000,30.0%)
No	isy Vacuum Column	28.64	20.0%	Vacuum Column Noisy (19542-000,20.0%)
Re	lay Failure	28.6%	20.0%	Relay Defective (19542-000,20.0%)
Un	known		30.00	Unknown (19542-000,30.0%)
	,Vibration graded Output	49.34	33.04	Sources:1 Degraded - Erratic Output (18175-000,25.0%), Degraded - High Output (18175-000,3.0%), Degraded - Low Output (18175-000,5.0%)
20	rç or Maximum Output	35.8%	24.0%	Catastrophic-Zero Or Maximum Output (18175-000,24.0%)
No	Operation	14.9%	10.04	Catastrophic-No Change/Output With Change Input (18175-090,10.0%)
Uni	known		33.0%	Unknown (18175-000,33.0%)
	,Water Chemistry graded Output	62.3%	33.0%	Sources:1 Degraded - Erratic Output (18175-000,21.0%) (18175-000,21.0%), Degraded - High Output (18175-000,1.0%) (18175-000,1.0%), Degraded - Low Output (18175-000,11.0%) (18175-000,11.0%)
No	Operation	32.18	17.04	Catastrophic-No Change/Output With Change/Input (19175-000,17.0%) (18175-000,17.0%)
Zei	ro or Maximum Output	5.7%	3.0%	Catastrophic-Zero Or Maximum Output (18175-000,3.0%) (18175-000,3.0%)
บเาไ	known	An an 10 - 1 as in .	47.08	Unknown (18175-000,47.0%) (18175-000,47.0%)
	Motor Starter W Resistance	100.0%	100.0%	Sources:1 Low Resistance-Voided Epoxy Over Coat (10722-000,Qty:1)
	Stepping Motor Juced		<0.14	Sources:1 Extreme Overvoltage (24417-001,NR)
Otł	er Control Winding Phase Shift	******	100.04 NR	Improper Phase Shift for Control Winding (24417-001, NR)
	Loose		NR	Radial/End Play of Shaft (24417-001, NR)
	Motor Failure		NR	Overloading of Motor (24417-001,NR)
	Wire Failure		NR	Defective Wire/Insulation (24417-001,NR)
	Bearing Failure		NR	Brinelled or Damaged Bearings-Shock Loads (24417-001, NR), Misseplication of Bearing Type (24417-001, NR)

art Failure	N=	Fail	Data
ert Failure esc. Mode/Mech	Norm Cist.		Data Source(s)/Details
ervo, Tachomster, Generator Induced	90 CE 10 CE 10 CE 10 CE	<0.1	Sourcesil Reduced Air Gap-Mach. Overstress due to Handling (24417-001,NR), Inaccutate Output-Improper Selection of Parts (24417-001,NR)
Other Drift		100.0% NR	Drift in Performance (24417-001,NR)
haft Seized	47.48	33.30	Sources:3 Worn Shaft/Keyway ~ Seized (25101-000,Qty:1)
Cracked/Fractured	35.5%	25.04	Cracked/Fractured (20609-000, Qty:3)
Bent/Dented/Warped	11.84	8.3%	Warped (20609-000, Qty:1)
Rust/Rustced	5.34	3.74	Rust Under Gusset (19542-000,11.1%)
Unknown	****	22.25	Unknown (19542-000,66.7%)
Induced		7.48	Hinge Redesign Required (19542-000,11.1%), Unit Had Grease Which Has Frozen (19542-000,11.1%)
haft Assembly Out of Adjustment	35.04	33.34	Sources:1 Out Of Adjustment - Excessive Play (25101-000,Qty:6), Out Of Adjustment - Inop/Unserviceable (25101-000,Qty:1)
Broken	30.0%	28.64	Part Struck/Damaged ~ Broken/Damaged (25101-000,Qty:1), Broken/Damaged (25101-300,Qty:5)
Bent/Dented/Warped	25.0%	23.8%	Collapsed/Bent (25101-000,Qty:1) (25101-000,Qty:2), Warped/Bent - Excessive Play (25101-000,Qty:1), Warped/Bent - Binding/Sticking (25101-000,Qty:1)
Binding/Sticking	5.0%	4.84	Binding/Sticking (25101-000,Qty:1)
Excessive Play	5.0%	4.8%	Worh Shaft/Keyway - Excessive Play (25101-000, Qty:1)
Induced		4.84	Lack Of Lubrication - Binding/Sticking (25101-000,Qty:1)
haft Collar Loose	100.0%	100.0%	Sources:1 Loose Clamp(s) ~ Excessive Play (25101-000,Qty:1)
haft,Drive Broken	25.98	25.0%	Sources:1 Broken/Damaged (25101-000,Qty:1)
Worn	25.0%	25.04	Worn - Inop Man Traverse (25101-000, Qty:1)
Bent/Dented/Warped	25.0	25.0%	Warped/Bent - Binding/Sticking (25201~000,Qty:1)

Out of Adjustment

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25.0% 25.0% Out Of Adjustment - Excessive Play (25101-000, Qty:1)

19 - 1 V	N	MI - 2 *	
Part Failure Desc. Mode/Mach	Norm Dist.	7ail Dist.	Data Source(3)/Details
Bhaft,Equilibrator Broken	100.04	23 O¥	Sources:1 Poor Design - Broken/Damaged (25101-000,Qty:1)
Induced	10 S. 175 S.	75.04	Poor Design - Fnd In TI/PMCS/INSP (25101-000,Qty:2), Poor Design - Preventive Action (25101-000,Qty:1)
haft,Shoulderud Worn	34.88	29.64	Sources:1 Worn Out (25101-000,Qty:1) (25101-000,Qty:2), Worn - Inop/Unserviceable (25101-000,Qty:3), Worn - Noisy (25101-000,Qty:1), Worn - Inop Man Traverse (25101-000,Qty:1)
Bent/Dented/Warped	26.1%	22.24	Warped/Bent - Inop Man Elevation (25101-000,Qty:1), Warped/Bend - Noisy (25101-000,Qty:1), Warped/Bent - Binding/Sticking (25101-000,Qty:1), Collapsed/Bent (25101-000,Qty:1) (25101-000,Qty:2)
Broken	17.40	14.8%	<pre>Part Struck/Damaged - Inop Man Elevation (25101-000,Qty:1), Worn/Stripped - Broken/Damaged (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1)</pre>
Binding/Sticking	13.0	11.14	Part Struck/Damaged - Binding/Sticking (25101-000,Qty:2), Binding/Sticking (25101-000,Qty:1)
Excessive Play	8.75	7.48	Worn - Excessive Play (25101-000,Qty:1) (25101-000,Qty:1)
Induced		14.85	Caused By Other Failure - Found In TI/PMCS/Insp (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:1), Improper Maintenance - Stripped (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1)
haft,Straight Loose	40.0%	40.0%	Sources:1 Out Of Adjustment - Loose (25101-000,Qty:2)
Worn	40.0	40.0%	Worn Out (25101-000,Qty:2)
Out of Adjustment	20.08	20.0%	Out Of Adjustment - Inop Man Elevation (25101-000, Qty:1)
haft,Worm Broken	22.24		Sources:1 Broksn/Damaged (25101-000,Qty:1), Shaft Broken - Binding/Sticking (25101-000,Qty:1)
Excessive Play	22.2	15.4%	Worn - Excessive Play (25101-000,Qty:2)
Seized	11.18	7.78	Seized (25101-000,Qty:1)
Worn	11.18	7.78	Worn/Shaft/Keyway - Loose (25101-000,Qty:1)
Bent/Dented/Warped	11.14	7.74	Warped/Bent - Inaccurate (25101-000,Qty:1)
Loose	11.18	7.78	Oversize - Loose (25101-000,Qty:1)
Out of Adjustment	11.18	7.78	Out Of Adjustment - Inaccurate (25101-000,Qty:1)
Induced			Overtorqued - Stripped (25101-000,Qty:1), Caused By Other Failure-Excessive Play (25101-000,Qty:1), Caused By Other Failure-Broken/Damaged (25101-000,Qty:1), Dropped - Broken/Damaged (25101-000,Qty:1)

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Part Failure	Norm	Fail	Data
esc. Mode/Mech	Dist.		Source(s)/Details
hield, Collimator			Sources:1
Bent/Dented/Warped	100.0%	100.0%	Collapsed/Bent (25101-000, Qty:1)
him	50.00		Sources:1
Binding/Sticking			Oversize - Binding/Sticking (25101-000,Qty:1)
Excessive Play	50.05	20.0%	Vibration - Excessive Play (25101-000,Qty:1)
Induced		60.0%	<pre>Improper Install - Found In TI/PMCS/Insp (25101-000,Qty:1), Improper Installation - Cracked (25101-000,Qty:1), Missing (25101-000,Qty:1)</pre>
hock Absorber Aged/Deteriorated	100.04	25.0%	Sources:1 Requires Refurbishing (19542-000,25.0%)
Induced		50.0%	Improper Mount (19542-000,50.0%)
Unknown		25.04	Unknown (19542-000,25.0%)
Sight Case Stow Brkt Worn	100.08	66.7%	Sources:1 Deteriorated/Aged - Worn Out (25101000,Qty:2)
Unknown		33.34	Unknown (25101-000, Qty:1)
iren, Annunciator Module			Sources:1
Degraded Operation	58.94	58.94	Degraded (18175-000,53.0%)
Fails to Op. on Demand	40.0%	40.0%	Catastrophic-Fails To Operate On Demand (18175-000,36.0%)
Spurious/False Operation	1.15	1.1*	Catastrophic-Operates Spurious Or False Response (18175-000,1.0%)
Loose	100.0%	100.0%	Sources:1 Internal Failure - Loose (25101-000,Qty:1)
leeve, Spacer Induced		100.0%	Sources:1 Improper Maintenance ~ Slams Into Battery (25101-000,Qty:1)
ocket, Ball Seat			Sources: )
Loose	89.5%	85.04	Loose (25101-000,Qty:1) (25101-000,Qty:4) (25101-000,Qty:11), Out Of Adjustment - Loose (25101-000,Qty:1)
Excessive Play	5.34	5.04	Excessive Play (25101-000, Qty:1)
Binding/Sticking	5.34	5.0%	Binding/Sticking (25101-000,Qty:1)
Unknown		5.05	Unknown (25101-000, gty:1)

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	91			Failure Distribution Summaries 3-2
art esc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
ockat In	, IC duced		<0.1%	Sources:1 Repeated Insertions (22540-000,NR), Incompatible I.C. Socket Plating and Lead Flating (22540-000,NR)
Ot	her Change in Resistance		100.0% NR	High Contact Resistance (22540-000,NR)
	Insulation Failure		NR	Loss of Insulation Integrity (22540-000, NR)
	Walk-Out		NR	Failure to Hold I.C. in Place (Walk-Out) (22540-000,NR)
	,Tube stable (peration	71.4%	71.4%	Sources:1 Unstable (24992-000,71.4%)
Sh	orted	14.3%	14.3%	Short (24992-000,14.3%)
Op	ened	14.3%	14.3%	Open (24992-000,14.3%)
oftwa D <b>e</b>	re sign Chauges	45.98	43.8%	Sources:2 Design Changes (24996-000,43.8%) (24997-000,43.8%)
	sign Error	40.98	39.0%	Software Design Errors (24996-000,39.0%), S/W Design Errors (24997-000,39.0%)
Us	er Error	7.4%	7.0%	Error in Keybrd/Coding/Handling (24996-000,7.0%) (24997-000,7.0%)
Do	cumentation Error	5.7%	5.5%	Documentation Error (24996-000,5.5%) (24997-000,5.5%)
Un	known		4.7%	Unknown (24996-000,4.7%) (24997-000,4.7%)
Oti	her Output Eirors		0.0% NR	Modes: Output Errors (24996-000,NR) (24997-000,NR)
	Program Halts		NR	Modes: Program Halts (24996-000,NR) (24997-000,NR)
	id (Summary) orted	51.5%		
Bi	nding/Sticking	28.7%		
-	ring Failure ened	14.9% 5.0%		
oleno She	id orted	51.5%	34.34	Sources:3 Short (24996-000,52.0%) (24997-000,52.0%)
Bi	nding/Sticking	28.7%	19.1%	Mechanical Binding & Sticking (24996-000,29.0%), Mechanical binding and sticking (24997-000,29.0%)
Sp	ring Failure	14.94	9.94	Weak Spring Action (24996-000,15.0%), Weak spring action (24997-000,15.0%)
Op	aned	5.0%	3.34	Open Circuit (24996-000,5.0%) (24997-000,5.0%)
Unl	known		33.34	Unknown (19542-000,100.0%)

art Failure	Norm	Fail	Data
esc. Mode/Mech			Source(s)/Details
pindle Assembly Cracked/Fractured	100.0%	100.0%	Sources:1 Cracked (25101-000,Qty:1)
pindle,Brake,Group Cracked/Fractured	55.2%	41.0%	Sources:1 Cracked (25101-000,Qty:1) (25101-000,Qty:11), Poor Design - Cracked (25101-000,Qty:4)
Broken	37.94	28.2%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:5), Poor Design - Broken/Damaged (25101-000,Qty:1), Broken/Separated - Broken/Damaged (25101-000,Qty:1)
Worn	3.4%	2.6%	Worn Out (25101-000,Qty:1)
Out of Adjustment	3.4%	2.6%	Brakes Not Adjusted (25101-000,Qty:1)
Induced		25.6%	<pre>Improper Maintenance - Missing (25101-000,Qty:1), Item Abuse/Neglect - Worn Out (25101-000,Qty:2), Improper Maintenance - Broken/Damaged (25101-000,Qty:2), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Caused By Other Failure-Broken/Damaged (25101-000,Qty:4)</pre>
indle,Brake,Support Cracked/Fractured	39.1%	22.0%	Sources:1 Cracked Weld-Cracked (25101-000,Qty:3) (25101-000,Qty:3), Vibration - Cracked (25101-000,Qty:1) (25101-000,Qty:1), Part Struck/Damaged - Cracked (25101-000,Qty:1)
Broken	30.4%	17.1%	<pre>Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1), Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1), Part Struck/Damaged - Broken Bolt(s) (25101-000,Qty:1), Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:2)</pre>
Bent/Dented/Warped	8.7%	4.9%	Collapsed/Bent (25101-000,Qty:1) (25101-000,Qty:1)
Excessive Vibration	8.7%	4.98	Vibration - Fnd In TI/PMSC/INSP (25101-000,Qty:2)
Bearing Failure	4.3	2.4	Bearing Failure-Worn Out (25101-000,Qty:1)
Out of Adjustment	4.34	2.4	No Failure - Out Of Adjustment (25101-000,Qty:1)
Loose	4.3*	2.4	No Failure - Loose (25101-000,Qty:1)
Induced			<pre>Improper Adjustment - Loose (25101-000,Qty:1), Lack Of Lubrication - Seized (25101-000,Qty:3), Improper Adjustment - Out Of Adjustment (25101-000,Qty:1), Improper Maintenance - Missing (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:4), Vibration - Missing (25101-000,Qty:1), Improper Maintenance - Collapsed/Bent (25101-000,Qty:1), Item Abuse/Neglect - Collapsed/Bent (25101-000,Qty:1) (25101-000,Qty:1), Lack Of Lubrication - Binding/Sticking (25101-000,Qty:1), Lack Of Maintenance - Binding/Sticking (25101-000,Qty:1), Lack Of Maintenance - Noisy (25101-000,Qty:1), Improper Installation - Binding/Sticking (25101-000,Qty:1)</pre>

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FMD-91			Failure Distribution Summaries 3-2	
Part Failure Desc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details	
pindle,Flange Bent/Dented/Warped	100.0%	100.0%	Sources:1 Collapsed/Bent (25101-000,Q:y:1)	
pindle,Handwheel Brok	50.0%	33.3%	Sources:1 Broken/Damaged (25101-000,Qty:1)	
Binding/Sticking	50.C¥	33.3%	Worn - Binding/Sticking (25101-000,Qty:1)	
induced	<b></b>	33.3%	Caused By Other Failure-Broken/Damaged (25101-000,Qty:1)	
plice,Fiber Optic Induced		<0.1%	Sources:1 Bad Cleaves (23413-000,NR), Improper Assembly Techniques (23413-000,NR)	
Other Broken		100.0% NR	Fiber Breakage (23413-000,NR)	
Fiber Endface Seperation		NR	Fiber Endface Seperation due to Improper Assembly (23413-000,NR)	
Contaminated		NR	Dirt (23413-000, NR)	
Excessive Vibration		NR	Vibration (23413-000,NR)	
pring (Summary) Creep Broken Worn Weakened Dragging Bearing Failure	27.24 22.64 19.94 11.74 11.24 7.54			
pring Broken	41.8%	27.3%	Sources:2 Broken (20609-000,Qty:15), Broken/Damaged (25101-000,Qty:2)	
Weakened	24.6%	16.1%	Weak (20609-000,Qty:2), Spring Weak - Inop/Unserviceable (25101-000,Qty:1), Spring Weak - Excessive Play (25101-000,Qty:1), Spring Weak - Locked (25101-000,Qty:2), Spring Weak - Binding/Sticking (25101-000,Qty:1)	
Binding/Sticking	12.14	7 <b>.9</b> %	Binding/Sticking (25101-000,Qty:2), Sticking - Loose (25101-000,Qty:1)	
Scored	9.0%	5.9%	Scored (20609-000, Qty:4)	
Excessive Play	8.0%	5.34	Excessive Play (25101-000,Qty:2)	
Worn	4.54	2.98	Worn Out (20609-000,Qty:2)	
Unknown		16.24	Ur.known (20609-000, Qty:11)	
Induced		13.24	<pre>Improper Maintenance - Missing (25101-000,Qty:1), Lack Of Lubrication - Broken/Damaged (25101-000,Qty:2), Lack Of Lubrication - Seized (25101-000,Qty:2)</pre>	
Other (<\$5) Corroded		5.34 2.64	Corroded-Seized (25101-000,Qty:1)	

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art esc.	Failure Distribution Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source (s) /Details
18G.		UISC.		SOULCE (S) / WELSIS
	7 (continued) her (continued) Aged/Deteriorated		2.64	Deteriorated/Agad - Binding/Sticking (25101-000,Qty:1)
	Brake Assy nding/Sticking	100.00	100.04	Sources:1 Shaft Binding (10722-000,Qty:1)
	I, Brake agging	50.0%	33.3%	Sources:1 Brake Dragging-Conductive Contam./Inad. Clearance (10722-000,Qty:1), Brake Dragging (10722-000,Qty:1), Brake Dragging-Insuff. Clearance Spring Disc>Case (10722-000,Qty:1)
Be	aring Failure	33.3%	22.28	Seized Bearing (10722-000,Qty:1), Bearing Seizure-Improper Bearing (10722-000,Qty:1)
Co	nnection Failure	16.7%	11.14	Open Connection Between Magnet Wire & Termination (10722-000,Qty:1)
Un	known	******	22.2*	Unknown (10722-000,gty:1) (10722-000,gty:1)
In	duced		11.1%	Excessive Drag-Improperly Installed Brake Disk (10722-000,Qty:1)
-	,Helical akened	37.1%	25.0%	<pre>Sources:1 Spring Weak - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Spring Weak - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2), Spring Weak - Misfire (25101-000,Qty:1), Spring Weak - Found In TI/PMCS/Insp (25101-000,Qty:2), Spring Weak - Inoperative Charging (25101-000,Qty:1), Spring Weak - Binding/Sticking (25101-000,Qty:1)</pre>
Be	nt/Dented/Warped	28.64	19.2%	<pre>Warped/Bent - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:1), Warped/Bent - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:3), Collapsed/Bent (25101-000,Qty:2), Warped/Bent - Found In TI/PMCS/Insp (25101-000,Qty:1), Warped/Bent - Binding/Sticking (25101-000,Qty:1)</pre>
Agi	ed/Deteriorated	14.3%	9.6%	Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2), Deteriorated/Aged - Leaking Hydraulic Oil (25101-000,Qty:1), Deteriorated/Aged - Fnd In TI/PMSC/INSP (25101-000,Qty:1)
Bro	oken	11,4%	7.7%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2), Broken/Separated - Inop/Sluggish Breech (25101-000,Qty:1)
Loo	ose	9,6 <b>%</b>		Part Missing/Loose - Inop/Unserviceable (25101-000,Qty:1), Part Missing/Loose - Misfire (25101-000,Qty:1), Part Missing/Loose - Broken/Damaged (25101-000,Qty:1)
Inc	duced			<pre>Improper Install - Inop/Sluggish Breech (25101-000, Qty:1), Improper Maintenauce - Missing (25101-000, Qty:1), Operator Error - Inop/Unserviceable (25101-000, Qty:1), Dropped - Inop/Unserviceable (25101-000, Qty:1), Improper Install - Misfire (25101-000, Qty:1), Improper Install - Inop/Unserviceable (25101-000, Qty:3), Stepped On - Collapsed/Bent (25101-000, Qty:1), Caused By Other Failurz-Broken/Damaged (25101-000, Qty:1), Lack Of Lubrication - Binding/Sticking (25101-000, Qty:1), Lack Of Maintenance - Seized (25101-000, Qty:1)</pre>

Part	-91			Failure Distribution Summaries	<u>3-20</u>
Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	,Helical (continued) hknown	40 CD 1 0 0 0 00 00 00	1.94	Unknown (25101-000, Qty:1)	
Ot	ther (<%4) Binding/Sticking	*	7.7 <b>4</b> 1.9%	Stepped On - Binding/Sticking (25101-000,Qty:1)	
	Worn		1.9%	Worn - Inop/Unserviceable (25101-000,Qty:1)	
	Seized		1.9%	Seized/Frozen - Inop/Unserviceable (25101-000,NR), Seized/Frozen - Excessive Play (25101-000,Qty:1)	
	Excessive Play		1.9%	Broken/Separated - Excessive Play (25101-000,Qty:1)	
	, Instrument, Light Loads eep	57.5%	36.5%	Sources:2 Change of Parameter-Creep/set- (24996-000,73.0%)	
Wo	orn	36.2%	23.0%	Wear (ends) ( $24996-000, 23.0$ %) (24997-000, 23.0%)	
Br	oken	6.3%	4.0%	Breakage or Mechanical Failure (24996-000,4.0%), Breakage or mechanical failure (24997-000,4.0%)	
Un	known		36.5%	Unknown (24997-000,73.0%)	
	Assembly oken	90.0%		Sources:1 Poor Design - Broken/Damaged (25101-000,Qty:16), Broken/Damaged (25101-000,Qty:1), Broken Bolt(s) (25101-000,Qty:1)	
No	Operation	10 <b>.0%</b>	5.3%	Poor Design - Inop/Unserviceable (25101-000,Qty:2)	
Un	known		47.4%	Unknown (25101-000,Qty:18)	
	r,Motor orted	100.0%	106.0%	Sources:1 Intrawinding Short B Phase-Mechanical Stress (10722-000,Qty:1)	
	rank Assembly oken	87.5%	87.5%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:5)	
Wo	rn	12.5%	12.5%	Worn - Inop/Unserviceablee (25101-000,Qty:1)	
	Aszembly oken	50.0%		Sources:1 Broken/Damaged (25101-000,Qty:2)	
	nt/Dented/Warped			Collapsed/Bent (25101-000, Qty:1)	
	·			Dropped - Worn Out (25101-000, Qty:1)	
Wo					
	luced			Fell Off Or Lost ~ Missing (25101-000,Qty:2), Missing (25101-000,Qty:1)	

Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(#)/Details
	,Webbing ged/Deteriorated	100.04	60.01	Sources:1 Deteriorated/Aged - Broken/Damaged (25101-000,Qty:1), Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:2)
I	nduced	74 M, W 87 88 88	40.0%	Fell Off Or Lost - Missing (25101-000, Qty:2)
	Nut,Hex racked/Fractured	100.0%	100.0%	Sources:1 Fractured-Over Torqued (10722-000,Qty:1)
	Plain roken	85.74	66.7%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:4), Operation Error - Broken/Damaged (25101-000,Qty:1)
Be	ent/Dented/Warped	14.3	11.14	Collapsed/Bent (25101-000, Qty:1)
Ir	nduced		22.2	Fell Off Or Lost - Frd In TI/PMCS/INSP (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damiged (25101-000,Qty:1)
	t Assembly t of Adjustment	28.6%	14.0%	Sources:1 Out Of Adjustment - Inop/Unserviceable (25101-000,Qty:1), Out Of Adjustment - Excessive Play (25101-000,Qty:3)
Bı	roken	28.6%	14.8%	Broken/Damaged (25101-000.Qty:1) (25101-000.Qty:1) (25101-000.Qty:1), Out Of Adjustment - Broken/Damaged (25101-000.Qty:1)
Se	ized	14.3%	7.48	Seized (25101-000,Qty:2)
E	cessive Play	7,1%	3.7€	Contact Defective - Excessive Play (25101-000,Qty:1)
B€	nt/Dented/Warped	7.1%	3.7%	Collapsed/Bent (25101-000,Qty:1)
Lc	00 <b>5</b> 0	7.1%	3.7%	Part Struck/Damaged - Loose (25101-000, Qty:1)
Wo	orn	7.1%	3.7%	Worn Out (25101-000,Qty:1)
Ir	lduced		48.1%	<pre>Improper Install - Loose (25101-000,Qty:1', Improper Install - Out Of Adjustment (25101-000,Qty:1), Improper Install - Inop/Unserviceable (25101-000,Qty:1), Improper Install - Binding/Sticking (25101-000,Qty:1), Improper Install - Out Of Synch (25101-000,Qty:2), Improper Install - Imp Assembly/Install (25101-000,Qty:3), Abnormal Operation (25101-000,Qty:4)</pre>

Support Assembly, Left Excessive Play

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Sources:1 100.0% 100.0% Excessive Play (25101-000,Qty:1)

Part Failur	<b>6</b>	Norm	Fail	Data
Mode/M	=	Dist.	Dist.	
Support Assem Excessive		62.54	50,0%	Sources:1 Excessive Play (25101-000,Qty:1) (25101-000,Qty:3), Undersize - Excessive Play (25101-000,Qty:1)
Loose		25.0%	20.04	Loose (25101-000,Qty:1) (25101-000,Qty:1)
Seized		12.5	10.0%	Seized (25101-000,Qty:1)
Induced			10.0%	Stolen - Missing (25101-000,Qty:1)
Unknown			10.0%	Unknown (25101-000,Qty:1)
Support Cradle Worn	e Assy	75.0%	60.0%	Sources:1 Worn - Inop/Unserviceable (25101-000,Qty:1), Worn - Inaccurate (25101-000,Qty:1), Worn - Found In TI/PMCS/Insp (25101-000,Qty:1)
Broken		25.0%	20.0%	Broken/Damaged (25101-000,Qty:1)
Induced			20.0%	Caused By Other Failure-Broken/Damaged (25101-000,Qty:1)
Support Rocker Broken	с Азву	60.0%	42.9%	Sources:1 Broken/Damaged (25101-000,Qty:3)
Cracked/F1	ractured	20.0%	14.3%	Cracked (25101-000,Qty:1)
Excessive	Play	20.0%	14.3%	Internal Failure - Excessivve Play (25101-000, Qty:1)
Unknown			14.3%	Unknown (25101-000, Qty:1)
Induced		*	14.3%	Caused By Other Failure-Broken/Damaged (25101-000,Qty:1)
Surface Acoust Induced	. Wave		<0.1%	Sources:1 Degradation-Surface Contamination (22540-000,NR)
Other Variabl	le Properties			Highly Variable Properties-Strain (22540-000,NR)
Electri	lcal Overstress		NR	Electro-Static Discharge (22540-000,NR)
Wire Bo	ond Failure		NR	Wire Bond Failure (22540-000,NR)
Opened			NR	Open Ground Wire (22540-000,NR)
Cracked	l/Fractured		NR	Cracks in Substrate (22540-000,NR), Cracks in Polymide (22540-000,NR)
Aluminu	m Migration		NR	Aluminum Migration (22540-000,NR)
Oxide D	efects		NR	Growth of Aluminum Oxide (22540-000,NR)
Shorted	l		NR	Short/Open Fingers (22540-000,NR)

t Failure	Norm	Fail	Data
c. Mode/Moch		Dist.	Source(s)/Details
tch (Summary)			
Opened	31.84		
Mechanical Failure Shorted	22.6%		
High Contact Resistance	14.24		
Drift	13.0%		
tch High Contact Resistance	30.4%	16.9%	Sources:16 Open (19542-000,1.6%) (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:2) (23038-004,Qty:321) (24992-000,22.3%), High Z (24991-000,50.0%), High On Resistance Between S2 (Pin 9) and D2 (10722-000,Qty:1), Open Contacts (24417-002,NR), Open Coils (24417-002,NR)
Mechanical Failure	18.3%	10.24	Connector Base Pulled Out (19542-000,1.6%), Broken/Fractured (23038-001,Qty:1) (23038-001,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:5), Loose (23038-001,Qty:1) (23038-001,Qty:4) (23038-002,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-006,Qty:1), Broken Or Fractured (23038-002,Qty:1) (23038-006,Qty:4), Mechanical Failure (24996-000,51.0%), Broken Contacts (24417-002,NR), Mechanical failure (24997-000,51.0%)
Shorted	14.3%	8.0%	Q-3 Leads Shorted (19542-000,1.6%), Short (19542-000,3.2%) (20609-000,Qty:31) (24992-000,2.1%) (24996-000,9.0%) (24997-000,9.0%) (25038-000,8.0%), Low Z (24991-000,50.0%), Shorted Or Grounded (23038-001,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2) (23038-006,Qty:3), Grounded Electrically (23038-002,Qty:1) (23038-002,Qty:1) (23038-004,Qty:1), Shorted/Ground (23038-003,Qty:2), Shorted or Grounded (23038-003,Qty:1), Shorted/Grounded (23038-006,Qty:1)
Broken	12.7%	7.0%	Broken (23038-001,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:5) (23038-003,Qty:1) (23038-003,Qty:2) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:3) (23038-004,Qty:4) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:2) (23038-005,Qty:3) (23038-005,Qty:3) (23638-005,Qty:9) (23038-006,Qty:1) (23038-006,Qty:4) (25464-000,Qty:196)
Binding/Sticking	10.4%	5.8%	Binding Stuck or Jammed (25464-000,Qty:118), Sticky (23038-002,Qty:1) (23038-002,Qty:2) (23038-003,Qty:2) (23038-003,Qty:3) (23038-004,Qty:1) (23038-004,Qty:2) (23038-005,Qty:2) (23038-005,Qty:6) (23038-006,Qty:1) (23038-006,Qty:1) (23038-006,Qty:4), Sticky; Broken (23038-002,Qty:2), Bind/Size/Friction (23038-003,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:3), Binding (23038-003,Qty:1) (23038-004,Qty:1), Friction Excessive (23038-005,Qty:6), Binding of Moving Parts (24417-002,NR)
Intermittent Operation	7.4%	4.18	<pre>Intermittent (20609-000,Qty:73) (23038-001,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (25038-000,19.0%), Intermittent Circuit (24996-000,13.0%), Intermittent circuit (24997-000,13.0%)</pre>
Noisy/Unstable/Chatter	6.54	3.64	Unstable (20609-000,Qty:40) (23038-005,Qty:1) (24992-000,40.6%), Noisy/Chattering (25464-000,Qty:26)
Unknown		15.6	Unknown (19542-000,1.6%) (19542-000,1.6%) (19542-000,1.6%) (19542-000,43.5%) (20609-000,Qty:17) (20609-000,Qty:354) (23038-001,Qty:1) (23038-001,Qty:2) (23038-001,Qty:6) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:2) (23038-002,Qty:3) (23038-002,Qty:3) (23038-002,Qty:5) (23038-002,Qty:7) (23038-003,Qty:1) (23038-003,Qty:5) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1)

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7MD-91	N		Failure Distribution Summaries 3-
art Failure esc. Mode/Mech		Fail Dist.	Data Source (s) /Details
vitch (continued) Unknown (continued)		*****	(23038-004, Qty:1) (23038-004, Qty:1) (23038-004, Qty:1) (23038-004, Qty:1) (23038-004, Qty:1) (23038-004, Qty:2) (23038-004, Qty:2) (23038-004, Qty:2) (23038-004, Qty:2) (23038-005, Qty:1) (23038-005, Qty:1) (23038-005, Qty:1) (23038-005, Qty:4) (23038-005, Qty:9) (23038-006, Qty:1)
Induced		6.3	<pre>(23038-006,Qty:4) (25038-000,18.0%) Damaged (19542-000,4.8%), Improper Connection (19542-000,3.2%), Improper Installation (19542-000,6.5%), Improper Wiring (19542-000,9.7%), Improper Bended (19542-000,1.6%), Reversed Leadm (19542-000,1.6%), Improper Energy Resp (23038-001,Qty:4), Missing (23038-001,Qty:4) (23038-002,Qty:3) (23038-003,Qty:1) (23038-003,Qty:1) (23038-003,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-001,Qty:2) (23038-005,Qty:1), Manufacturer Defect (23038-001,Qty:1), Disconnected (23038-001,Qty:1), Twisted (23038-001,Qty:1), Wrong Part (23038-002,Qty:1), Improper Fit (23038-002,Qty:1), Miswired (23038-003,Qty:1), Disconnected/Disenga (23038-003,Qty:1), Cold Solder Joint (23038-004,Qty:1), Caused By Other Dev. (23038-004,Qty:1) (23038-004,Qty:1), Improper Adjustment (23038-005,Qty:2), Operating Error (23038-005,Qty:1), Undersize (23038-05,Qty:1), Workmanship (20609-000,Qty:1), Poor Terminal Plating (24417-002,NR)</pre>
Other (<\$5) Opened		22.6% 2.8%	Opened (20609-000,Qty:58), Open (24996-000,9.0%) (24997-000,9.0%) (25038-000,15.0%)
Audio Fault/Failure		2.4	Audio Faulty (23038-002, Qty:1) (23038-003, Qty:1) (23038-003, Qty:7) (23038-004, Qty:1) (23038-004, Qty:3) (23038-005, Qty:2) (23038-005, Qty:2) (23038-005, Qty:2) (23038-005, Qty:2) (23038-006, Qty:1)
Drift.		2.3%	Fluctuates, Unstable or Errati (25464-000,Qty:21), Fail To Tune/Drift (23038-002,Qty:1) (23038-004,Qty:1), Fluctuates, Unstable (23038-003,Qty:1), Drift (24996-000,8.0%) (24997-000,8.0%) (25038-000,9.0%)
Dielectric Breakdown		1.8%	Dielectric Breakdokwn (24992-000,26.8%)
No Operation		1.5%	Inoperative (23038-002,Qty:1), No Operation (20609-000,Qty:9), Fail to Operate (24996-000,10.0%), Fail to operate (24997-000,10.0%)
Loss of Control		1.5%	Control Inoperative (23038-002,Qty:1) (23039-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-003,Qty:1) (23038-003,Qty:2) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-006,Qty:1) (23038-006,Qty:1)
Out of Spec.		1.28	Out of Specification (20609-000,Qty:29), Out of Spec. (25038-000,14.0%)
Worn		1.0%	Worn, Chaffed, Frayed, or Torn (25464-000,Qty:41), Worn Excessively (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:5) (23038-005,Qty:1), Wore Excessively (23038-005,Qty:1), Brush Fail/Worn Exce (23038-005,Qty:1), Worn Out (20609-000,Qty:5)
Leaking		1.0%	Leaking Internal or External (25464-000,Qty:7), Leaking (20609-000,Qty:8) (23038-006,Qty:2) (25038-000,7.0%)
Contact Failure		1.04	Contact Chatter (24992-000,8.0%), Contact/Conn Defect (23038-006,Qty:1) (25464-000,Qty:11), Contact Defective (23638-002,Qty:1), Deformed Contacts (24417-002,NR), Loose

	Failure Mode/Mech	Norm Dist,		Data Source(s)/Details
itch	(continued)			
	her (continued)			
				Contacts (24417-002, NR)
	Out of Adjustment		0.8%	Needs Repositioning (19542-000,4.8%), Out Of Adjustment (23038-004,Qty:1) (23038-005,Qty:1) (23038-006,Qty:1), Adjustment Improper (23038-004,Qty:1), Out of Adjustment (20609-000,Qty:16)
	Spurious/False Operation		0.74	Faulty Reading (23038-002,Qty:1) (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:2) (23038-006,Qty:3)
	Unstable Operation		0.74	Unstable (25038-000,10.0%)
	Jammed/Stuck		0.6%	Jammed (23038-001, Cty:1) (23038-005, Cty:1) (23038-005, Cty:4)
	Loose		0.6%	Connection Loose (19542-000,1.6%), Loose Due to Excessive Vibrations (19542-000,1.6%), Loose Installation (19542-000,1.6%), Loose,Damaged,or Missing Har (25464-000,Qty:3), Loose (23038-001,Qty:1)
	Loss of Power		0.4%	Electrical Pwr Loss (23038-006,Qty:1) (23038-006,Qty:1)
	Wire Failure		0.3%	Defective Wiring (19542-000,4.8%)
	Change in Capac.		0,3%	Capacitance Incorrect (25464-000,Qty:21)
	Bent/Dented/Warped		0.34	Switch Is Bent (19542-000,1.6%), Dented Start (23038-001,Qty:1)
	Lamp Failure		0.2%	Burned Out Or Defective Lamp, (25464-000,Qty:2), No Indicating Light (23038-002,Qty:1) (23038-002,Qty:1)
	Stripped		0.2\$	<pre>Stripped (23038-001,Qty:1) (23038-004,Qty:1), Shripped (23038-004,Qty:1)</pre>
	Corroded		0.2%	Corroded (23038-003,Qty:1) (23038-004,Qty:2)
	Clogged/Clogging		0.2%	Clogged (23038-002,Qty:1), Clogged, Leaky (23038-002,Qty:1)
	Cut/Scarred/Punctured		0.2%	Cut/Torn (23038-002,Qty:2)
	Cracked/Fractured		0.2	Cracked (23038-001,Qty:1) (25464-000,Qty:1)
	Connection Failure		0.2%	Connection Defective (23038-001,Qty:1)
	Contaminated		<0.1%	Contaminated (20609-000,Qty:5), Contaminated Contacts (24417-002,NR)
	Degraded Operation		<0.1%	Beyond Spec. Tol. (23038-004,Qty:1)
	Limit Unadjuctable		<0.1%	Unable To Adjust Lim (23038-004,Qty:1)
	Degraded Contact		NR	Poor Contact Alignment (24417-002,NR), Pitted Contacts (24417-002,NR)
	Spring Failure		NR	Loss of Resiliency in Springs (24417-002,NR)

FMD-91			Failure Distribution Summaries	3-215
Part Failure	Norm	Fail	Data	
Desc. Mode/Mech	Dist.	Dist.	Source(s)/Details	
Switch, Control			Sources:1	
Opened	33.04	33.04	Open Circuit (24996-000,33.0%)	
Drift	27.0	27.04	Parameter Change (24996-000,27.0%)	
Shorted	22.0	22.0%	Short (24996-000,12.0%)	
Mechanical Damage	18.0%	18.0%	Mechanical Damage (24996-000,18.0%)	
Switch, Float No Operation	37.64	22.94	Sources:2 No Operation (20609-000,Qty:3) (25038-000,23 0%)	
Spurious/False Operation			False Response (20609-000, Qty:3) (25038-000, 23.0%)	
Out of Adjustment	24.8%	15.1%	Out of Adjustment (20609-000, Qty:2) (25038-000, 15.0%)	
Other (<89) Cracked/Fractured		39.04 7.84	Cracked/Fractured (20609-000,Qty:1) (25038-000,8.0%)	
Leaking		7.84	Leaking (20609-000,Qty:1) (25038-000,8.0%)	
Seized		7.8%	Seized (20609-000,Qty:1) (25038-000,8.0%)	
Stuck Closed		7.8%	Stuck Closed (20609-000,Qty:1) (25032-000,8.0%)	
Stuck Open		7.8%	Stuck Open (20609-000, Qty:1) (25038-000,8.0%)	

Switch, Flow Out of Adjustment	16.7%	Sources:1 9.1% Out Of Adjustment (23038-005,Qty:1)
Lamp Failure	16.7%	9.1% No Indicating Light (23038-005, Qty:1)
Shorted	16.7%	9.1% Shorted Or Grounded (23038-005, Qty:1)
Clogged/Clogging	16.7%	9.1% Clogged (23038-005, Qty:1)
No Operation	16.78	9.1% Inoperative (23038-005,Qty:1)
Drift	16.7%	9.1% Fluctuates, Unstable (23038-005,Qty:1)
Unknown	17 in iii aa na na	45.5% Unknown (23038-005,Qty:2) (23038-005,Qty:3)

Switch,Foot Binding/Sticking	41 74	Sources:1 38.5% Sticky (23038-001, 2ty:5)
Binding/Sticking	41./4	38.34 Sticky (23036-001, 209:5)
Cracked/Fractured	25.0%	23.1% Broken/Fractured (23038-001,Qty:3)
Worn	16.7%	15.4% Worn Excessively (23038-001,Qty:2)
Loose	16.74	15.4% Loose (23038-001,Qty:2)
Unknown		7.7% Unknown (23038-001,Qty:1)

Part Failure Desc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
witch, Interconnect, Ma Shorted		100.0%	Sources:1 Short-Overstress (10722-000,Qty:1)
Witch, Magnetic Mechanical Damage	60.0%	60.0%	Sources:1 Mechanical Damage (25000-000,Qty:24)
Intermittent Opera	tion 15.0%	15.0%	<pre>Intermittent-Noise (25000-000,Qty:3), Intermittent-General (25000-000,Qty:3)</pre>
Short - Open	12.5%	12.5%	Short-Open (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3)
Drift	7.5	7.5	Parameter Drift-High Contact Resistance (25000-000,Qty:1) (25000-000,Qty:1), Parameter Drift-Insulation Resistance (25000-000,Qty:1)
Shorted	5.0%	5.0%	Short (25000-000,Qty:2)
witch, Manual Drift	53.1*	45.7%	Sources:1 Parameter Drift-High Contact Resistance (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:1), Parameter Drift-General (25000-000,Qty:1) (25000-000,Qty:6) (25000-000,Qty:34), Parameter Drift-Insulation Resistance (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:6) (25000-000,Qty:17)
Opened	22.9%	19.7%	Open-Open Contacts (25000-000,Qty:4), Open-General (25000-000,Qty:4) (25000-000,Qty:12) (25000-000,Qty:21)
Mechanical Damage	9.5%	8.24	Mechanical Damage (25000-000,Qty:17)
Intermittent Operat	ion 9.5%	8.24	Intermittent-Noise (25000-000,Qty:3), Intermittent-General (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:8)
Shorted	5.04	4.34	Short-Dielectric Strength (25000-000,Qty:4), Short (25000-000,Qty:1) (25000-000,Qty:4)
Unknown		1 <b>3.9</b> %	Unknown (25000-000,Qty:4) (25000-000,Qty:11) (25000-000,Qty:14)
witch,Micro Change in Resistanc	e 60.0%;	60.0%	Sources:1 High Resistance (24990-000,60.0%)
Opened	30 GB	30.05	Cpen (24990-000,30.0%)

10.0% 10.0% No Function (24990-000,10.0%)

No Operation

 Switch, Pressure
 Sources:8

 Degraded Operation
 25.2%
 13.7%
 Fluctuates (23038-001,Qty:2) (23038-001,Qty:2) (23038-001,Qty:1), Incorrect Frequency (23038-001,Qty:1), Incorrect Oil Pressu (23038-001,Qty:1) (23038-001,Qty:2) (23038-001,Qty:6), Incorrect Temp/Melt (23038-001,Qty:1), Incorrect Pressure (23038-001,Qty:2) (23038-001,Qty:1) (23038-001,Qty:2) (23038-001,Qty:2) (23038-001,Qty:2) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2) (23038-004,Qty:2) (25038-005,Qty:1) (23038-005,Qty:2) (23038-004,Qty:2) (23038-004,Qty:1), Temp. Incorrect Fuel Press

MD-91 art Failure	Norm	Fail	Failure Distribution Summaries 3-2
art Fallure ast. Mode/Moch	Dist.		
Atch, Pressure (continued) Degraded Operation (continued)			
			(23038-001,Qty:8), Incorrect Feedback (23038-001,Qty:1), Pressure Incorrect (23038-002,Qty:2) (23038-003,Qty:3) (23038-004,Qty:4), Fluctured, Unstable (23038-002,Qty:1), Oil Pressure Incorrect (23038-002,Qty:1), Surged (23038-002,Qty:1), Fluctuates Unstable (23038-003,Qty:1), Oil Pressure Incorre (23038-003,Qty:1), Fluctuates, Unstable (23038-004,Qty:1) (23038-005,Qty:1), Fluctuates, Unstable (23038-004,Qty:1) (23038-005,Qty:1), Incorrect Output (23038-006,Qty:4) (23038-006,Qty:5), Setting Drift and Lack
			of Repeatability (24417-002, NR)
Spurious/False Operation	19.4	10.5%	Faulty Reading (23038-001,Qty:1) (23038-001,Qty:4) (23038-001,Qty:5) (23038-001,Qty:7) (23038-001,Qty:8) (23038-002,Qty:5) (23038-002,Qty:5) (23038-003,Qty:4) (23038-003,Qty:8) (23038-004,Qty:1) (23038-004,Qty:6) (23038-005,Qty:1) (23038-005,Qty:7) (23038-006,Qty:1)
Losa of Control	19.0%	9.8%	Control Inoperative (23038-001.(ty:3) (23038-001,(ty:3) (23038-001,(ty:6) (23038-002,(ty:2) (23038-003,(ty:3) (23038-003,(ty:6) (23038-004,(ty:1) (23038-004,(ty:1) (23038-004,(ty:3) (23038-004,(ty:6) (23038-005,(ty:2) (23038-005,(ty:2) (23038-005,(ty:5) (23038-006,(ty:1) (23038-006,(ty:2)
Closed	13.2%	7.1%	Close (24992-000,50.0%)
Opened	13.2	7.1%	Open (24992-000,50.0%)
Mechanical Failure	11.18	6.0%	Clogged (23038-001,Qty:1) (23038-001,Qty:3) (23038-002,Qty:1) (23038-003,Qty:1), Broken (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:7) (23038-003,Qty:2) (23038-003,Qty:3) (23038-004,Qty:1) (23038-004,Qty:2) (23038-005,Qty:1) (23038-005,Qty:3), Cracked (23038-001,Qty:1), Broken/Fractured (23038-001,Qty:1) (23038-002,Qty:1) (23038-002,Qty:4) (23038-006,Qty:1), Tooth Broken On Gear (23038-002,Qty:1)
Unknown		25.2%	Unknown (23038-001,Qty:1) (23038-001,Qty:2) (23038-001,Qty:2) (23038-001,Qty:7) (23038-001,Qty:10) (23038-001,Qty:18) (23038-001,Qty:31) (23038-001,Qty:36) (23038-002,Qty:2) (23038-002,Qty:4) (23038-002,Qty:15) (23038-003,Qty:1) (23038-003,Qty:2) (23038-003,Qty:3) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:4) (23038-004,Qty:5) (23038-004,Qty:6) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1) (23038-005,Qty:2) (23038-005,Qty:2) (23038-005,Qty:2) (23038-005,Qty:34) (23033-006,Qty:1) (23038-006,Qty:2)
Induced		2.4%	Caused By Other Dav (23038-001,Qty:1), Maintenance Error (23038-001,Qty:1), Caused By Other Dev. (23038-001,Qty:1) (23038-001,Qty:4) (23038-002,Qty:1) (23038-005,Qty:1), Missing (23038-001,Qty:1) (23038-001,Qty:3) (23038-002,Qty:2) (23038-003,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1), Improper Fit (23038-003,Qty:1)
Other (<%6) Shorted		18.14 3.6%	<pre>Short (23038-001,Qty:1) (23038-001,Qty:4), Short Or Grounded (23038-001,Qty:3) (23038-002,Qty:2) Shorted Or Grounded (23038-001,Qty:1) (23038-003,Qty:1) (23038-005,Qty:3), Shorted/Grounded (23038-003,Qty:2) (23038-006,Qty:1) (23038-006,Qty:1), Grounded Electricaly (23038-005,Qty:1)</pre>
No Output		3.34	No Output (23038-001,Qty:1) (23038-003,Qty:2) (23038-004,Qty:1) (23038-004,Qty:1) (23038-005,Qty:3) (23038-006,Qty:1), Inoperative (23038-002,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1), Did

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art ≥≢c.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	, Pressure (continued)			
Ot,	her (continued)			Not Work, Test Ok (23038-004, Qty:2)
	Leaking		3.0%	Leaking (23038-001,Qty:2) (23038-005,Qty:1) (23038-006,Qty:3), Leaking Liquid (23038-003,Qty:1) (23038-005,Qty:1), Leaks (23038-006,Qty:1)
	Lamp Failure		1.9%	No Indicating Light (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:2) (23038-002,Qty:3), Light Bulb Failure (23038-004,Qty:1) (23038-004,Qty:1), No Indicating Lights (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1)
	Binding/Sticking		1.5%	Jammed (23038-001,Qty:1), Sticky (23038-002,Qty:1) (23038-004,Qty:1) (23038-005,Qty:2), Fused; Bind/Friction (23038-002,Qty:2), Bind/Size/Friction (23038-004,Qty:1)
	Out of Adjustment		1.0%	Out Of Adjustment (23038-001,Qty:1) (23038-001,Qty:1) (23038-002,Qty:1) (23038-002,Qty:1) (23038-004,Qty:1), Adjustment Improper (23038-004,Qty:1)
	Improper Output		0.9%	<pre>Improper Output Sour (23038-001,Qty:1), Improper Source Output (23038-001,Qty:1) (23038-002,Qty:1) (23038-004,Qty:1) (23038-005,Qty:2)</pre>
	Loose		0.8%	Loose (23038-001,Qty:3) (23038-003,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1)
	Contact Failure		0.6%	Defective Contact (23038-001,Qty:1), Contact/Conn Defect (23038-004,Qty:1) (23038-005,Qty:1) (23038-005,Qty:1)
	Worn		0.5%	Worn Excessively (23038-002,Qty:1) (23038-005,Qty:2)
	Intermittent Operation		0.5%	Intermittent (23038-001,Qty:1) (23038-002,Qty:2)
	Incorrect Voltage		0.24	Incorrect Voltage (23038-004,Qty:1)
	Burred		0.2%	Burred (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1)
	Loss of Power		<0.1%	Loss Of Elec. Power (23038-001,Qty:1)
	Connection Failure		<0.1%	Connection Defective (23038-001,Qty:1)
	Seized		<0.1%	Excessive Sized Bind (23038-001,Qty:1)
	Seal/Gasket Failure		NR	Seal Failures of Bellows, Diaphragms, etc. (24417-002,NR)

Switch, Pressure, Fluid Intermittent Operation	44.9%	Sources:1 44.9% Intermittent-Noise (25000-000,Qty:16), Intermittent-General (25000-000,Qty:3) (25000-000,Qty:5) (25000-000,Qty:7)
Drift	30.4%	<pre>30.4% Parameter Drift-High Contact Resistance (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:4), Parameter Drift-Insulation Resistance (25000-000,Qty:1) (25000-000,Qty:3), Parameter Drift-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:4) (25000-000,Qty:4)</pre>
Opened	21.74	21.7% Open-Open Contacts (25000-000,Qty:1), Open-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:8)
Seal Failure	1.4%	1.4% Seal Leak (25000-000, Qty:1)
Shorted	1.44	1.4% Short (25000-000,Qty:1)

FMD	-91			Failure Distribution Summaries 3-219
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	n, Push Button pened	60.0%	45.0%	Sources:5 Open (24990-000,80.0%), High Z (24991-000,100.0%)
C	Contaminated		25.0%	Sticking Flux Penetrating Into Cavity (10722-000,Qty:2), In-House Contact Contamination (24417-002,NR)
SI	norted	6.74	5.0%	Short (24990-000,20.0%), Low Z (24991-000,NR)
I	nduced		25.0%	Design Problem (23037-000,Qty:1)
	n,Push Button,Illuminated hknown		<0.1%	Sources:2 Unknown (24996-000,NR) (24997-000,NR)
Ot	ther Change in Resistance		100.0% NR	High Resistance or Intermittent Contact (24996-000,NR)
	Opened		NR	Lamp Failure (24996-000, NR)
	Fails to Close		NR	Fails to Close (24996-000,NR), Fails to close (24997-000,NR)
	Fails to Open		NR	Fails to Open (24996-000,NR), Fails to open (24997-000,NR)
	High Contact Resistance		NR	High resistance or intermittent contact (24997-000,NR)
	Lamp Failure		NR	Lamp failure (24997-000, NR)
	n,Push Button,Pendant-Hoist Inding/Sticking		23.14	Sources:5 Sticky (23038-001,Qty:1) (23038-002,Qty:9) (23038-004,Qty:1) (23038-005,Qty:2), Binding (23038-006,Qty:1), Sticky/Binding (23038-006,Qty:5)
Lo	oss of Control	22.1	16.2	Control Inoperative (23038-001,Qty:2) (23038-004,Qty:6) (23038-005,Qty:1) (23038-006,Qty:1) (23038-006,Qty:1) (23038-006,Qty:1)
Me	echanical Failure	21.0%	15.4%	Broken/Fractured (23038-001,Qty:2) (23038-002,Qty:1), Broken (23038-001,Qty:1) (23038-002,Qty:1) (23038-004,Qty:5) (23038-005,Qty:1) (23038-006,Qty:1), Distorted (23038-002,Qty:1), Friction Excessive (23038-002,Qty:1)
De	graded Operation	9.6%	7.0%	Faulty Reading (23038-001,Qty:2) (23038-001,Qty:3), Fluctuate (23038-001,Qty:1), Incorrect Oil Pressu (23038-001,Qty:1)
Wo	prn	7.24	5.34	Worn Excessively (23038-001,Qty:1) (23038-002,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1)
Co	ontact Failure	6.24	4.54	Dirty (23038-002,Qty:1), Corroded (23038-002,Qty:1), Contact Defect (23038-002,Qty:1), Contact/Conn Defect (23038-005,Qty:1)
Ja	www.d/Stuck	2.3	1.75	Jammed (23038-001,Qty:1) (23038-002,Qty:1)
Un	iknown		24.48	Unknown (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:1) (23038-001,Qty:2) (23038-002,Qty:1) (23038-002,Qty:2) (23038-002,Qty:2) (23038-002,Qty:5) (23038-004,Qty:2) (23038-004,Qty:2) (23038-005,Qty:1) (23038-005,Qty:1) (23038-006,Qty:1) (23038-006,Qty:1)
In	duced		1.34	Missing (23038-002,Qty:2)
Ot	her (<\$3)		1.14	

3-220 Part	Failure Distribution Sur	Norm	Fail	Data	FMD-9
Desc.		Dist.	Dist.		
witch	n, Push Button, Pendant-Hoist	Key (cont	tinued)		
	ther (continued)	•			
	Intermittent Operation		1.1*	Intermittent (23038-004,Qty:1)	
	h, Reed	~~ ~~		Sources:2	
O	ut of Spec.	30.05	30.0%	Out of Specification (20609-000,Qty:3), Out of Spec. (25038-000,30.0%)	
No	o Operation	30.0%	30.0%	No Operation (20609-000,Qty:3) (25038-000,30.0%)	
S	purious/False Operation	20.0%	20.0%	False Response (20609-000,Qty:2) (25038-000,20.0%)	
Oj	pened	10.0%	10.0%	Opened (20609-000,Qty:1), Open (25038-000,10.0%)	
I	ntermittent Operation	10.0%	10.0%	Intermittent (20609-000,Qty:1) (25038-000,10.0%)	
	h,Rotary,Manual			Sources:1	
	igh Z			High Z (24991-000,Qty:3)	
S	horted	20.0%	20.0%	Low Z (24991-000,25.0%)	
	h,Sensitive Micro inding/Sticking	78.3*	52.98	Sources:2 Jammed (23038-004,Qty:1), Sticky (23038-005,Qty:1)	
	roken	8.75		Broken (23038-004, Qty:1) (23038-004, Qty:1)	
_	o Output	4.3		No Output (23038-004,Qty:1)	
	horted	4.3%		Short Or Grounded (23038-004, Qty:1)	
C	ontaminated	4.38		Dirty (23038-004, Qty:1)	
Ur	nkiiown			Unknown (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:1) (23038-004,Qty:2) (23038-004,Qty:2) (23038-004,Qty:3)	)
Ir	nduced		2.9%	Incorrect Voltage (23038-004, Qty:1)	
witch	n,Slide			Sources: 1	
Co	prroded	16.7%	11.14	Corroded (23038-004, Qty:1)	
No	Operation			Incperative (23038-004,Qty:1)	
	roken			Broken (23038-004, Qcy:1)	
	orted			Shorted Cr Grounded (23038-004, Qty:1)	
	ess of Control			Control Inoperative (23038-004, Qty:1)	
La	mp Failure	16.7%	11.18	Light Bulb Failure (23038-004, Qty:1)	
Un	known		33.3%	Ur.known (23038-004, gty:3)	

Part Failure	Nozm	Fail	Data
art Failure Dosc. Mode/Mach	Dist.		Data Source(s)/Details
witch, Snap Opened	75.0%	75.0	Sources:2 Open (24992-000,50.0%), N.O. Contact Not Closing (10722-000,Qty:1)
Shorted	12.54	12.5%	Short (24992-0(7,25.0%)
Mechanical Failure	12.5	12.5	Mechanical Fallure (24992-000,25.0%)
Switch, Thermal Drift	41.24	28.1%	Sources:9 Parameter Drift-Insulation Res. (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:5), Parameter Drift-General (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:5) (25000-000,Qty:6) (25000-000,Qty:8) (25000-000,Qty:15), Parameter Drift-High Contact Resistance (25000-000,Qty:3) (25000-000,Qty:4), Faulty Reading (23038-003,Qty:1) (23038-005,Qty:1), Out Of Adjustment (23038-006,Qty:1), Out of Adjustment (20609-000,Qty:4), Erratic (20609-000 '3), Drift (20609-000,Qty:36)
Mechanical Failure	27.2%	18.6%	Broken/Fractured (23038-001,Qty:1), Broken (23038-003,Qty:1) (23038-004,Qty:1) (23038-005,Qty:1)
Opened	19.6%	13.44	Open (25000-000,Qty:2) (25000-000,Qty:3), High 2 (24991-000,100.0%)
Degraded Operation	4.4%	3.0%	Oil Pressure Incorre (23038-003,Qty:1), Beyond Spec. Tol. (23038-004,Qty:1)
No Cutput	3.0%	2.1	No Output (23038-003,Qty:1)
Loss of Control	2.6%	1.8	Control Inoperative (23038-004,Qty:2)
Shorted	2.1%	1.4%	Short-Dielectric (25000-000,Qty:3), Low Z (24991-000,NR), Shorted Or Grounded (23038-004,Qty:1)
Unknown		22.5%	Unknown (20609-000.gty:20) (20609-000,gty:32) (23038-003,gty:2) (23038-004,gty:6) (23038-006,gty:1)
Incad		7.1%	Melted (23038-004,Qty:1), Caused By Other Dev. (23038-005,Qty:_)
Other (<%3) Binding/Sticking		1.9% 1.0%	Sticky (23038-004, gty:1), Sticking (20609-000, Gty:1)
Loss of Power		0.9%	Electrical Pwr Loss (23038-004, Qty:1)
Seal/Gasket Failure		NR	Seal Failure (24417-002,NR)
witch,Toggle Mechanical Failure	42.5%	29.8%	Sources:11 Mechanical Failure (24992-000,66.6%) (24996-000,NR), Bent (23038-001,Qty:1), Broken/Fractured (23038-001,Qty:1) (23038-001,Qty:1), Broken (23038-002,Qty:2) (23038-003,Qty:1) (23038-004,Qty:2), Broked/Fractured (23038-006,Qty:1), Mechanical failure (24997-000,NR), Mechanical (25038-060,35.0%)
Opaned	25.1	17.6%	Open (23038-002,Qty:1) (23038-002,Qty:2) (23038-004,Qty:1) (23038-005,Qty:1) (24992-000,16.7%) (25038-000,24.0%), No Output (23038-001,Qty:1), Corroded (23038-006,Qty:1), Open Circuit (24996-000,NR) (24997-000,NR)
Contact Failure	9.11	6.34	<pre>Intermittent Contact (24993-000,50.0%), Contact/Conn Defect (23038-004,Qty:1)</pre>

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Unknown

t Failure	Nurm	Fail	Data
c. Mode/Mach	Dict.	Dist.	Seurce(s)/Details
tch,Toggle (continued) Shorted	8.14	5.78	Short (24992-000,16.7%) (24996-000,NR) (24997-000,NR) (25038-000,16.0%), Shorted Or Grounded (23038-001,Qty:1)
Spring Failure	6.3%	4.4%	Spring Breakage (Fatigue) (24993-000,40.0%)
Intermittent Operation	5.0%	3,5%	Intermittent (25038-000,35.0%)
Binding/Sticking	3.84	2.6%	Sticky (23038-004, Qty:1) (23038-005, Qty:)
Unknown		23.14	Unknown (23038-002,gty:1) (23038-002,gty:1) (23038-003,gty:1) (23038-003,gty:1) (23038-004,gty:1) (23038-004,gty:2) (23038-004,gty:2) (23038-005,gty:1) (23038-005,gty:1) (23038-006,gty:1) (24993-000,10.0%)
Induced		4.5	Damaged For Test Pur (23038-004,Qty:1), Missing (23038-005,Qty:)), Maintenance Error (23038-005,Qty:1)
Other (<\$3) Lamp Failure		2.4% 0.8%	Light Bulb Failure (23038-004,Qty:1)
Burned/Charred		0.8%	Burred (23038-004, (ty:1)
Worn		0.8%	Worn Excessively (23038-004,Qty:1)
chro Winding Failure	44,48	40.0%	Sources:2 Winding Failures (24993-000,40.0%)
Bearing Failure	33.34	30.0%	Bearing Failures (24993-000,30.0%)
Brush Failure	22.2	20.0%	Slipring And Brush Failures (24993-000,20.0%)
Unknown	******	10.0%	Unknown (24993-000,10.0%)
Other Degraded Operation		0.0% NR	Null Voltage and Error Changes (24417-001,NR), Incorrect Zeroing (24417-001,NR)
Opened		NR	Open Slip Ring Contact (24417-001,NR) (24417-001,NR), Open Slip Ring Contact-Insufficient Spring Pressur (24417-001,NR), Open Slip Ring Contact-Loose Slip Ring Assemblies (24417-001,NR)
chro,Resolver	100.0%	100.0%	Sources:1 Loose, Damaged, or Missing Har (25464-000, Gty:3)
k Lesking	80.6 <b>%</b>	64.1%	Sources:1 Leaking (20609-000, Qty:25)
Cracked/Fractured	9.78	7.78	Cracked/Fractured (20609-000, Qty:3)
Burst/Ruptured	5.24	2.64	Ruptured (20609-000,Qty:1)
Cut/Scarred/Punctured	3.28	2.64	Ripped/Torn/Cut (20609-000, Qty:1)

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----- 20.5% Unknown (20609-000, gty:8)

Part Desc.	Failure	Norm	Fail	Data
	Mode/Mech	Dist.	Dist.	
	torage,Low Pressure chanical Failure	65.0%	65.0%	Sources:1 Mechanical Failure (24996-000,65.0%)
Ma	tallurgical Failure	35.0%	35.0%	Metallurgical Failure (24996-000,35.0%)
	one System, PBX duced		<0.18	Sources:1 Degradation of Service (24996-000,NR)
Un	known		<0.1%	Unknown (24996-000, NR)
Ot	her System Outage		100.0% NR	System Outage (24996-COO,NR)
	one System, PBX, PABX duced		<0.1%	Sources:1 Degradation of service (24997-000,NR)
Jn	known		<0.1	Unknown (24997-000, NR)
OL	her System Outage			System outage (24997-000,NR)
	one System, Switching, Elec duced	tronic	<0.1	Sources:1 Operator errors (24997-000,NR), Maintenance actions effects (24997-000,NR)
In			100.0%	Operator errors (24997-000, NR), Maintenance actions effects
In	duced		100.0% NR	Operator errors (24997-000,NR), Maintenance actions effects (24997-000,NR) S/W errors; 6-18 month to stability (1-2 per mo.)
In Oti	duced her Software Failure Hardware Failure		100.0% NR NR	Operator errors (24997-000,NR), Maintenance actions effects (24997-000,NR) S/W errors; 6-18 month to stability (1-2 per mo.) (24997-000,NR)
In Otl	duced ber Software Failure Hardware Failure bpe uking		100.0% NR NR 5.9%	Operator errors (24997-000,NR), Maintenance actions effects (24997-000,NR) S/W errors; 6-18 month to stability (1-2 per mo.) (24997-000,NR) Hardware malfunction (24997-000,NR) Sources:2 Interna <sup>1</sup> Failure - Leaking Nitrogen (25101-000,Qty:1),
In Ot Blesco Lea Wor	duced ber Software Failure Hardware Failure bpe uking	33.3	100.0% NR NR 5.9% 2.9%	Operator errors (24997-000,NR), Maintenance actions effects (24997-000,NR) S/W errors; 6-18 month to stability (1-2 per mo.) (24997-000,NR) Hardware malfunction (24997-000,NR) Sources:2 Interna <sup>1</sup> Failure - Leaking Nitrogen (25101-000,Qty:1), Leak/Temp Drop - Low Pow Pl Oil Press (25101-000,Qty:1)
In Otl Blesco Les Woi Bro	duced her Software Failure Hardware Failure bpe sking	33.34	100.0% NR NR 5.9% 2.9%	Operator errors (24997-000,NR), Maintenance actions effects (24997-000,NR) S/W errors; 6-18 month to stability (1-2 per mo.) (24997-000,NR) Hardware malfunction (24997-000,NR) Sources:2 Interns <sup>1</sup> Failure - Leaking Nitrogen (25101-000,Qty:1), Leak/Temp Drop - Low Pow Pl Oil Press (25101-000,Qty:1) Unknown - Worn Out (25101-000,Qty:1)
In Oti Blesco Lea Woi Bro Sea	duced For Software Failure Hardware Failure Hardware Failure Recommendation	33.34 16.74 16.78	100.0% NR 5.9% 2.9% 2.9%	Operator errors (24997-000,NR), Maintenance actions effects (24997-000,NR) S/W errors; 6-18 month to stability (1-2 per mo.) (24997-000,NR) Hardware malfunction (24997-000,NR) Sources:2 Interna <sup>1</sup> Failure - Leaking Nitrogen (25101-000,Qty:1), Leak/Temp Drop - Low Pow Pl Oil Press (25101-000,Qty:1) Unknown - Worn Out (25101-000,Qty:1) Broken/Damaged (25101-000,Qty:1)
In Ot lesco Los Bro Sea Out	duced ber Software Failure Hardware Failure bpe king m bken hl/Gasket Failure	33.34 16.74 16.74	100.0% NR 5.9% 2.9% 2.9% 2.9% 2.9%	Operator errors (24997-000,NR), Maintenance actions effects (24997-000,NR) S/W errors; 6-18 month to stability (1-2 per mo.) (24997-000,NR) Hardware malfunction (24997-000,NR) Sources:2 Interna <sup>1</sup> Failure - Leaking Nitrogen (25101-000,Qty:1), Leak/Temp Drop - Low Pow Pl Oil Press (25101-000,Qty:1) Unknown - Worn Out (25101-000,Qty:1) Broken/Damaged (25101-000,Qty:1) Seals Worn - Internal Moisture (25101-000,Qty:1)

	Failure	Norm	FA11	Data
rt sc.	Mode/Mech		Fail Dist.	
	ope,Elbow nding/Sticking	36.4%	21.6%	Sources:1 Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:6), Part Struck/Damaged - Binding/Sticking (25101-000,Qty:1)
Se	zed	36.4%	21.6%	Seized (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Locked (25101-000,Qty:1) (25103-000,Qty:2), Internal Failure - Seized (25101-000,Qty:1)
Loc	50	18.2%	10.8%	Poor Einding - Loose (25101-000,Qty:1), Vibration - Loose (25101-000,Qty:3)
Bor	d/Beam Failure	9.1%	5.4%	Poor Bonaing - Inop/Unserviceable (25101-000,Qty:2)
Inc	luced		18.9%	Fell Off Or Lost - Missing (25101-000, Qty:7)
Unl	nown		8.1%	Unknown (25101-000,Qty:1) (25101-000,Qty:2)
Otł	er (<\$5) Out of Adjustment		13.5% 2.7%	Cut Of Adjustment - Locked (25101-000, Qty:1)
	Leaking		2.7%	Undersize - Leaking Nitrogen (25101-000,Qty:1)
	Bent/Dented/Warped		2.7%	Warped Bent - Seized (25101-000,Qty:1)
	Moisture Intrusion		2.78	Internal Moisture (25101-000,Qty:1)
	Excessive Vibration		2.7%	Vibration - Inop/Unserviceable (25101-000,Qty:1)
	p <b>e, M</b> ount ken	32.4%	23.1%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:2) (25101-000,Qty:3), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2), Part Struck/Damaged - Out Of Synch (25101-000,Qty:1)
Ехс	essive Play	24.3%	17.3%	Excessive Play (25101-000,Qty:1) (25101-000,Qty:1), Worn - Excessive Play (25101-000,Qty:1), Poor Design - Excessive Play (25101-000,Qty:1) (25101-006,Qty:5)
Wor	n	13.5%	9.6%	Worn - Inop/Unserviceable (25101-000,Qty:1), Poor Design - Worn Out (25101-000,Qty:4)
Bin	ding/Sticking	10.84	7.7%	Chipped-Binding/Sticking (25101-000,Qty:1), Gears Binding - Binding/Sticking (25101-000,Qty:2), Binding/Sticking (25101-000,Qty:1)
Cra	cked/Fractured	8.11	5.8%	Cracked (25101-000,Qty:1), Cracked/Split-Inop/Unserviceable (25101-000,Qty:1), Vibration - Cracked (25101-000,Qty:1)
Out	of Synch.	5.4%	3.84	Out Of Synch (25101-000, Qty:1), Vibration - Out Of Synch (25101-000, Qty:1)
Out	of Adjustment	5.4%		Out Of Adjustment - Excessive Play (25101-000, Cty:1), Out Of Adjustment - Binding/Sticking (25101-000, Qty:1)
Ind	uced			<pre>Improper Adjustment - Out Of Adjustment (25101-000,Qty:1), Improper Maintenance - Out Of Synch (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Caused By Other Failure-Binding/Sticking (25101-000,Qty:1), Item Abuse/Neglect - Cracked (25101-000,Qty:1), Item Abuse/Neglect - Cracked (25101-000,Qty:1), Lack Of Maintenance - Loose (25101-000,Qty:1), Improper Maintenance - Stripped (25101-000,Qty:1)</pre>
			1 05	Unknown (25101-000, Qty:))
Unk			1.94	

MD-				Failure Distribution Summaries 3-
esc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
	ope, Mount (continued) her (continued)			
	Seal/Gasket Failure		1.9%	Seals Worn - Out OF Adjustment (25101-000,Qty:1)
	Sent/Dented/Warped		1.9%	Collapsed/Bent (25101-000,Qty:1)
	Lamp Failure		1.9%	Inop Fire Control Light (25101-000,Qty:1)
	Spring Failure		1.9%	Spring Weak - Out Of Adjustment (25101-000,Qty:1)
	ope,Pan nding/Sticking	31.3%	18.6%	Sources:1 Gears Binding - Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:1), Worn/Stripped - Binding/Sticking (25101-000,Qty:1), (25101-000,Qty:1), Poor Design - Binding/Sticking (25101-000,Qty:1), Gears Binding - Inop/Unserviceable (25101-000,Qty:1), Worn - Binding/Sticking (25101-000,Qty:1), Internal Failure - Binding/Sticking (25101-000,Qty:3), No Failure - Binding/Sticking (25101-000,Qty:1), Unknown - Binding/Sticking (25101-000,Qty:1)
Wo	rn	25.3%	15.0%	Worn Out (25101-000,Qty:20), Worn - Inop/Unserviceable (25101-000,Qty:1)
Ex	cessive Play	12.0%	7.1%	Excessive Play (25101-000,Qty:1) (25101-000,Qty:1), Internal Failure - Excessive Play (25101-000,Qty:6), No Failure - Excessive Play (25101-000,Qty:2)
Br	oken	10.8%	6.4%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:2), Poor Design - Broken/Damaged (25101-000,Qty:1), Vibration - Broken/Damaged (25101-000,Qty:1), Unknown - Broken/Damaged (25101-000,Qty:2)
Мо	isture Intrusion	8.4%	5.0%	Internal Moisture (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:5)
Ou	t of Adjustment	7.24	4.3%	Out Of Adjustment (25101-000,Qty:1), Out Of Adjustment - Excessive Play (25101-000,Qty:1), Out Of Adjustment - Binding/Sticking (25101-000,Qty:1), Vibration - Out Of Adjustment (25101-000,Qty:1) (25101-000,Qty:1), Out Of Adjustment - Out Of Adjustment (25101-000,Qty:1)
Se	ized	4.8%	2.94	Worn - Seized (25101-000,Qty:2), Worn/Stripped - Seized (25101-000,Qty:1), Internal Failure - Seized (25101-000,Qty:1)
Ind	duced			Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Lack Of Maintenance - Out Of Adjustment (25101-000,Qty:1), Abnormal Operation (25101-000,Qty:1), Safety Wire/Key Failure - Missing (25101-000,Qty:1), Fell Off Or Lost - Missing (25101-000,Qty:1), Vibration - Missing (25101-000,Qty:1) (25101-000,Qty:1), Dropped - Broken/Damaged (25101-000,Qty:1), Item Abuse/Neglect - Inop/Unserviceable (25101-000,Qty:1), Improper Maintenance - Internal Moisture (25101-000,Qty:1), Internal Failure - Inaccurate (25101-000,Qty:5), Lack Of Maintenance - Internal Moisture (25101-000,Qty:3), Overtorqued - Out Of Adjustment (25101-000,Qty:1), Overtorqued - Binding/Sticking (25101-000,Qty:1)
Uni	nown		3.64	Unknown (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1)
Oth	er (<\$4) Seal/Gasket Failure			Seals Worn - Internal Moisture (25101-000,Qty:3)

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irt	Failure	Norm	Fail	Data
asc.		Dist.		Source(s)/Details
	ope, Pan (continued) her (continued)			
	Loose		2.1	<pre>Part Missing/Loose - Missing (25101-000,Qty:1), Loose Screw(s) - Inop/Unserviceable (25101-000,Qty:1) (25101-000,Qty:1)</pre>
	Bent/Dented/Warped		2.1	Collapsed/Bent (25101-000,Qty:3)
	Aged/Deteriorated		1.4	Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:1), Deteriorated/Aged - Inop Fire Control Light (25101-000,Qty:1)
	Spring Failure		0.7%	Spring Weak - Inop/Unserviceable (25101-000,Qty:1)
	Excessive Vibration		0.7%	Vibration - Inop/Unserviceable (25101-000,Qty:1)
	Cracked/Fractured		0.7%	Part Struck/Damaged - Cracked (25101-000,Qty:1)
	Corroded		0.75	Corroded-Seized (25101-000,Qty:1)
	Lamp Failure		0.7%	Internal Failure - Inop Fire Control Light (25101-000,Qty:1)
	Degraded Operation		0.7%	No Failure - Abnormal Operation (25101-000,Qty:1)
	Stripped		0.7%	Stripped (25101-000,Qty:1)
	Cut/Scarred/Punctured		0.7%	Cut/Scarred (25101-000,Qty:1)
Ot	her Change in Resistance Wire Failure			Increased Contact Resist-Stress Relaxation: Creep (13741-000,NR), Increased Contact Resist-Stress Relax:Recrystal. (13741-000,NR), Increased Contact Resistance-Corrosion: Atmospheri (13741-000,NR), Increased Contact Resistance-Corrosion: Galvanic (13741-000,NR), Increased Contact Resistance-Undercrimping (13741-000,NR) Wire Breakage Near Terminal-Overcrimping (13741-000,NR), Wire Breakage Near Terminal-High Vibration (13741-000,NR)
	al Connection,Lug,Strip oken	100.0%	100.0%	Sources:1 Broken (25464-000,Qty:8)
	al Connection, Terminal Board duced		<0.1	Sources:2 Terminals: Intermittent Contact (24996-000, NR)
Uni	known		<0.1%	Unknown (24997-000, NR)
Oti	ner Flashover		100.0% NR	Terminal Boards: Flashover (24996-000,NR)
	Broken		NR	Terminal Boards: Mechanical Breakage (24996-000,NR)
	Contact Failure		NR	Terminals: (Intermittent contact) (24997-000,NR)
	Mechanical Failure		NR	Terminals: Mechanical Separation (24996-000, NR),

	91			Failure Distribution Summaries 3-2
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	al Connection, Terminal Board	(conti	nued)	, a de la construction de la
Oti	her (continued)			Terminals: (Mechanical separation) (24997-000,NR)
	Mechanical Damage		NR	Terminal Boards: (Mechanical breakage) (24997-000,NR)
	Shortod		NR	Terminal Boards: Shorts (24996-000,NR), Terminal Boards: (Shorts) (24997-000,NR)
limer Out	(Summary) t of Adjustment	100.0%		
•	Electromechanical t of Adjustment	106.0%	33.34	Sources:1 Needs Adjustment (19542-000,33.3%)
Unl	known		66.7%	Unknown (19542-000,66.?%)
	loy Ingot oken	100.0%	100.0%	Sources:1 Broken/Separated-Seized (25101-000,Qty:1)
Cut Wor Age Lea Bro	Summary) t/Scarred/Punctured rn ed/Deteriorated aking oken ripped ose	63.7% 11.8% 10.8% 5.9% 5.9% 1.0%		
'ire Cui	t/Scarred/Punctured	59.0%	57.1%	Sources:1 Cut-Inop/Unserviceable (25101-000,Qty:2), Cut-Punctured (25101-000,Qty:2), Cut-Leaking Air (25101-000,Qty:19), Cut-Cut/Scarred (25101-000,Qty:5), Punctured (25101-000,Qty:7), Cut/Scarred (25101-000,Qty:1)
Wo	rn	19.7%	19.0%	Worn Out (25101-000,Qty:5), Worn - Inop/Unserviceable (25101-000,Qty:7)
Lei	aking	9.84	9.5%	Leaking Air (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Overheated - Leaking Air (25101-000,Qty:1), Part Struck/Damaged - Leaking Air (25101-000,Qty:1)
Age	ed/Deteriorated	8.24	7.9%	Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:2), Deteriorated/Aged - Fnd In TI/PMSC/INSP (25101-000,Qty:1), Deteriorated/Aged - Abnormal Operation (25101-000,Qty:1), Deteriorated (25101-000,Qty:1)
Bro	oken	3.34	3.24	Part Struck/Damaged - Missing Rubber (25101-000,Qty:1), Broken/Separated - Leaking Air (25101-000,Qty:1)
Unk	known		1.6%	Unknown (25101-000, gty:1)
•	iuced		1.68	Improper Alignment - Inop/Unserviceable (25101-000,Qty:1)

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Part	Failure	Norm	Fail	Data
)esc.	Mode/Mach	Dist.	Dist.	Source(s)/Details
	Roller Assembly ut/Scarred/Punctured	70.7%	56.9%	Sources:1 Cut/Scarred (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:4) (25101-000,Qty:9), Cut-Cut/Scarred (25101-000,Qty:3), Part Struck/Damaged - Cut/Scarred (25101-000,Qty:10)
A	ged/Detericrated	14.6%	11.8%	Deteriorated/Aged - Inop/Unserviceable (25101-000,Qty:6)
B	roken	9.8%	7.8%	Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Fnd In TI/PMCS/INSP (25101-000,Qty:3)
L	00 <b>3e</b>	2.4%	2.0%	Loose (25101-000,Qty:1)
St	ripped	2.4%	2.0%	Part Missing/Loose - Stripped (25101-000,Qty:1)
I	nduced		19.6%	Item Abuse/Neglect - Cut/Scarred (25101-000,Qty:10)
	lox Cover oken	94.4%	81.0%	Sources:1 Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1), Poor Design - Broken/Damaged (25101-000,Qty:14), Broken/Separated - Inop/Unserviceable (25101-000,Qty:1)
Cr	acked/Fractured	5.6%	4.8%	Cracked (25101-000,Qty:1)
Ir	duced		14.3%	Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:3)
	& Bracket Assy duced		100.0%	Sources:1 Lack Of Maintenance - Low Pow Pl Oil Press (25101-000,Qty:1)
rail Cr	Box acked/Fractured	66.7%	15.4%	Sources:1 Vibration - Cracked (25101-000,Qty:2)
Be	nt/Dented/Warped	33.3%	7.7%	Collapsed/Bent (25101-000, Qty:1)
In	duced			Caused By Other Failure-Cracked (25101-000,Qty:1), Caused By Other Failure-Broken/Damaged (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Item Abuse/Neglect - Collapsed/Bent (25101-000,Qty:7)
	eiver Wer Supply Failure	52.4%	17.8	Sources:1 Failure of Power Supply (C10573) (25027-000,14.8%), Failure of Power Supply (C10573)-Vibration (25027-000,0tv:28)
Fl	ex-Rigid Failure	31.0%	10.8%	Failure of Flex-Rigid, MIB (16VE279) (25027-000,9.0%), Failure of Flex-Rigid, MIB (16VE279)-Vibration (25027-000,Qty:17)
1/0	O Status Logic Failure	5.6%		Failure of I/O Status Logic (16E10154) (25027-000,6.9%), Failure of I/O Status Logic (16E10154)-Vibration (25027-000,Qty:3)
Но	asing Failure	5.64		Failure of AMRIU Housing (16E1611) (25027-000,2.7%), Failure of AMRIU Housing (16E1611)-Vibration (25027-000,Qty:3)
Re	lay Failure	4 - 64	1.64	Chassis/Relays (25027-000,1.6%)

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art Failure esc. Mode/Mach	Norm		
		Fail Dist.	Data Source(s)/Details
ransducer (Summary)			
Contaminated	44.4%		
Out of Spec.	27.3		
Opened Shorted	7.2%		
Resistor Failure	5.38		
Degraded Operation	5.3%		
Out of Adjustment	4.84		
ransducer Out of Spec.	81 68	52 38	Sources:1 Out of Tolerance (20609-000,Qty:163), Out of Specification
	01.04	52.55	(20609-000,Qty:107)
Contaminated	7.3%		Contaminated (20609-000,Qty:24)
Intermittent Operation	4.2%		Intermittent (20609-000,Qty:14)
Burned/Charred	3.0%		Burned (20609-000,Qty:10) Opened (20609-000,Qty:8)
Opened No Operation	1.5%		No Operation (20609-000, Qty:5)
Unknown			Unknown (20609-000, gty: 47) (20609-000, gty: 134)
Other (<\$2) Leaking	هند هنه برند هند ابن ابند	0.8% 0.6%	Leaking (20609-000,Qty:3)
Binding/Sticking		0.2%	Binding (20609-000,Qty:1)
ransducer, Pressure Contaminated	72.7%	66.7%	Sources:1 PIND Noise-Conductive Particles/Potential Short (10722-000,Qty:8)
Degraded Operation	9.18	8.34	Drop In Output Voltage-Mechanical Overstress (10722-000,Qty:1)
Shorted	9.18	8.3%	Internal Short-Conductive Mobile Particle Leadwire (10722-000, Qty:1)
Resistor Failure	9.1	8.34	Intermittent Open Thin Film Bridge Resistors (10722-000, Qty:1)
Unknown		8.3%	Unknown (10722-000,Qty:1)
ransducer, Sensor (Summary) Out. of Adjustment Out. of Spec. Burned/Charred	40.6% 19.5% 11.7%		
Opened	10.2		
Spurious/False Operation	7.04		
Intermittent Operation Shorted	6.34 4.74		

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230 Failure Distribution Su				FMD-9
rt Failure		Fail	Data	
sc. Mode/Mech	Dist.	Dist.	Source(s)/Details	
ansducer, Sensor			Sources:]	
Out of Adjustment	46.0%	24.28	Out of Adjustment (20609-000, Qty:46)	
Burned/Charred	15.0%	7.9%	Burned (20609-000,Qty:15)	
Opened	13.0%	6.8%	Opened (20609-000, Qty:13)	
Out of Spec.	9.0%	4.78	Out of Specification (20609-000,Qty:9)	
Spurious/False Operation	6.0%	3.28	Erratic (20609-000,Qty:6)	
Shorted	6.0%	3.2%	Short (20609-000,Qty:6)	
Intermittent Operation	5.0%	2.6%	Intermittent (20609-000,Qty:5)	
Unknown	******	44.2%	Unknown (20609-000,Qty:2) (20609-000,Qty:82)	
Other (<%3)		3.2%		
Contaminated		1.1%	Contaminated (20609-000,Qty:2)	
Cracked/Fractured		0.5%	Cracked/Fractured (20609-000,Qty:1)	
Corroded		0.5%	Corroded (20609-000,Qty:1)	
Broken		0.5%	Broken (20609-000,Qty:1)	
Leaking		0.5%	Leaking (20609-000,Qty:1)	

Transducer, Sensor, Light Out of Spec.	65.24	Sources:1 53.6% Out of Specification (20609-000,Qty:15)
Out of Adjustment	21.7	17.9% Out of Adjustment (20609-000,Qty:5)
Spurious/False Operation	13.0%	10.7% False Response (20609-000,Qty:3)
Other (<\$5) Stuck Closed		17.9% 3.6% Stuck Closed (20609-000,Qty:1)
No Operation		3.6% No Operation (20609-000,Qty:1)
Leaking		3.6% Leaking (20609-000,Qty:1)
Intermittent Operation		3.6% Intermittent (20609-000,Qty:1)
Cracked/Fractured		3.6% Cracked/Fractured (20609-000, gty:1)

Transducer, Sensor, Pneumatic	Sources:1				
Out of Adjustment	50.0%	50.0% Out of Adjustment (20609-000, Qty:1)			
No Operation	50.08	50.0% No Operation (20609-000, gty:1)			

FMD-91 Failure Distribution Summaries				
art Failure esc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details	
ransducer, Sensor, Solid State Intermittent Operation	66.7%	66.78	Sources:1 Intermittent (20609-000,Qty:2)	
Out of Spec.	33.3%	33.34	Out of Specification (20639-000,Qty:1)	
ransducer, Temperature Opened	.100.0%	100.0%	Sources:1 Open Lead-Cyclic Fatigue Of A Leadwire (10722-000,Qty:1)	
ransformer (Summary)				
Opened	37.5% 37.4%			
Shorted Degraded Output	37.4% 8.5%			
Drift	6.2%			
Mechanical Failure	5.2%			
Worn	5.1%			
ransformer Opened	40.1*	31.5%	Sources:11 Open (24991-000,33.0%) (24991-000,40.0%) (24991-000,50.0%) (24991-000,100.0%) (24992-000,25.0%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:6) (25000-000,Qty:7) (25000-000,Qty:1) (25000-000,Qty:14) (25000-000,Qty:17) (25027-000,Qty:1), Open - Primary (24990-000,50.0%), Open - Secondary (24990-000,10.0%), Open Circuits (24993-000,5.0%), Open Magnet Wire-Mechanical Stress (10722-000,Qty:1), Open Primary Winding (10722-000,Qty:1), Open Primary Windings-Ext. Electrical Overstress (10722-000,Qty:2), Verified Open Magnet Wire (10722-000,Qty:1), Intermittent Opens (10722-000,Qty:3), Open In One Of Secondary Windings-Ext. Overstress (10722-000,Qty:1), Open Windings-Tensile Fractures Of The Magnet Wire (10722-000,Qty:2), Faulty Leads (25038-000,5.0%)	
Shorted	39.5 <b>%</b>	31.10	Short- Dielectric Strength (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:5), Short- General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:21), Short-Dielectric Strength (25000-000,Qty:2) (24991-000,NR) (24991-000,50.0%) (24991-000,60.0%) (24991-000,66.0%) (24992-000,25.0%) (25000-600,Qty:20), Breakdown Between Windings, Core and Case Surface (25016-000,NR), Short - Primary (24990-000,30.0%), Short - Secondary (24990-000,10.0%) Shorted Turns (24993-000,80.0%), Catastrophic-Due To Shorts (18175-000,14.0%), Intra Winding Short (10722-000,Qty:1), Short-Excessive Lengths Of Crossed 4 Bare Lead Wir (10722-000,Qty:1), Primary To Secondary Short (10722-000,Qty:1), Lamination-Solder Particle (10722-000,Qty:1), Insulation Breakdown (25038-000,25.0%), Insulation Deterioration (25038-000,20.0%)	
Dielectric Breakdown	6.44	5.0%	Dielectric Breakdokwn (24992-000,50.0%)	
Drift	6.2\$	4.98	Parameter Drift- Delta L (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1), Parameter Drift- Delta R (25000-000,Qty:27) (25000-000,Qty:37), Parameter Drift- Insulation Resistance (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:4) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:6) (25000-000,Qty:7) (25000-000,Qty:8) (25000-000,Qty:8) (25000-000,Qty:9)	

art	Failure	Norm	Fail	Data
	Mode/Mech			Source(s)/Details
	ormer (continued)			
DL	ift (continued)			(25000-000,Qty:10) (25000-000,Qty:17), Parameter Drift- General (25000-000,Qty:23) (25000-000,Qty:54)
Co	rroded	4.2%	3.3%	Corrosion (25000-000,Qty:2) (25000-000,Qty:6) (25000-000,Qty:17) (25000-000,Qty:18), Corroded Windings (25038-000,25.0%)
Wi	re Failure	3.6%	2.9%	Tensile Fracture Of Magnet Wire (10722-000,Qty:1), Wire over-stress (25038-000,25.0%)
Un	known		5.7%	Unknown (10722-000,Qty:1) (10722-000,Qty:1) (18175-000,15.0%) (20609-000,Qty:1) (24993-000,15.0%) (25000-000,Qty:2) (25000-000,Qty:6) (25000-000,Qty:11)
In	duced		3.6%	Catastrophic-No Output Due To Automatic Removal (18175-000,42.0%), Incorrect Output Due To Faulty Tap Changer (18175-000,5.0%)
Otl	her (<%4) Open Circuit			Catastrophic-No Output Due To Open Circuit (18175-000,35.0%)
	Intermittent Operation		2.0%	Intermittent (20609-000, Qty:1) (25000-000, Qty:2)
	Degraded Operation		2.0%	Degraded (20609-000,Qty:1)
	Mechanical Damage		1.8%	Mechanical Damage (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:5) (25000-000,Qty:6) (25000-000,Qty:10) (25000-000,Qty:30), Degraded - Mechanical Damage (18175-000,9.0%)
	Lead Damage		1.1%	Low Cycle Fatigue-Fractured Leads (10722-000,Qty:3)
	Cracked/Fractured		0.7%	Fractured Lead-Torsional Fatigue (10722-000,Qty:1), Fractured Wire-Mechanical Overstress (10722-000,Qty:1)
	Seal Failure		0.5%	Leakage (seal) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:8), Leakage(Seal) (25000-000,Qty:14)
	Degraded Output		0.5%	Degraded - Output Less Than Rated Capacity (18175-000,6.0%)
	No Output		0.5%	Catastrophic-No Output Due To Manual Removal (18175-000,6.0%)
	Electrical Overstress		0.4%	Overstress (10722-000,Qty:1)
	Winding Failure		NR	Open or Short Circuit in Windings (25016-000,NR)
	Change in Resistance		NR	Decrease in Insul. Resis. Between Windings & Core (25016-000,NR), Change in DC Resistance in Windings (25016-000,NR)
	Decrease in Exciting Curren	t	NR	Radical Decrease in Excitation Current (25016-000,NR)
	Change in Value		NR	Radical Decrease or Loss of Inductance (25016-000,NR)

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FMD-91 Failure Distribution Summaries 3-23				
Part Failure Desc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
Transformer Assembly Opened	100.0%	100.0%	Sources:1 Open-Faulty Solder Joint (10722-000,Qty:1), Pin 20 To Pin 16 Is Open-Fractured Magnet Wire (10722-000,Qty:1), Pin 10 To Pin 11 Is Open-Fracture Magnet Wire (10722-000,Qty:1), Open Between Pins 17 And 3-Fractured Magnet Wire (10722-000,Qty:1), Open Between Pins 10 And 11-Fractured Magnet Wire (10722-000,Qty:1)	
T:ansformer Assembly,Dual Opened	80.0%	80.0%	Sources:1 Open-Diode Cracked (10722-000,Qty:1), Noisy-Fractured Magnet Wire (10722-000,Qty:1), Fractured/Open Magnet Wire-Mechanical Overstress (10722-000,Qty:1), Open Output Winding (10722-000,Qty:1)	
Degraded Operation	20.0%	20.0%	Excessive Reverse Breakdown Voltage (10722-000,Qty:1)	
Transformer, Audio Opened	55.0%	36.7%	Sources:3 Open (24994-000,60.0%), Open Primary (10722-000,Qty:1)	
Shorted	45.0%	30.0%	Short (24994-000,40.0%), Short Primary (10722-000,Qty:1)	
Induced		33.34	Inconsistent Inductance Ranges-Manufacturing Error (25027-000,Qty:1)	
Other Drift		0.04 NR	Drift (24994-000,NR)	
Fransformer, Auto, Liquid Filled Degraded Output	43.8%	14.0%	Sources:1 Degraded - Incorrect Output Due To Faulty Tap (18175-000,8.0%), Degraded - Output Less Than Rated Capacity (18175-000,6.0%)	
Mechanical Damage	25.0%	8.0%	Degraded - Mechanical Damage (18175-000,8.0%)	
No Output	18.8%	6.0%	Catastrophic-No Output Due To Manual Removal (18175-000,6.0%)	
Open Circuit	12.5	4.0%	Catastrophic-No Output Due To Open Circuit (18175-000,4.0%)	
Induced		59.0%	Catastrophic-No Output Due To Automatic Removal (18175-000,59.0%)	
Unknown		9.0%	Unknown (18175-000,9.0%)	
Fransformer, Auto, Liquid Filled, S Degraded Output		11.24	Sources:1 Degraded - Incorrect Output Due To Faulty Tap (18175-000,4.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,10.0%) (18175-000,10.0%) Dsgraded - Output Less Than Rated Capacity (18175-000,3.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,8.0%) (18175-000,4.0%) Degraded - Incorrect Output Data To Faulty Tap (18175-000,4.0%), Degraded - Output Less Than Capacity (18175-000,5.0%)	

28.5% 8.5% Degraded - Mechanical Damage (18175-000,3.0%)

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Mechanical Damage

234	Failure Distributio		Fail	FMI
rt sc.	Failure Mode/Mech	Norm Dist.		Data Source(s)/Details
ansf	ormer, Auto, Liquid Fil	lled,Single Pha	se (con	tinued)
Me	chanical Damage (cont	inued)		
				(18175-000,5.0%) (18175-000,5.0%) (18175-000,7.0%)
				(18175-000,7.0%) (18175-000,7.0%) (18175-000,7.0%)
				(18175-000,10.0%) (18175-000,11.0%) (18175-000,15.0%)
				(18175-000, 16.0%)
No	Output	17.8%	5.34	Catastrophic-No Output Due To Manual Removal
				(18175-000,3.0%) (18175-000,4.0%) (18175-000,4.0%)
				(18175-000,4.0%) (18175-000,4.0%) (18175-000,5.0%)
				(18175-000,7.0%) (18175-000,8.0%) (18175-000,9.0%),
				Catastrophic-No Output Due To Manual Removal 1
				(18175-000,6.0%), Catastrophic-No Output Due to Manual
				Removal (18175-000,4.0%)
00	en Circuit	16.0%	4.7%	Catastrophic-No Output Due To Open Circuit (18175-000,1.0%
				(18175-000,2.0%) (18175-000,2.0%) (18175-000,2.0%)
				(18175-000,2.0%) (18175-000,5.0%) (18175-000,7.0%)
				(18175-000,9.0%) (18175-000,10.0%) (18175-000,10.0%),
				Catastophic-No Output Due To Open Circuit (18175-000,2.0%)
In	duced		50.4%	Catastrophic-No Output Due To Automatic Removal
				(18175-000,40.0%) (18175-000,40.0%) (18175-000,60.0%)
				(18175-000,61.0%) (18175-000,63.0%) (18175-000,64.0%)
				(18175-000,64.0%) (18175-000,64.0%) (18175-000,65.0%)
				(18175-000,71.0%) (18175-000,72.0%)
Un	known		10.0%	Unknown (18175-000,3.0%) (18175-000,5.0%) (18175-000,8.0%)
				(18175-000,8.0%) (18175-000,9.0%) (18175-000,9.0%)
				(18175-000,9.0%) (18175-000,11.0%) (18175-000,16.0%)
				(18175-000,16.0%) (18175-000,16.0%)
	ormer, Auto, Liquid Fil			Sources:1
Degraded Output	49.34	12.0%	Degraded - Incorrect Output Due To Faulty Tap	
				(18175-000,4.0%) (18175-000,6.0%) (18175-000,6.0%)
				(18175-000,7.0%) (18175-000,11.0%) (18175-000,16.0%), Degraded - Cutput Less Than Rated Capacity (18175-000,2.0%)
				(18175-000, 2.04) (18175-000, 3.04) (18175-000, 4.04)
				(18175-000, 5.0%) (18175-000, 6.0%)

Mechanical Damage	24.0%	5.8% Degraded - Mechanical Damage (18175-000,5.0%)
-		(18175-000,5.0%) (18175-000,5.0%) (18175-000,5.0%)
		(18175-000, 6.0%) (18175-000, 9.0%)
No Output	19.98	4.8% Catastrophic-No Output Due To Manual Removal
-		(18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%)
		(18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%)
Open Circuit	6.84	1.7% Catastrophic-No Output Due To Open Circuit (18175-000,1.0%)
	••••	(18175-000,1.0%) (18175-000,2.0%) (18175-000,2.0%)
		(18175-000, 4.0%)
		(101:0-000)4:04)
Induced		65.0% Catastrophic-No Cutput Due To Automatic Removal
		(18175-000.54.04) (18175-000.60.04) (18175-000.64.04)
		(18175-000, 66.0%) (18175-000, 69.0%) (18175-000, 77.0%)
		(101/0-000'00'00) (301/3-000'03:04) (101/3-000'11/04)
Unknown		10.7% Unknown (19175-000,4.0%) (18175-000,7.0%) (18175-000,10.0%)
UNKINOWI		
		(18175-000, 14.04) $(18175-000, 14.04)$ $(18175-000, 15.04)$

F			Failure Distribution Summaries 3-23
Part Failure Desc. Wode/Mach	Norm Dist "	Fail Dist.	Data Source(s)/Details
Transformer, Boose Converter Shorted	100.0%	100.0%	Sources:1 Short-Stray Wire Shorted To Threaded Insert (10722-000,Qty:1), Winding To Insert Short-Inadequate Clearance (10722-000,Qty:1)
Transformer, Choke Opened	100.0%	100.0%	Sources:1 Open (24994-000,100.0%)
Other Shorted		0.0% NR	Short (24994-000,NR)
Drift		NR	Drift (24994-000,NR)
Transformer,Coil Opened	45.78	44.5%	Sourcen:2 Open (24992-000,89.0%)
Worn	28.1%	27.4	Worn, Chaffed, Frayed, or Torn (25464-000,Qty:231)
Mechanical Failure	20.3%	19.8%	Broken (25464-000,Qty:158), Cracked (25464-000,Qty:4), Loose,Damaged,or Missing Har (25464-000,Qty:5)
Shorted	5.74	5.5%	Short (24992-000,11.0%)
Drift	0.1	0.1%	Fluctuates, Unstable or Errati (25464-000, Qty:1)
Unknown		2.78	Unknown (25464-000,Qty:3) (25464-000,Qty:20)
Transformer, Dither Opened	100.0%	100.0%	Sources:1 Open Windings-Machanical Overstress (10722-000,Qty:2), Open-Cut Wire (10722-000,Qty:1)
Transformer,Dual Sense Shorted	100.0%	100.0%	Sources:1 Internal Short-Part Misplacement Vendor Defect (10722-000, Gty:1)
Transformer, FET Shorted	100.04	100.0%	Sources:1 Shorted Drain To Source To Gate (10722-000,Qty:3)
Transformer,High Voltage Shorted	75.0%	75.0%	Sources:1 Winding Short-Lakcok Of Adequate Insulation (10722-000,Qty:1), Low Secondary Voltage-Intrawinding Short (10722-000,Qty:1), Short-Inadequate Insulation (10722-000,Qty:1)

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	Failure	No	Fail 1	
art esc.		Norm Dist.	Fail Dist.	Data Source(s)/Details
	ormer, Inductor, Assembly orted	75.0%	75.0%	Sources:1 Inductor L1 Shorted To L2 (10722-900,Qty:1), Short-Insert Contacting Coil Windings (10722-000,Qty:2)
Ind	ductor Failure	25.0%	25.0%	Inductors (10722-000, Qty:1)
	ormer, Inductor, Audio, High P duced	ower & Pi		Sources:1 Excessive Primary Voltage (24417-002,NR), Excessive Secondary Current (24417-002,NR), Input Frequency
				Fluctuations (24417-002, NR)
Oth	ner Corona			Corona (24417-002, NR)
	Shorted		NR	Insulation Breakdown (24417-002,NR), Short-Uninsulated Current Carying Parts (24417-002,NR)
	Opened		NR	Open-Poor Wire Terminations (24417-002,NR)
	ormer, Instrument, Current orted	66.9%	57.3%	Sources:1 Catastrophic-No Output Due To Shorts (18175-000,55.0%) (18175-000,57.0%) (18175-000,60.0%)
Ope	en Circuit	19.1%	16.34	Catastrophic-No Output Due To Open Circuit (18175-000,15.0%) (18175-000,17.0%) (18175-000,17.0%)
Deg	graded Operation	14.0%	12.0%	Degraded (18175-000,10.0%) (18175-000,12.0%) (18175-000,14.0%)
Uni	KNOWN	****	14.3%	Unknown (18175-000,13.0%) (18175-000,14.0%) (18175-000,16.0%)
	ormer, Instrument, Potential orted	70.8%	60.0%	Sources:1 Catastrophic-No Output Due To Shorts (18175-000,55.0%)
Ope	an Circuit	18.0%	15.3%	(18175-000,61.0%) (18175-000,61.0%) (18175-000,63.0%) Catastrophic-No Output Due To Open Circuit (18175-000,14.0%) (18175-000,15.0%) (18175-000,15.0%) (18175-000,17.0%)
Deg	graded Operation	11.24	9.5%	Degraded (18175-000,9.0%) (18175-000,9.0%) (18175-000,9.0%) (18175-000,11.0%)
Unk	nown		15.3%	Unknown (18175-000,14.0%) (18175-000,15.0%) (18175-000,15.0%) (18175-000,17.0%)
	ormer, Output uned	100.0%		Sources:1 Open In Secondary-Tensil Failure Magnet Wire (10722-000,Qty:1)

art	91 Telline	Neve	Fail	Failure Distribution Summaries 3-
850.	Failure Mode/Mech	Norm Dist.		Data Source(s)/Details
	ormer, Power, Distribution aned	50.0%	50.0%	Sources:1 Open Circuit (24996-000,50.0%)
Sh	orted	50.0%	50.0%	Short (24996-000,50.0%)
	ormer,Power,Filter orted	60.0%	60.0*	Sources:1 Short (24994-000,60.0%)
Op	ened	40.0%	40.0%	Open (24994-000,40.0%)
Oti	her Drift		0,0% NR	Drift (24994-000,NR)
	ormer,Power,Gen/Unit graded Output	84. د4	14.0%	Sources:1 Degraded - Incorrect Output Due To Faulty Tap (18175-000,6.0%), Fegraded - Output Less Than Rated Capacity (18175-000,8.0%)
No	Output	43.84	14.0%	Catastrophic-No Output Due To Manual Removal (18175-000,14.0%)
Ope	en Circuit	12.5%	4.0*	Catastrophic-No Output Due To Open Circuit (18175-000,4.0%)
Ind	duced		54.0%	Catastrophic-No Output Due To Automatic Removal (18175-000,48.0%), Degraded - Mechanical (18175-000,6.0%)
Un)	known		14.0%	Unknown (18175-000,14.0%)
	ormer, Power, Gen/Unit, Liquid graded Output			Sources:1 Degraded - Incorrect Output Due To Faulty Tap (18175-000,2.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,7.0%) (18175-000,8.0%), Degraded - Output Less Than Rated Capacity (18175-000,4.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,8.0%) (18175-000,9.0%)
	Output	30.3%	0 0 <b>5</b>	Catastrophic-No Oupput Due To Manual Removal
No			9.94	(18175-000,4.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,9.0%) (18175-000,9.0%) (18175-000,17.0%) (18175-000,18.0%)
	an Circuit	23.2%		(18175-000,4.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,9.0%) (18175-000,9.0%) (18175-000,17.0%)
Opa	an Circuit chanical Damage		7.6%	(18175-000,4.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,9.0%) (18175-000,9.0%) (18175-000,17.0%) (18175-000,18.0%) Catastrophic-No Output Due To Open Circuit (18175-000,1.0%) (18175-000,2.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,10.0%) (18175-000,25.0%), Catastrophic-No Output
Opa Med		23.2%	7.6% 4.4%	(18175-000,4.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,9.0%) (18175-000,9.0%) (18175-000,17.0%) (18175-000,18.0%) Catastrophic-No Output Due To Open Circuit (18175-000,1.0%) (18175-000,2.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,10.0%) (18175-000,25.0%), Catastrophic-No Output Due To Open Circuit (18175-000,3.0%) Dograded - Mechanical Damage (18175-000,3.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%)

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Unknown

art	Failure	Norm	Fail	Data
esc.	Mode/Mech	Dist.	Dist.	Source(s)/Details
ransf	ormer, Power, Gen/Unit, Liquid	Fill 3-	Phase	Sources:1
De	graded Output	42.8	13.4	Degraded - Incorrect Output Due To Faulty Tap
				(18175-000,4.0%) (18175-000,6.0%) (18175-000,7.0%)
				(18175-000,8.0%) (18175-000,8.0%) (18175-000,10.0%)
				(18175-000,10.0%), Degraded - Output Less Than Rated
				Capacity (18175-000,3.0%) (18175-000,4.0%) (18175-000,4.0%)
				(18175-000,5.0%) (18175-000,5.0%) (18175-000,7.0%)
				(18175-000,9.0%) (18175-000,9.0%), Degraded - Incorrect
				Damage Due To Faulty Tap (18175-000,8.0%)
Me	chanical Damage	24.4	7.64	Degraded - Mechanical Damage (18175-000,5.0%)
	-			(18175-000,5.0%) (18175-000,5.0%) (18175-000,6.0%)
				(18175-000,7.0%) (18175-000,10.0%) (18175-000,10.0%)
				(18175-000,13.0%)
No	Output	18.8%	5.9%	Catastrophic-No Output Due To Manual Removal
	-			(18175-000,2.0%) (18175-000,4.0%) (18175-000,5.0%)
				(18175-000,7.0%) (18175-000,7.0%) (18175-000,7.0%)
				(18175-000,7.0%) (18175-000,8.0%)
Op	en Circuit	14.0%	4.48	Catastrophic-No Output Due To Open Circuit (18175-000,3.0%)
-				(18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%)
				(18175-000,4.0%) (18175-000,4.0%) (18175-000,7.0%)
				(18175-000,7.0%)
Ind	duced		52.9%	Catastrophic-No Output Due To Automatic Removal
				(18175-000,46.0%) (18175-000,47.0%) (18175-000,49.0%)
				(18175-000,49.0%) (18175-000,52.0%) (18175-000,53.0%)
				(18175-000,59.0%) (18175-000,68.0%)
Unl	known		15.9%	Unknown (18175-000,3.0%) (18175-000,11.0%)
				(18175-000,14.0%) (18175-000,17.0%) (18175-000,17.0%)
				(18175-000,18.0%) (18175-000,23.0%) (18175-000,24.0%)
canafo	ormer, Power, Gen/Unit, Liquid	Filled		Sources:1
No	Output	50.0%	17.04	Catastrophic-No Output Due To Manual Removal
	-			(18175-000, 17.0%)
Deg	graded Output	29.4%	10.0%	Degraded - Incorrect Output Due To Faulty Tap
				(18175-000,7.0%), Degraded - Output Less Than Rated Capacity (18175-000,3.0%)
		11 68		
	chanical Damage	11.8%		Degraded - Mechanical Damage (18175-000,4.0%)
Ope	an Circuit	8.8*	3.0%	Catastrophic-No Output Due To Open Circuit (18175-000,3.0%)
T	iuced		52 08	Catastrophic-No Output Due To Automatic Removal

 Transformer, Power, Phase, Three
 Sources:1

 Opened
 100.0% 100.0% Primary Winding Open-Tensile Failure (10722-000, Qty:1)

----- 14.0% Unknown (18175-000,14.0%)

FMD-91			Failure Distribution Summaries 3-23
Part Failure Desc. Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details
Transformer, Power, Set Up Opened	100.0%	100.0%	Sources:1 Winding 7/8 Open-Tensile Failure (10722-000,Qty:1)
Fransformer,Pulse Opened	80.0%	80.0%	Sources:2 Open (24994-000,60.0%), Open-Wire Damage Prior To Potting (10722-000,Qty:1)
Shorted	20.0%	20.0%	Short (24994-000,40.0%)
Other Drift		0.0 <del>1</del> NR	Drift (24994-000,NR)
Transformer, Pulse, Dual Opened	100.0%	100.0%	Sources:1 Open-Tensile Fracture Of Magnet Wire (10722-000,Qty:1), Open At Pin 4-Mechanical Damage (10722-000,Qty:1)
Transformer,Pulse,High Power Mechanical Failure	68 . 6%	16.3%	Sources:1 Mech (25030-000,Qty:1) (25030-000,Qty:1) (25030-000,Qty:1) (25030-000,Qty:2) (25030-000,Qty:5) (25030-000,Qty:25), Mech. (25030-000,Qty:6) (25030-000,Qty:29)
Shorted	12.78	3.0%	Die Breakdown (25030-000,Qty:13)
Exciting Current	7.8%	1.9%	Exciting Current (25030-000, Qty:4) (25030-000, Qty:4)
Opened	3.9%	0.9%	Open (25030-000,Qty:1) (25030-000,Qty:3)
High Secondary Resistence	3.9%	0.9%	Sec. Res. OHL (25030-000,Qty:4)
Turns Ratio	2.9%	0.78	Turns Ratio (25030-000, Qty:1) (25030-000, Qty:2)
Unknown		39.2%	Unknown (25030-000,Qty:1) (25030-000,Qty:1) (25030-000,Qty:4) (25030-000,Qty:5) (25030-000,Qty:6) (25030-000,Qty:7) (25030-000,Qty:8) (25030-000,Qty:10) (25030-000,Qty:10) (25030-000,Qty:11) (25030-000,Qty:12) (25030-000,Qty:17) (25030-000,Qty:32) (25030-000,Qty:44)
Induced	*****	37.1	Assembled Wrong (25030-000,Qty:1) (25030-000,Qty:5) (25030-000,Qty:48) (25030-C00,Qty:105)
ransformer, Pulse, Low Power Degraded Output	61.4	54.0%	Sources:3 Parameter Change (24996-000,54.0%), Change in Core Characteristics (24417-002,NR), Parameter change (24997-000,54.0%)
Shorted	22.78	20.0%	Short (24996-000,20.0%) (24997-000,20.0%)
Opened	15.94	14.0%	Open Circuit (24996-000,14.0%) (24997-000,14.0%)
Unknown		12.0%	Unknown (24996-000,12.0%) (24997-000,12.0%)
Other Broken		0.04 NR	Broken Coil Wire (24417-002,NR)
Insulation Failure		NR	Insulation Failure (24417-002,NR)

3-24	ومحمد الأرجاب والمحمد والمتكريمية والمتحا الشرجينية ومحمد والمكافئة فأرا	Norm	Fail	FMD-91
Part Desc		Dist.	Pail Dist.	Data Source(s)/Details
	sformer,RF & Coil Drift	85.0%	85.0%	Sources:1 Drift (24994-000,85.0%)
(	Oraned	15.0%	15.0%	Open (24994-000,15.0%)
(	Other Shorted		0.0% NR	Short (24994-000,NR)
	sformer,Rectifier No Output	32.6%	14.0%	Sources:1 Catastrophic-No Output Due To Manual Removal (18175-000,14.0%)
I	Degraded Output	30.2%	13.0%	Degraded - Output Less Than Rated Capacity (18175-000,13.0%)
ł	Mechanical Damage	25.6%	11.0%	Degraded - Mechanical Damage (18175-000,11.0%)
C	Open Circuit	11.6%	5.0%	Catastrophic-No Output Due To Open Circuit (18175-000,5.0%)
:	Induced	~ ~	48.C%	Catastrophic-No Output Due To Automatic Removal (18175-000,48.0%)
τ	Jnknown		9.0%	Unknown (18175-000,9.0%)
Ľ	oformer,Rectifier,Excitation Degraded Output	42.9%		Sources:1 Degraded - Output Less Than Rated Capacity (18175-000,21.0%) Catastrophic-No Output Due To Manual Removal
-		•=•••		(18175-000, 16.0%)
C	Open Circuit	12.2	6.0%	Catastrophic-No Output Due To Open Circuit (18175-000,6.0%)
M	echanical Damage	12.28	6.0%	Degraded - Mechanical Damage (18175-000,6.0%)
I	Induced		42.0%	Catastrophic-No Output Due To Automatic Removal (18175-000,42.0%)
U	Inknown		9.0%	Unknown (18175-000,9.0%)
	former,Rectifier,Precipitator Megraded Output	58.24	32.0%	Sources:1 Degraded - Output Less Than Rated Capacity (18175-000,32.0%)
м	echanical Damage	21.8%	12.0%	Degraded ~ Mechanical Damage (18175-000,12.0%)
N	o Output	14.5%	8.0%	Catastrophic-No Output Due To Manual Removal (18175-000,8.0%)
o	pen Circuit	5.5%	3.0%	Catastrophic-No Output Due To Open Circuit (18175-000,3.0%)
I	induced		40.0%	CEtastrophic-No Output Due To Automatic Removal (18175-000,40.0%)
U	nknown		5.04	Unknown (18175-000,5.0%)

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<pre>met. Mode/Mech Dist. Dist. Source(s)/Details Sources:1 Sources:1 Sources:1 Sources:1 Sources:1 Sources:1 Source:1 S</pre>	<ul> <li>ac. Mode/Mech</li> <li>Dist. Dist. Dist. Source(s)/Details</li> <li>Sources11</li> <li>So</li></ul>	imaries 3	Failure Distribution Summaries			D-91	
Opened       87.56       87.56       87.57       Open-Fractured Didde (10722-000, Opy1), Fractured Magnet Mire-Proces Damage (10722-000, Opy1), Intermittent Open-Fractured Magnet Mire (10722-000, Opy1)         Shorted       12.51       12.55       12.55       Low Resistance Short (10722-000, Opy1)         Shorted       12.54       12.55       Low Resistance Short (10722-000, Opy1)         Shorted       12.55       Low Resistance Short (10722-000, Opy1)         Open Circuit       24.06       6.06       Degraded - Mechanical Damage (18175-000, 5.08)         Degraded Output       24.08       6.06       Degraded - Mechanical Damage (18175-000, 5.08)         Induced	Opened       87.56       87.56       97.56 <t< th=""><th></th><th>Data Source(s)/Details</th><th>Fail Dist.</th><th>Norm Dist.</th><th></th><th>-</th></t<>		Data Source(s)/Details	Fail Dist.	Norm Dist.		-
Tanaformer, Station Service Incl         Sources:1 (1875-000,7.0%)           Open Circuit         24.0%         6.0% Catastrophic-No Output Due To Manual Removal (18175-000,7.0%)           Mechanical Damage         24.0%         6.0% Degraded - Mechanical Damage (18175-000,6.0%)           Degraded Output         24.0%         6.0% Degraded - Incorrect Output Due To Paulty Tap (18175-000,3.0%), Degraded - Output Lees Than Rated Capacit (18175-000,3.0%), Degraded - Output Lees Than Rated Capacit (18175-000,5.0%)           Induced          63.0% Catastrophic-No Output Due To Automatic Removal (18175-000,63.0%)           Unknown          12.0% Unknown (18175-000,12.0%)           Vanknown          12.0% Unknown (18175-000,12.0%)           No Output         23.6%         7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%)           No Output         23.6%         7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%)           Degraded Output         22.0%         6.8% Degraded - Incorrect Output Due To Paulty Tap (18175-000, 6.0%), Degraded - Output Lees Than Rated Capacit (18175-000, 5.0%)           Open Circuit         21.1%         6.5% Catastrophic-No Output Due To Automatic Removal (18175-000, 5.0%)           Open Circuit         21.1%         6.5% Catastrophic-No Output Due To Automatic Removal (18175-000, 5.0%)           Open Circuit <td>Fansformer, Station Service Incl.         Sources:1 No Output         Sources:1 (18175-000,7.0%)           Open Circuit         28.0%         7.0% Catastrophic-No Output Due To Manual Removal (18175-000,7.0%)           Open Circuit         24.0%         6.0% Degraded - Mechanical Damage (18175-000,6.0%)           Degraded Output         24.0%         6.0% Degraded - Mechanical Damage (18175-000,6.0%)           Degraded Output         24.0%         6.0% Degraded - Mechanical Damage (18175-000,6.0%)           Induced        </td> <td>Wire-Proces ufacturing d WIre In</td> <td>Open-Fractured Diode (10722-000, Qty:1), Open-Fractured Magnet Wire (10722-000, Qty:1), Fractured Magnet Wire-Pr Damage (10722-000, Qty:1), Intermittent Open-Manufacturi Process Defect (10722-000, Qty:1), Open-Fractured WIre T Transformer (10722-000, Qty:1), Internal Wire Fractured-Cyclic Fatigue (10722-000, Qty:1), Intermitten</td> <td>87.5%</td> <td>87.5%</td> <td></td> <td></td>	Fansformer, Station Service Incl.         Sources:1 No Output         Sources:1 (18175-000,7.0%)           Open Circuit         28.0%         7.0% Catastrophic-No Output Due To Manual Removal (18175-000,7.0%)           Open Circuit         24.0%         6.0% Degraded - Mechanical Damage (18175-000,6.0%)           Degraded Output         24.0%         6.0% Degraded - Mechanical Damage (18175-000,6.0%)           Degraded Output         24.0%         6.0% Degraded - Mechanical Damage (18175-000,6.0%)           Induced	Wire-Proces ufacturing d WIre In	Open-Fractured Diode (10722-000, Qty:1), Open-Fractured Magnet Wire (10722-000, Qty:1), Fractured Magnet Wire-Pr Damage (10722-000, Qty:1), Intermittent Open-Manufacturi Process Defect (10722-000, Qty:1), Open-Fractured WIre T Transformer (10722-000, Qty:1), Internal Wire Fractured-Cyclic Fatigue (10722-000, Qty:1), Intermitten	87.5%	87.5%		
No         Output         28.0%         7.0% Catastrophic=No         Output         Due To         Manual Removal           (18175-000,7.0%)         Gene Circuit         24.0%         6.0% Catastrophic=No         Output Due To         Open Circuit (18175-000,6.0%)           Degraded Output         24.0%         6.0% Degraded - Mechanical Damage (18175-000,6.0%)           Degraded Output         24.0%         6.0% Degraded - Mechanical Damage (18175-000,6.0%)           Induced          63.0% Catastrophic=No         Output Due To         Automatic Removal (18175-000, 0.0%)           Unknown          12.0% Unknown (18175-000, 10.0%) (18175-000, 10.0%)         (18175-000, 0.0%)           ansformer,Station Service Incl, Dry Type, 1-PhaseSources:1         33.% 10.3% Degraded - Mechanical Damage (18175-000, 9.0%)           No Output         23.6%         7.3% Catastrophic=No Output Due To Manual Removal (18175-000, 10.0%) (18175-000, 7.0%) (18175-000, 7.0%)           No Output         23.6%         7.3% Catastrophic=No Output Due To Faulty Tap (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 7.0%)           Degraded Output         22.0%         6.8% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%)           Degraded Output         22.0%         6.8% Degraded - Incorrect Output Due To Paulty Tap (18175-000, 7.0%)           Open Circuit         21.1%	No         Output         28.04         7.06 Catastrophic=No Output Due To Manual Removal (18175-000, 7.04)           Open Circuit         24.04         6.04 Catastrophic=No Output Due To Open Circuit (18175 Mechanical Damage         24.04         6.04 Degraded - Mechanical Damage (18175-000, 6.04)           Degraded Output         24.04         6.04 Degraded - Incorrect Output Due To Faulty Tap (18175-000, 3.04), Degraded - Output Less Than Rai (18175-000, 3.04), Degraded - Output Less Than Rai (18175-000, 3.04)           Induced          63.03 Catastrophic=No Output Due To Automatic Removal (18175-000, 63.04)           Unknown          12.04 Unknown (18175-000, 12.04)           ansformer, Station Service Incl, Dry Type, I=PhaseSources:1 Mechanical Damage         13.34         10.38 Degraded - Mechanical Damage (18175-000, 9.04) (18175-000, 10.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 7.04) (18175-000, 2.04) (18175-000, 2.04) (18175-000, 7.04) (18175-000, 2.04) (18175-000, 2.04) (18175-000, 7.04) (18175-000, 2.04) (18175-000, 2.04) (18175-000, 7.05 (18175-000, 5.04) (18175-000, 1.04) (18175-000, 5.05)           Open Circuit         21.14         6.58 Catastrophic=No Output Due To Automatic Removal (18175-000, 54.05) (18175-000, 1.04) (18175-000, 57 (18175-000, 54.05) (18175-000, 1.04) (18175-000, 57 (18175-000, 54.05) (18175-000, 1.04) (18175-000,		Low Resistance Short (10722-000,Qty:1)	12.5%	12.5%	Shorted	Sho
Mechanical Damage         24.0%         6.0% Degraded - Mechanical Damage (18175-000, 6.0%)           Degraded Output         24.0%         6.0% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 3.0%), Degraded - Output Less Than Rated Capacit (18175-000, 63.0%)           Induced          63.0% Catastrophic-No Output Due To Automatic Removal (18175-000, 63.0%)           Unknown          63.0% Catastrophic-No Output Due To Automatic Removal (18175-000, 12.0%)           No Cutput         23.5%         10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 10.0%)           No Cutput         23.6%         7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%)           Degraded Output         22.0%         6.8% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 54.0%) (18175-000, 51.0%)           Open Circuit         21.1%         6.5% Catastrophic-No Output Due To Automatic Removal (18175-000, 54.0%) (18175-000, 51.0%)           Unknown	Mechanical Damage       24.0%       6.0% Degraded - Mechanical Damage (18175-000, 6.0%)         Degraded Output       24.0%       6.0% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 3.0%), Degraded - Output Less Than Rai (18175-000, 3.0%)         Induced        63.0% Catastrophic-No Output Due To Automatic Removal (18175-000, 63.0%)         Unknown        12.0% Unknown (18175-000, 12.0%)         ansformer, Station Service Incl, Dry Type, 1-PhaseSources:1 Mechanical Damage       33.3%       10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 7.0%)         No Output       23.6%       7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 6.0%), Obgraded - Jncorrect Output Due To Faulty Tap (18175-000, 6.0%) (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 7.0% (18175-000, 6.0%) (18175-000, 2.0%) (18175-000, 7.0% (18175-000, 6.0%) (18175-000, 2.0%) (18175-000, 7.0% (18175-000, 5.0%)         Open Circuit       21.1%       6.5% Catastrophic-No Output Due To Automatic Removal (18175-000, 54.0%) (18175-000, 54.0%) (18175-000, 51.0%)         Unknown        55.8% Catastrophic-No Output Due To Automatic Removal (18175-000, 54.0%) (18175-000, 51.0%)         Unknown        55.8% Catastrophic-No Output Due To Manual Removal (18175-000, 51.0%) (18175-000, 11.0%) (18175-000, 11.0%)         No Output       35.0%       10.6% Catastrophic-No Output Due To Manual Removal (18175-000, 91.0%) (18175-000, 11.0%) (18175-000, 11.0%		Catastrophic-No Output Due To Manual Removal	7.0%		· · · ·	
Degraded Output       24.0%       6.0% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 3.0%), Degraded - Output Less Than Rated Capacit (18175-000, 3.0%)         Induced        63.0% Catastrophic-No Output Due To Automatic Removal (18175-000, 63.0%)         Unknown        12.0% Unknown (18175-000, 12.0%)         Mechanical Damage       33.3% 10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 12.0%)         No Output       23.6%       7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 2.0%)         Degraded Output       22.0%       6.0% Degraded - Incorrect Output Due To Manual Removal (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%)         Degraded Output       22.0%       6.0% Degraded - Incorrect Output Due To Paulty Tap (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%)         Degraded Output       21.1%       6.5% Catastrophic-No Output Due To Open Circuit (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Induced        55.6% Catastrophic-No Output Due To Automatic Removal (18175-000, 54.0%) (18175-000, 13.0%) (18175-000, 57.0%) (18175-000, 54.0%) (18175-000, 13.0%) (18175-000, 57.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%)         Induced        55.6% Catastrophic-No Output Due To Manual Removal (18175-000, 20.0%) (18175-000, 13.0%) (18175-000, 13.0%)         Unknown        13.5% Unknown (18175-0	Degraded Output       24.0%       6.0% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 3.0%), Degraded - Output Less Than Rai (18175-000, 3.0%)         Induced        63.0% Catastrophic-No Output Due To Automatic Removal (18175-000, 63.0%)         Unknown        12.0% Unknown (18175-000, 12.0%)         ansformer, Station Service Incl, Dry Type, 1-PhaseSources:1 Mechanical Damage       33.3%       10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 10.0%)         No Output       23.6%       7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 4.0%) (18175-000, 7.0%) (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 2.0%) (18175-000, 2.0%)         Degraded Output       22.0%       6.8% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%)         Open Circuit       21.1%       6.5% Catastrophic-No Cutput Due To Open Circuit (18175 (18175-000, 6.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Induced        55.8% Catastrophic-No Cutput Due To Automatic Removal (18175-000, 50.0%) (18175-000, 51.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%)         Unknown        13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11. (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11. (18175-000, 12.0%)         ansformer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output       35.8% In.0% Catastrop	75-000,5.0%)	Catastrophic-No Output Due To Open Circuit (18175-000,6	6.0%	24.0%	Open Circuit	Ope
(18175-000, 3.0%), Degraded - Output Less Than Rated Capacit (18175-000, 3.0%)         Induced          63.0% Catastrophic-No Output Due To Automatic Removal (18175-000, 63.0%)         Unknown          12.0% Unknown (18175-000, 12.0%)         Mechanical Damage       33.3%         10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 9.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 12.0%)         No Output       23.6%         7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 4.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 4.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Open Circuit       21.1%         6.5% Catastrophic-No Output Due To Open Circuit (18175-000, 7.0%) (18175-000, 50.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Induced          55.8% Catastrophic-No Output Due To Automatic Removal (18175-000, 51.0%)         Unknown          13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11.0%) (18175-000, 12.0%)         Open Circuit       23.3%         7.1% Catastrophic-No Output Due To Manual Removal (18175-000, 11.0%) (18175-000, 11.0%) (18175-000, 11.0%) (18175-000, 12.0%)	(18175-000, 3, 0%), Degraded - Output Less Than Rati (18175-600, 3, 0%)         Induced          63.0% Catastrophic-No Output Due To Automatic Removal (18175-000, 63, 0%)         Unknown          12.0% Unknown (18175-000, 12.0%)         ansformer, Station Service Incl, Dry Type, 1-PhaseSources:1 Mechanical Damage         33.3% 10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 7.0%)         No Output       23.6%         7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%)         Open Circuit       21.1%       6.5% Catastrophic-No Cutput Due To Open Circuit (18175 (18175-000, 50.0%) (18175-000, 51.0%) (18175-000, 51.0%)         Unknown        55.8% Catastrophic-No Cutput Due To Automatic Removal (18175-000, 51.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%)         Unknown        13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%)         Induced        13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%)         Informer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output       35.8% 10.6% Catastrophic-N		Degraded - Mechanical Damage (18175-000,6.0%)	6.0%	24.0%	Mechanical Damage	Mec
(18175-000, 63.0%)         Unknown       12.0% Unknown (18175-000, 12.0%)         ansformer, Station Service Incl, Dry Type, 1-PhaseSources:1         Mechanical Damage       33.3% 10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 12.0%)         No Output       23.6%       7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 2.0%) (18175-000, 4.0%) (18175-000, 7.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%)         Degraded Output       22.0%       6.8% Degraded - Incorrect Output Due To Foulty Tap (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%)         Open Circuit       21.1%       6.5% Catastrophic-No Cutput Due To Open Circuit (18175-000, 7.0%) (18175-000, 6.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Induced        55.8% Catastrophic-No Cutput Due To Open Circuit (18175-000, 5.0%) (18175-000, 50.0%) (18175-000, 51.0%) (18175-000, 51.0%)         Unknown        13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11.0%) (18175-000, 12.0%)         Open Circuit       23.3%       1.1% Catastrophic-No Output Due To Manual Removal (18175-000, 12.0%)         Open Circuit       23.3%       1.1% Catastrophic-No Output Due To Manual Removal (18175-000, 11.0%) (18175-000, 11.0%) (18175-000, 51.0%)         Open Circuit       23.3%       7.1% Catastrophic-No Output Due To Open Circuit (18175-000, 5.0%) (18175-000, 2.0%)	<pre>(18175-000, 63.0%) Unknown 12.0% Unknown (18175-000, 12.0%) ansformer,Station Service Incl,Dry Type,1-PhaseSources:1 Mechanical Damage 33.3% 10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 10.0%) Degraded Output 23.6% 7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 4.0%) (18175-000, 4.0%) Degraded Output 22.0% 6.8% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 2.0%) (18175-000, 4.0%) (18175-000, 4.0%) Degraded Output 22.0% 6.8% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 0.0%) (18175-000, 7.0%) (18175-000, 7.0%) Induced 55.8% Catastrophic-No Output Due To Automatic Removal (18175-000, 53.0%) (18175-000, 54.0%) (18175-000, 53.0%) Unknown 13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11. (18175-000, 12.0%) Open Circuit 23.3% 7.1% Catastrophic-No Output Due To Open Circuit (18175-000, 12.0%) Open Circuit 23.3% 7.1% Catastrophic-No Output Due To Open Circuit (18175-000, 12.0%) Open Circuit 23.3% 7.1% Catastrophic-No Output Due To Open Circuit (18175-000, 12.0%)</pre>	ated Capacit	(18175-000,3.0%), Degraded - Output Less Than Rated Cap	6.0%	24.0%	Degraded Output	Deg
ansformer, Station Service Incl, Dry Type, 1-PhaseSources:1         Mechanical Damage       33.3%       10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 12.0%)         No Output       23.6%       7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Degraded Output       22.0%       6.8% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%)         Open Circuit       21.1%       6.5% Catastrophic-No Output Due To Open Circuit (18175-000, 7.0%) (18175-000, 54.0%) (18175-000, 54.0%) (18175-000, 57.0%) (18175-000, 54.0%) (18175-000, 51.0%) (18175-000, 57.0%) (18175-000, 58.0%)         Unknown        13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 12.0%)         unsformer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output       35.8% 10.8% Catastrophic-No Output Due To Manual Removal (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11.0%) (18175-000, 12.0%)         Open Circuit       23.3%       7.1% Catastrophic-No Output Due To Open Circuit (18175-000, 5.0%) (18175-000, 5.0%) (18175-000, 5.0%) (18175-000, 5.0%)	ansformer, Station Service Incl, Dry Type, 1-PhaseSources:1         Mechanical Damage       33.3%         10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 12.0%)         No Output       23.6%         7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 2.0%)         Degraded Output       22.0%         6.8% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%)         Open Circuit       21.1%         6.5% Catastrophic-No Output Due To Open Circuit (18175 (18175-000, 6.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Induced          55.8% Catastrophic-No Output Due To Automatic Removal (18175-000, 54.0%) (18175-000, 13.0%) (18175-000, 13.0%)         Unknown          13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11.0%)         unsformer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output         35.8% 10.8% Catastrophic-No Output Due To Manual Removal (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11.0%)         (18175-000, 12.0%)         Open Circuit       23.3% 7.1% Catastrophic-No Output Due To Manual Removal (18175-000, 12.0%)			63.0%		Induced	Ind
Mechanical Damage       33.3%       10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 12.0%)         No Output       23.6%       7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 8.0%)         Degraded Output       22.0%       6.8% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Open Circuit       21.1%       6.5% Catastrophic-No Output Due To Open Circuit (18175-000, 6.0%) (18175-000, 54.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Induced        55.8% Catastrophic-No Output Due To Automatic Removal (18175-000, 54.0%) (18175-000, 54.0%) (18175-000, 57.0%) (18175-000, 58.0%)         Unknown        13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 15.0%)         ansformer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output       23.3%       10.8% Catastrophic-No Output Due To Manual Removal (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11.0%) (18175-000, 12.0%)         Open Circuit       23.3%       7.1% Catastrophic-No Output Due To Open Circuit (18175-000, 5.0%) (18175-000, 7.0%) (18175-000, 8.0%) (18175-000, 8.0%)       10.6%	Mechanical Damage       33.3%       10.3% Degraded - Mechanical Damage (18175-000, 9.0%) (18175-000, 10.0%) (18175-000, 10.0%) (18175-000, 12.0%)         No Output       23.6%       7.3% Catastrophic-No Output Due To Manual Removal (18175-000, 7.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Degraded Output       22.0%       6.8% Degraded - Incorrect Output Due To Faulty Tap (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 4.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 2.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Open Circuit       21.1%       6.5% Catastrophic-No Cutput Due To Open Circuit (18175 (18175-000, 5.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Induced        55.8% Catastrophic-No Cutput Due To Automatic Removal (18175-000, 58.0%)         Unknown        13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%)         ansformer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output       35.8%       10.8% Catastrophic-No Output Due To Manual Removal (18175-000, 13.0%) (18175-000, 11.0%) (18175-000, 11.0%)         ansformer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output       35.8%       10.8% Catastrophic-No Output Due To Manual Removal (18175-000, 9.0%) (18175-000, 11.0%) (18175-000, 11. (18175-000, 12.0%)         Open Circuit       23.3%       7.1% Catastrophic-No Output Due To Open Circuit (18175		Unknown (18175-000,12.0%)	12.0%		Unknown	Unk
(18175-000, 4.0%)       (18175-000, 4.0%)       (18175-000, 4.0%)         (18175-000, 6.0%)       Degraded - Output Less Than Rated Capacit         (18175-000, 2.0%)       (18175-000, 2.0%)       (18175-000, 2.0%)         Open Circuit       21.1%       6.5% Catastrophic-No Output Due To Open Circuit (18175-000, 6.0%)         Induced        55.8% Catastrophic-No Output Due To Automatic Removal         (18175-000, 54.0%)       (18175-000, 54.0%)       (18175-000, 57.0%)         Unknown        55.8% Catastrophic-No Output Due To Automatic Removal         (18175-000, 54.0%)       (18175-000, 54.0%)       (18175-000, 57.0%)         Unknown        13.5% Unknown (18175-000, 13.0%)       (18175-000, 13.0%)         No Nutput       35.8%       10.8% Catastrophic-No Output Due To Manual Removal       (18175-000, 11.0%)         (18175-000, 12.0%)       (18175-000, 11.0%)       (18175-000, 11.0%)       (18175-000, 11.0%)         Open Circuit       23.3%       7.1% Catastrophic-No Output Due To Open Circuit (18175-000, 51.0%)       (18175-000, 80.0%)	(19175-000,4.0%)       (18175-000,4.0%)       (18175-000,4.0%)         (18175-000,6.0%)       Degraded - Output Less Than Rat (18175-000,2.0%)       (18175-000,2.0%)         Open Circuit       21.1%       6.5%       Catastrophic-No Output Due To Open Circuit (18175- (18175-000,6.0%)         Open Circuit       21.1%       6.5%       Catastrophic-No Output Due To Open Circuit (18175- (18175-000,54.0%)         Induced        55.8%       Catastrophic-No Output Due To Automatic Removal (18175-000,54.0%)         Unknown        13.5%       Unknown (18175-000,13.0%)         Unknown        13.5%       Unknown (18175-000,13.0%)         ansformer, Station Service Incl Dry Type, 3-PhaseSources:1       No Output       35.8%       10.8%         No Output       35.8%       10.8%       Catastrophic-No Output Due To Manual Removal (18175-000,9.0%)       (18175-000,11.0%)         Open Circuit       23.3%       7.1%       Catastrophic-No Output Due To Open Circuit (18175-000,11.0%)		Catastrophic-No Output Due To Manual Removal (18175-000,7.0%) (18175~000,7.0%) (18175-000,7.0%)	7.34	23.64	No Output	No
Open Circuit       21.1%       6.5% Catastrophic-No Output Due To Open Circuit (18175-000, 6.0%) (18175-000, 6.0%) (18175-000, 7.0%) (18175-000, 7.0%)         Induced        55.8% Catastrophic-No Output Due To Automatic Removal (18175-000, 54.0%) (18175-000, 54.0%) (18175-000, 57.0%) (18175-000, 58.0%)         Unknown        13.5% Unknown (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 13.0%) (18175-000, 15.0%)         vanasformer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output       35.8% 10.8% Catastrophic-No Output Due To Manual Removal (18175-000, 9.0%) (18175-000, 11.0%) (18175-000, 11.0%) (18175-000, 12.0%)         Open Circuit       23.3%       7.1% Catastrophic-No Output Due To Open Circuit (18175-000, 5.0%) (18175-000, 7.0%) (18175-000, 8.0%) (18175-000, 8.0%)	Open Circuit       21.1%       6.5% Catastrophic-No Cutput Due To Open Circuit (18175-000, 7.0%)         Induced        55.8% Catastrophic-No Output Due To Automatic Removal (18175-000, 54.0%)         Induced        55.8% Catastrophic-No Output Due To Automatic Removal (18175-000, 54.0%)         Unknown        13.5% Unknown (18175-000, 13.0%)       (18175-000, 13.0%)         Unknown        13.5% Unknown (18175-000, 13.0%)       (18175-000, 15.0%)         anaformer, Station Service Incl Dry Type, 3-PhaseSources:1       No Output       35.8% 10.8% Catastrophic-No Output Due To Manual Removal (18175-000, 13.0%)         No Output       35.8% 10.8% Catastrophic-No Output Due To Manual Removal (18175-000, 12.0%)       (18175-000, 12.0%)         Open Circuit       23.3%       7.1% Catastrophic-No Output Due To Open Circuit (18175	)%) ated Capacity	(18175-000,8.0%) Degraded - Incorrect Output Due To Faulty Tap (18175-000,4.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,6.0%), Degraded - Output Less Than Rated Cap (18175-000,2.0%) (18175-000,2.0%) (18175-000,2.0%)	6.84	22.0%	Degraded Output	Deg
(18175-000, 54.0%)       (18175-000, 54.0%)       (18175-000, 57.0%)         Unknown        13.5%       Unknown (18175-000, 13.0%)       (18175-000, 13.0%)         unknown        13.5%       Unknown (18175-000, 13.0%)       (18175-000, 13.0%)         ansformer, Station       Service       Incl. Dry Type, 3-PhaseSources:1       (18175-000, 13.0%)       (18175-000, 15.0%)         ansformer       St.8%       10.8%       Catastrophic-No Output Due To Manual Removal (18175-000, 11.0%)       (18175-000, 12.0%)         Open Circuit       23.3%       7.1%       Catastrophic-No Output Due To Open Circuit (18175-000, 5.0%)         (18175-000, 7.0%)       (18175-000, 8.0%)       (18175-000, 8.0%)       (18175-000, 8.0%)	(18175-000,54.0%) (18175-000,54.0%) (18175-000,57 (18175-000,58.0%) Unknown 13.5% Unknown (18175-000,13.0%) (18175-000,13.0%) (18175-000,13.0%) (18175-000,15.0%) ansformer,Station Service Incl. Dry Type, 3-PhaseSources:1 No Output 35.8% 10.8% Catastrophic-No Output Due To Manual Removal (18175-000,9.0%) (18175-000,11.0%) (18175-000,11. (18175-000,9.0%) (18175-000,11.0%) (18175-000,11. (18175-000,12.0%) Open Circuit 23.3% 7.1% Catastrophic-No Output Due To Open Circuit (18175		Catastrophic-No Output Due To Open Circuit (18175-000,6	6.5%	21.1%	Open Circuit	0pe
(18175-000,13.0%) (18175-000,15.0%) ansformer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output 35.8% 10.8% Catastrophic-No Output Due To Manual Removal (18175-000,9.0%) (18175-000,11.0%) (18175-000,11.0%) (18175-000,12.0%) Open Circuit 23.3% 7.1% Catastrophic-Ne Output Due To Open Circuit (18175-000,5.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,8.0%)	(18175-000,13.0%) (18175-000,15.0%) ansformer, Station Service Incl. Dry Type, 3-PhaseSources:1 No Output 35.8% 10.8% Catastrophic-No Output Due To Manual Removal (18175-000,9.0%) (18175-000,11.0%) (18175-000,11. (18175-000,12.0%) Open Circuit 23.3% 7.1% Catastrophic-No Output Due To Open Circuit (18175	57.0%)	(18175-000,54.0%) (18175-000,54.0%) (18175-000,57.0%)	55.8%		Induced	Ind
No Output         35.8%         10.8% Catastrophic-No Output Due To Manual Removal (18175-000, 9.0%) (18175-000, 11.0%) (18175-000, 11.0%) (18175-000, 12.0%)           Open Circuit         23.3%         7.1% Catastrophic-Ne Output Due To Open Circuit (18175-000, 5.0%) (18175-000, 7.0%) (18175-000, 8.0%) (18175-000, 8.0%)	No Output         35.8%         10.8% Catastrophic-No Output Due To Manual Removal (18175-000,9.0%)         To Manual Removal (18175-000,11.0%)           Open Circuit         23.3%         7.1% Catastrophic-Ne Output Due To Open Circuit         000000000000000000000000000000000000			13.5%	*****	Unknown	Unk
(18175-000,12.0%) Open Circuit 23.3% 7.1% Catastrophic-No Output Due To Open Circuit (18175-000,5.0 (18175-000,7.0%) (18175-000,8.0%) (18175-000,8.0%)	(19175-000,12.0%) Open Circuit 23.3% 7.1% Catastrophic-Ne Output Due To Open Circuit (19175	0 <b>%</b> ) 57.0%)	(18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%) Catastrophic-No Output Due To Automatic Removal (18175-000,54.0%) (18175-000,54.0%) (18175-000,57.0%) (18175-000,58.0%) Unknown (18175-000,13.0%) (18175-000,13.0%) (18175-000,13.0%) (18175-000,15.0%) eSources:1 Catastrophic-No Output Due To Manual Removal	55.8 <b>%</b> 13.5 <b>%</b> 3-Phase		Induced Unknown sformer,Station Service Ind	Ind Unk
	(18175-000.7.0%) (18175-000.8.0%) (18175-000.8.0%)		Catastrophic-Ne Output Due To Open Circuit (18175-000,5.	7.1*	23.34	Open Circuit	Оре
				7.14	23.34	Mechanical Damage	Maci

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esc. Mod ransform Degrad Induce Unknow ransforme No Out Open C Mechar	ed er,Station	Norm Dist. Sorvice Incl, Dry Type 17.5  Service Incl, Liquid F 30.7%	,3-Phase 5.3 56.9 12.6 illed,1-	Degraded - Incorrect Output Due To Faulty Tap (18175-000,2.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%), Degraded - Output Less Than Pated Capacity (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,2.0%) Catastrophic-No Output Due To Automatic Removal (18175-000,55.0%) (18175-000,56.0%) (18175-000,56.0%) (18175-000,59.0%) Unknown (18175-000,12.0%) (18175-000,12.0%) (18175-000,13.0%) (18175-000,14.0%)
Degrad Induce Unknow ransforme No Out Open C Mechar Degrad Induce	ed er,Station tput	17.5  Service Incl,Liquid F	5.3% 56.9% 12.6%	Degraded - Incorrect Output Due To Faulty Tap (18175-000,2.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%), Degraded - Output Less Than Pated Capacity (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,2.0%) Catastrophic-No Output Due To Automatic Removal (18175-000,55.0%) (18175-000,56.0%) (18175-000,56.0%) (18175-000,59.0%) Unknown (18175-000,12.0%) (18175-000,12.0%) (18175-000,13.0%) (18175-000,14.0%)
Unknow ransforme No Out Open C Mechar Degrad	wn er,Station tput	Service Incl, Liquid F	12.6%	(18175-000,55.0%) (18175-000,56.0%) (18175-000,56.0%) (18175-000,59.0%) Unknown (18175-000,12.0%) (18175-000,12.0%) (18175-000,13.0%) (18175-000,14.0%)
ransforme No Out Open C Mechar Degrad	er,Station tput	Service Incl, Liquid F	illed,1-	(18175-000,13.0%) (18175-000,14.0%)
No Out Open C Mechar Degrad	tput	· -	•	
Mechar Degrad	Circuit			Catastrophic-No Output Due To Manual Removal (18175-000,5.0%) (18175-000,6.0%) (18175-000,8.0%) (18175-000,12.0%)
Degrad Induce		24.8%	6.34	Catastrophic-No Output Due To Open Circuit (18175-000,4.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,8.0%)
Induce	nical Damag	e 22.8%	5.84	Degraded - Mechanical Damage (18175-000,5.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%)
	ded Output	21.8%	5.6%	Degraded - Incorrect Ouput Due To Faulty Tap (18175-000,4.0%), Degraded - Output Less Than Rated Capacity (18175-000,2.0%) (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%), Degraded - Incorrect Output Due To Faulty Tap (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%)
Unknow	əd		61.5%	Catastrophic-No Output Due To Automatic Removal (18175-000,54.0%) (18175-000,60.0%) (18175-000,63.0%) (18175-000,66.0%)
	m		1 <b>2.9%</b>	Unknown (18175-000,12.0%) (18175-000,13.0%) (18175-000,13.0%) (18175-000,13.0%)
ransforme No Out	-	Service Incl,Liquid Fi 37.3%		PhaseSources:1 Catastrophic-No Output Due To Manual Removal (18175-000,8.0%) (18175-000,9.0%) (18175-000,12.0%) (18175-000,12.0%)
Degrad	led Output	24.5%	6.8%	Degraded - Incorrect Output Due To Faulty Tap (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,9.0%), Degraded - Output Less Than Rated Capacity (18175-000,1.0%) (18175-000,2.0%) (18175-000,2.0%) (18175-000,3.0%)
Open C	lircuit	20.0	5.5%	Catastrophic-No Output Due To Open Circuit (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%)
Mechan	ical Damag	e 18.2%	5.0%	Degraded - Mechanical Damage (18175-000,5.0%) (18175-000,6.0%) (18175-000,9.0%)
Induce	d			Catastrophic-No Output Due To Automatic Removal (18175-000,38.0%) (18175-000,52.0%) (18175-000,58.0%) (18175-000,61.0%)
Unknow				Unknown (18175-000,9.0%) (18175-000,12.0%) (18175-000,14.0%) (18175-000,45.0%)

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	Failure	Norm	Fail	Data
	Mode/Mech	Dist.		Source(s)/Details
	rmer, Substation, Liq raded Output			Sources:1 Degraded - Incorrect Output Due To Faulty Tap (18175-000,3.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,8.0%) (18175-000,10.0%) (18175-000,10.0%) (18175-000,15.0%), Degraded - Output Less Than Rated Capacity (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,9.0%)
Mec	hanical Damage	27.7%	8.1%	Degraded - Mechanical Damage (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,7.0%) (16175-000,8.0%) (18175-000,8.0%) (18175-000,12.0%) (18175-000,13.0%)
No (	Output	22.0%	6.4%	Catastrophic-No Output Due To Manual Removal (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,12.0%) (18175-000,15.0%)
Oper	n Circuit	8.7%	2.64	Catastrophic-No Output Due To Open Circuit (18175-000,1.0%) (18175-000,1.0%) (18175-000,2.0%) (18175-000,2.0%) (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,6.0%)
Indu	uced		53.4%	Catastrophic-No Output Due To Automatic Removal (18175-000,14.0%) (18175-000,28.0%) (18175-000,55.0%) (18175-000,57.0%) (18175-000,58.0%) (18175-000,63.0%) (18175-000,63.0%) (18175-000,71.0%) (18175-000,72.0%)
Unkr	משסר		17.2%	Unknown (18175-000,8.0%) (18175-000,10.0%) (18175-000,10.0%) (18175-000,11.0%) (18175-000,12.0%) (18175-000,13.0%) (18175-000,19.0%) (18175-000,32.0%) (18175-000,40.0%)
	mer,Substation,Liqu aded Output	id Filled, 3-Pha 39.9%	9.18	Sources:1 Degraded - Incorrect Output Due To Faulty Tap (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,9.0%), Degraded - Output Less Than Rated Capacity (18175-000,1.0%) (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,5.0%) (18175-000,6.0%)
Degr		•	9.1% 6.7%	Degraded - Incorrect Output Due To Faulty Tap (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,9.0%), Degraded - Cutput Less Than Rated Capacity (18175-000,1.0%) (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,3.0%)
Degr Mech	aded Output	39.94	9.1 <b>%</b> 6.7 <b>%</b> 4.6 <b>%</b>	Degraded - Incorrect Output Due To Faulty Tap (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,9.0%), Degraded - Cutput Less Than Rated Capacity (18175-000,1.0%) (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,6.0%) Degraded - Mechanical Damage (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%)
Degr Mech No C	aded Output	39.9¥ 29.5¥	9.1¥ 6.7% 4.6% 2.4%	Degraded - Incorrect Output Due To Faulty Tap (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,9.0%), Degraded - Output Less Than Rated Capacity (18175-000,1.0%) (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,2.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,6.0%) Degraded - Mechanical Damage (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,9.0%) Catastrophic-No Output Due To Manual Removal (18175-000,4.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%)
Degr Mech No C	anical Damage	39.9¥ 29.5¥ 20.2¥ 10.4¥	9.1¥ 6.7¥ 4.6¥ 2.4¥	Degraded - Incorrect Output Due To Faulty Tap (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,9.0%), Degraded - Output Less Than Rated Capacity (18175-000,1.0%) (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,6.0%) Degraded - Mechanical Damage (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,9.0%) Catastrophic-No Output Due To Manual Removal (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,6.0%), Catastrophic-No Output Due to Manual Removal (18175-000,5.0%) Catastrophic-No Output Due To Open Circuit (18175-000,1.0%) (18175-000,1.0%) (18175-000,1.0%) (18175-000,2.0%)

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sc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
ansformer, Toridal Shorted	100.0%	100.0%	Sources:1 Primary To Shield Shorts (10722-000,Qty:5)
ansformer,Transmission Tile Degraded Output	37.5%	12.0%	Sources:1 Degraded - Incorrect Output Due To Faulty Tap (18175-000,7.0%), Degraded - Output Less Than Rated Capacity (18175-000,5.0%)
Open Circuit	21.9%	7.0%	Catastrophic-No Output Due To Open Circuit (18175-000,7.0%)
Mechanical Damage	21.9%	7.0%	Degraded - Mechanical Damage (18175-000,7.0%)
No Output	18.8%	6.0%	Catastrophic-No Output Due To Manual Removal (18175-000,6.0%)
Induced		58.0%	Catastrophic-No Output Due To Automatic Removal (18175-000,58.0%)
Unknown		10.0%	Unknown (18175-000,10.0%)
			Degraded - Incorrect Output Due To Faulty Tap (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%), Degraded - Output Less
			(18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%)
No Output	26.5*		(18175-000, 3.0%) (18175-000, 4.0%) (18175-000, 5.0%) (18175-000, 6.0%) (18175-000, 6.0%) (18175-000, 6.0%) (18175-000, 7.0%) (18175-000, 7.0%), Degraded - Output Less Than Rated Capacity (18175-000, 3.0%) (18175-000, 3.0%) (18175-000, 4.0%) (18175-000, 5.0%) (18175-000, 5.0%) (18175-000, 5.0%) (18175-000, 7.0%)
No Output	26.5%	8.4%	(18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%), Degraded - Output Less Than Rated Capacity (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,7.0%) Catastrophic-No Output Due To Manual Removal (18175-000,5.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,5.0%) (18175-000,7.0%) (18175-000,9.0%) (18175-000,10.0%) (18175-000,13.0%)
No Output Open Circuit	26.5% 20.6%	8.4%	(18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%), Degraded - Output Less Than Rated Capacity (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,7.0%) Catastrophic-No Output Due To Manual Removal (18175-000,5.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,8.0%) (18175-000,9.0%)
		8.4* 6.5*	(18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%), Degraded - Output Less Than Rated Capacity (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,7.0%) Catastrophic-No Output Due To Manual Removal (18175-000,5.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,13.0%) Catastrophic-No Output Due To Open Circuit (18175-000,3.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,4.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,4.0%)
Open Circuit	20.6%	8.4% 6.5% 6.4%	<pre>(18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%), Degraded - Output Less Than Rated Capacity (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,7.0%) Catastrophic-No Output Due To Manual Removal (18175-000,5.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,8.0%) (18175-000,9.0%) (18175-000,10.0%) (18175-000,13.0%) Catastrophic-No Output Due To Open Circuit (18175-000,3.0%) (18175-000,10.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,10.0%) (18175-000,16.0%) Degraded - Mechanical Damage (18175-000,2.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,7.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,7.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,8.0%) (18175-000,4.0%) (18175-000,7.0%) (18175-000,4.0%) (18175-000,4.0%)</pre>
Open Circuit Mechanical Damage	20.6% 20.2% 2.8%	8.4% 6.5% 6.4%	<pre>(18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%), Degraded - Cutput Less Than Rated Capacity (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,7.0%) Catastrophic-No Output Due To Manual Removal (18175-000,5.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,8.0%) (18175-000,9.0%) (18175-000,10.0%) (18175-000,13.0%) Catastrophic-No Output Due To Open Circuit (18175-000,3.0%) (18175-000,10.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,10.0%) (18175-000,16.0%) Degraded - Mechanical Damage (18175-000,2.0%) (18175-000,4.0%) (18175-000,4.0%) (18175-000,10.0%) (18175-000,12.0%)</pre>

**a** <sup>3</sup>

Part	Failure	Norm	Fail	Data
	Mode/Mech	Dist.	Dist.	Source(s)/Details
	ormer, Transmission Tile graded Output			aseSources:1 Degraded - Incorrect Output Due To Faulty Tap (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,10.0%), Degraded - Output Less Than Rated Capacity (18175-000,2.0%) (18175-000,3.0%) (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,8.0%), Degraded - Incorrecct Output Due To Faulty Tap (18175-000,11.0%)
Me	chanical Damage	25.4%	9.3%	Degraded - Mechanical Damage (18175-000,2.0%) (18175-000,3.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,6.0%) (18175-000,12.0%) (18175-000,15.0%) (18175-000,26.0%)
No	Output	22.3%	8.1%	Catastrophic-No Output Due To Manual Removal (18175-000,6.0%) (18175-000,6.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,8.0%) (18175-000,9.0%) (18175-000,10.0%) (18175-000,12.0%)
Ор	en Circuit	19.9%	7.3%	Catastrophic-No Output Due To Open Circuit (18175-000,3.0%) (18175-000,4.0%) (18175-000,5.0%) (18175-000,5.0%) (18175-000,7.0%) (18175-000,7.0%) (18175-000,12.0%) (18175-000,15.0%)
Ind	duced		52.4%	Catastrophic-No Output Due To Automatic Removal (18175-000,38.0%) (18175-000,41.0%) (18175-000,46.0%) (18175-000,47.0%) (18175-000,54.0%) (18175-000,60.0%) (18175-000,65.0%) (18175-000,68.0%)
Unl	known		11.3%	Unknown (18175-000,8.0%) (18175-000,8.0%) (18175-000,9.0%) (18175-000,11.0%) (18175-000,12.0%) (18175-000,12.0%) (18175-000,12.0%) (18175-000,18.0%)
Fransi: Sho	stor orted	23.4%	17.4%	Sources:13 Short (24417-002,NR) (24990-000,30.0%) (24992-00C,30.0%) (24992-000,31.5%) (24994-000,20.0%) (24997-000,37.0%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:6) (25000-000,Qty:7) (25000-000,Qty:2) (25000-000,Qty:24) (25000-000,Qty:34) (25000-000,Qty:40) (25000-000,Qty:257) (25000-000,Qty:595) (25014-000,Qty:17) (25027-000,Qty:2) (25027-000,Qty:4), Short-Thermal Expansion Mismatch (25016-000,NR), Short-Foreign Particles (25016-000,NR), Short-Surface Defects (25016-000,NR), Short-Defective Bonds (25016-000,NR), Intermittent Short (10722-000,Qty:1)
Ope	aned	22.94		Open (24417-002,NR) (24992-000,52.6%) (24992-000,70.0%) (24994-000,15.0%) (24997-000,29.0%) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:7) (25000-000,Qty:8) (25000-000,Qty:15) (25000-000,Qty:12) (25000-000,Qty:14) (25000-000,Qty:15) (25000-000,Qty:17) (25000-000,Qty:17) (25000-000,Qty:15) (25000-000,Qty:24) (25000-000,Qty:106) (25000-000,Qty:15) (25014-000,Qty:49), Interconnect (24417-002,NR) (25014-000,Qty:8), Open-Defective Bonds (25016-000,NR), Open-Thermal Expansion Mismastch (25016-000,NR), High Thermal Resistance-Defective Bonds (25016-000,NR), High Thermal Resistance-Thermal Expansion Mismatch (25016-000,NR), Open Circuit (24990-000,30.0%), Open Terminals (24993-000,4.0%), Excessive On-Voltage Drop (24417-002,NR), Open Circuit Between Anode and Cathode Terminals (24417-002,NR)
Red	luced Beta	15.00	11.15	Parameter Drift-hFE (25000-000,Qty:1) (25000-000,Qty:1)

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t Failure	Norm	Fail	Data
c. Mode/Nech	Dist.	Dist.	Source(s)/Details
nsistor (continued)	- <u></u>		
Reduced Beta (continued)			(25000-000,Qty:5) (25000-000,Qty:5) (25000-000,Qty:7), Low Beta-Surface Defects (25016-000,NR), Low Beta-Junction Profile Changes (25016-000,NR), Low Gain (24990-000,20.0%), Output Low (24991-000,67.0%), Low gain (25027-000,Qty:10)
Base Opened	12.5*	9.3%	Open base-Base bond wire fused open (25001-000,Qty:1), Base&Emitter Bond Leads Melted Open-Overstress (10722-000,Qty:1)
Drift	11.2	8.3%	Parameter Drift-General (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:4) (25000-000,Qty:5) (25000-000,Qty:4) (25000-000,Qty:8) (25000-000,Qty:19) (25000-000,Qty:43) (25000-000,Qty:3) (25000-000,Qty:19) (25000-000,Qty:43) (25000-000,Qty:3) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:4) (25000-000,Qty:3) (25000-000,Qty:6) (25000-000,Qty:4) (25000-000,Qty:3) (25000-000,Qty:3) (25000-000,Qty:6) (25000-000,Qty:3) (25000-000,Qty:7), Drift (24992-000,5.3%) (24994-000,65.0%) Parameter change (24997-000,15.0%)
High Leakage Current	10.8%	8.0%	High Leakage-Thermal Expansion Mismatch (25016-000,NR), High Leakage-Surface Defects (25016-000,NR), High Leakage-Foreign Particles (25016-000,NR), High Leakage (24990-000,20.0%), High Collector To Base Leakage Current (24993-000,59.0%), Junction Leakages (10722-000,Qty:1), Leakage current (24997-000,5.8%)
Low Breakdown Voltage	4.24	3.14	Low BVceo-Surface Defects (25016-000,NR), Low Collector To Emitter Breakdown Voltage (BVCEO) (24993-000,37.0%)
Unknown		3.74	Unknown (24417-002,7.0%) (24997-000,12.6%) (25000-000,Qty:1) (25000-000,Qty:2) (25000-000,Qty:3) (25000-000,Qty:21) (25000-000,Qty:34) (25014-000,Qty:7) (25014-000,Qty:34)
Induced		1.34	External Mechanical Degradation (24417-002,NR), Bulk Defect (24417-002,NR), Photolithography Defects (24417-002,4.0%), Electrical Defects (24417-002,12.0%)
Other (<\$4) Metallization			Metalization (25014-000,Qty:14), Metallization (24417-002,26.0%)
Output Stuck High		2.8%	Output High (24991-000,33.0%)
Mechanical Damage		1.9	Mechanical Damage (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:4) (25000-000, Qty:5) (25000-000, Qty:21), Mechanical (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:1) (25000-000, Qty:3) (25000-000, Qty:4) (25000-000, Qty:7), Degraded (25014-000, Qty:14), Broken Lead (25027-000, Qty:3)
Bond/Beam Failure		1.9%	Internal Bonds (24417-002,23.0%)
Emitter Opened		1.9%	Open Emitter-Bond Wires Open Due To Ext. Overstres (10722-000,Qty:2)
Die/Attachment Failure		1 05	Die (25014-000,Qty:7), Lifted Die (25014-000,Qty:1), Die

art Mac.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
ranei	stor (continued)			
Ot	her (continued)			Attachment (24417-002,NR), Die to Header Bond Defects (24417-002,17.0%)
	Collector-Base Opened		1.30	Open - Collector to Emitter-Overscress-High Curren (25027-000,QCy:1), Emitter Leadwire Was Fused Open (10722-000,Qty:1)
	Wire Bond Failure		1.20	Wire Bond (25014-000, Qty:26)
	Collector-Emitter Shorted		0.9%	Verified C-E Short-External Overstress (10722-000,Qty:1)
	Collector-Base Chorted		0.90	Emitter Was Open And Collector To Base Was Shorted (10722-000,Qty:1)
	Leaking		0.9%	B-C Leakage Confirmed (10722-000,Qty:1)
	Contaminated		0.6%	Contamination (25014-000,Qty:1), Surface Contamination (24417-002,NR) (24417-002,7.0%), Contaminated Gas Ambient (24417-002,NR)
	Degraded Operation		0.4	Bad Output (25027-000, Qty:1)
	Base-Emitter Opened		0.4%	Open B-E (25027-000,Qty:1)
	Intermittent Operation		0.4%	Intermittent (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:1) (25000-000,Qty:3) (25000-000,Qty:4) (25014-000,Qty:7), Intermittent-Noise (25000-000,Qty:2), Intermittent Operation-Foreign Particles (25016-000,NR), Intermittent Operation-Loose Bonds (25016-000,NR), Intermittent Operation (24417-002,NR)
	Unstable Operation		0.34	Unstable (24992-000,8.3%)
	Hermetic Leakage		0.3%	Hermeticity (24417-002,4.0%)
	Oxide Defects		0.1	Oxide Defect (25014-000,Qty:3), Oxide Defects (24417-002,NR)
	Noisy		<0.1%	Noisy (24992-000,2.3%)
	Seal Failure		<0,1	Seal Leakage (25000-000,Qty:2) (25000-000,Qty:2) (25000-000,Qty:3)
	Corroded		<0.1%	Corrosion (25000-000,Qty:1)
	Cracked/Fractured		NR	Cracks-Thermal Expansion Mismatch (25016-000,NR)
	Electrical Overstress		NR	Electrical Stress (24417-002, NR)
	Seal/Gasket Failure		NR	Degraded Seals (24417-002,NR)
	Package/Related Failure		NR	Degraded Part Package (24417-002,NR), Mismarked/Umarked Package (24417-002,NR)
	Failure to Turn On		NR	Failure to Turn On When Properly Triggered (24417-002,NR)
Sho Bat	stor,Bipolar (Summary) orted me-Emtter Shorted Litter Opened	53.74 15.54 15.44 11.54		

Part Failure	Norm	Fail	Data
Desc. Mode/Mech			Source(s)/Details
Transistor,Bipolar Collector=Emitter Shorted	100.0%	100.0%	Sources:1 Collector To Emitter Short-Overvoltage EOS (10722-000,Qty:1)
Transistor, Bipolar, NPN Shorted	<b>46.2</b> %	46.2%	Sources:2 Short C-E-Electrical (thermal) Overstress (25027-000,Qty:5), Short C-B-Electrical (thermal) Overstress (25027-000,Qty:2), Short E-C-Electrical (thermal) Overstress (25027-000,Qty:2), Short E-B-Electrical (thermal) Overstress (25027-000,Qty:12), Short B-C-Electrical (thermal) Overstress (25027-000,Qty:2), Short B-E-Electrical Overstress (25027-000,Qty:1)
Emitter Opened	33.34	33.34	Open Emitter-Current Surge (10722-000,Qty:2), Open Emitter (10722-000,Qty:2)
Base-Emtter Shorted	20.5%	20.5%	Short B-E-Electrical (thermal) Overstress (25027-000,Qty:2), Short B-E (10722-000,Qty:2)
ransistor, Bipolar, PNP Shorted	65.9%	56.5 <del>%</del>	Sources:2 Short C-E-Electrical Overstress (25027-000,Qty:28), Short C-B-Electrical Overstress (25027-000,Qty:29), Short E-C-Electrical Overstress (25027-000,Qty:27), Short E-B-Electrical Overstress (25027-000,Qty:27), Short B-C-Electrical Overstress (25027-000,Qty:30), Collector-Base Short-High Volt,Low Energy Transien (10722-000,Qty:1), Short C-E-B-Overstress (10722-000,Qty:1)
Opened	25.0%	21.4*	Emitter To Base And To Collector Open (10722-000,Qty:1), Open B-E and C-E, but Shorted B-C-Overcurrent (10722-000,Qty:1), Open B-C, B-E, and C-E-Overstress (10722-000,Qty:1)
Base-Emtter Shorted	9.14	7.8%	Short B-E-Electrical Overstress (25027-000,Qty:26)
Induced		14.3*	B-C Degraded-Conduct. Particle Under Base Leadwire (10722-000,Qty:1), Degraded-Premature Breakdown In Transistor (10722-000,Qty:1)
ransistor,Field Effect (Summary) Gate-Source Shorted Shorted Output Stuck Low Drift Output Stuck High Opened	27.4% 23.4% 21.9% 16.5% 5.5% 5.3%		
ransistor,Field Effect Output Stuck Low	28.6%		Sources:5 Output Low (24991-000,80.0%)
Shorted	28.6%		Short (24994-000,20.0%) (24994-000,20.0%), Shorted D-S-G-Overstress (10722-000,Qty:2), Short-High Voltage Overstress (10722-000,Qty:1)
Drift	23.28		Drift (24994-000,65.0%) (24994-000,65.0%), Instability or

12.5% 11.7% Open (24994-000,15.0%) (24994-000,15.0%), Shorted Drain to Gate, Open Source (10722-000,Qty:1)

Opened

FMD				Failure Distribution Summaries 3-	
Part Desc.	Failure Mode/Mach	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	stor, Field Effect (continued atput Stuck High	1) 7.1	6.71	Output High (24991-000,20.0%)	
Ur	hknown		6.7%	Unknown (10722-000,Qty:1)	
Ir	nduced		<0.1	Instantaneous Burnout (25037-000,NR), Channel Degradation (25037-000,NR)	
Ot	her Degraded Operation		0.0% NR	Long-term Gradual Dergradation (24417-002,NR)	
	Electrical Overstress		NR	Electrical Overstress (24417-002,NR)	
	Gate Metal Sinking		NR	Gate Metal Sinking (25037-000,NR)	
	Surface Defects		NR	Surface Degradation (25037-000,NR)	
	Change in Resistance		NR	Ohmic Contact Degradation (25037-000,NR)	
	Long Term Burnout		NK	Long Term Burnout (25037-000,NR)	
	Intermetallic Phase Format:	ion	NR	Intermetallic Phase Formation (25037-000,NR)	
	stor,Field Effect,Junction te-Source Shorted	50.0%	50.0%	Sources:2 Short Source to Gate (25027-000,Qty:4)	
El	ectrical Overstress	50.0%		Source 2 Metallization Was Fused Open-Overstress (10722-000,Qty:1)	
	stor,Field Effect,Power orted	85.7%		Sources:1 Shorted S-G-D-Die Cracked From Physical Stress (10722-000,Qty:1), Short Between The Source And The Gate-Overstress (10722-000,Qty:1) (10722-000,Qty:1), Shorted D-G-S-Severe Overstress Damage (10722-000,Qty:1), Short Between The Source And The Drain-Overstress (10722-000,Qty:1), Shorted Gate To Drain With An Open At The Source (10722-000,Qty:1)	
	ntaminated	14.3%	10.0%	PIND Failures-Sodium Particle Found (10722-000,Qty:1)	
Co			30.0%	Degraded-Overstressed (10722-000,Qty:3)	
	duced				
Ind ransi:	duced stor,Field Effect,R.F. lft			Sources:1 Drift (24994-000,50.0%)	
Ind ransis Dr:	stor,Field Effect,R.F.	50.0%	50.0%		

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	ilure	Norm	Fail	Data
esc. M	ode/Mech	Dist.	Dist.	Source(s)/Details
ransist Opera	or, Ga <b>as</b> Fet ad	56.04	56.0%	Sources:1 Open (25028-000,Qty:1) (25028-000,Qty:1) (25028-000,Qty:1) (25028-000,Qty:3) (25028-000,Qty:4) (25028-000,Qty:4)
Shor	led	24.0%	24.0%	Short (25028-000,Qty:1) (25028-000,Qty:1) (25028-000,Qty:1) (25028-000,Qty:1) (25028-000,Qty:2)
Drif	:	12.04	12.0%	Vt Drift (25028-000,Qty:1) (25028-000,Qty:2)
VT E	traction	8.0%	8.0%	Vt Extraction (25028-000,Qty:1) (25028-000,Qty:1)
ransisto Shori	or,High Power ed	44.0%	40.5%	Sources:4 Short-Electrical Overstress (25027-000,Qty:4) (25027-000,Qty:26), Short-External Electrical Overstress (10722-000,Qty:2), Transistor Shorted C-B-E-Overstress From VCE/ICE (10722-000,Qty:1), Short Case To Bracket-External Particle Indicated (10722-000,Qty:1), Short C-E-Secondary Breakdown (24417-002,NR)
Degra	ded Operation	36.24	33.34	Output Low (24991-000,43.0%), Output High (24991-000,57.0%)
Bond,	Beam Failure	9.1*	8.34	Lifted Emitter Die Bond (10722-000, Qty:1) (10722-000, Qty:1)
Elect	rical Overstress	4.5%	4.2	Forward Bias Overstress Shorted (10722-000,Qty:1)
Mecha	nical Overstress	4.5%	4.2*	Q2 Die Cracked; Machanical Stress (10722-000,Qty:1)
Open	bd	1.7%	1.6%	Open-Electrical Overstress (25027-000,Qty:2)
Indu	ced		7 <b>.9</b> %	Degredation-Electrical Overstress (25027-000,Qty:10)
Othe: W	r Ire Bond Failure		0.04 NR	Wire Bond Failure (24417-002,NR)
cansisto Cracl	or, Lead sed/Fractured	100.0%	100.0%	Sources:1 Fracture-Lack Of Solder Wetting (10722-000,Qty:2)
ransisto Drift	pr,Linear :	65.0%	65.0%	Sources:1 Drift (24994-000,65.0%)
Short	ed	20.0%	20.0%	Short (24994-000,20.0%)
Opene	ed.	15.0%	15.0%	Open (24994-000,15.0%)
	or, Microwave Return Loss	100. <b>0</b> %	100.0%	Sources:2 High Return Loss (25027-000,Qty:6)
Other Al	uminum Migration		0.0% NR	Aluminum Migration (24417-002,NR)
Di	e/Attachment Failure		NR	Die Attach Failure (24417-002,NR)
03	ide Defisitio		NR	Metal-Over-Oxide-Step Coverage (24417-002,NR)
Wi	re Bond Failure		NR	Lead Bond Failures (24417-002,NR)
No	Operation		NR	Device Inability to Operate into a Mismatched Load

	91			Failure Distribution Summaries 3-
Part Desc.	Failure Mode/Mech		Fail Dist.	Data Source(s)/Details
Fransi	stor, Microwave (con	t inued)		
	her (continued)			(24417-002, NR)
	stor, Multiple	100.0%	100.0%	Sources:1 Shorted Off Base Emitter And Degraded Collector
				(10722-000, Qty: 1)
	stor, Multiple, Darli			Sources:1
Sh	urted	100.0%	100.0%	Short C-E-Cracked Die (23027-000,Qty:1), Short C-B-Cracked Die (25027-000,Qty:1)
Transi	stor,Multiple,Darli			Sources:1
Sh	orted	100.0%	100.0%	Short-Cracked Die (25027-000,Qty:2), Short-Electrical Overstress (25027-000,Qty:1)
fransi	stor,Multiple,Dual,			Sources:1
Sh	orted	100.0%	100.0%	Collector Base Short-Overstress (10722-000,Qty:1)
	stor, Multiple, Quad se Opened	50.0%	50.0%	Sources:1 Open Base Pin 6-Excessive Intermetallic (10722-000,Qty:1)
	itter Openea			Emitter Open-Lifted Chip Bond (10722-000,Qty:1)
ransi	stor,R.F.			Sources:1
	ift	50.0%	50.0%	Dirft (24994-000,50.0%), Drift (24994-000,50.0%) (24994-000,50.0%)
Sh	orted	40.0%	40.0%	Short (24994-000,40.0%) (24994-000,40.0%) (24994-000,40.0%)
Op	ened	10.0%	10.0%	Open (24994-000,10.0%) (24994-000,10.0%) (24994-000,10.0%)
	stor, Small Signal			Sources:1
	ø Output gh Output			Output Low (24991-000,80.0%) Output High (24991-000,20.0%)
		20.00	20100	
	stor, Switching, High		100.00	Sources:1
HIG	gh Leakage Current	100.04	100.04	Excessive current draw-NPN junction degradation (25001-000, Qty:1)

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Part	Failuro	Norm	Fail	Data
Desa.	Mode/Mach	Dist.	Dist.	Source(s)/Details
	stor, Switching, Logic orted	60.0%	60.0%	Sources:1 Short (24994-000,60.0%)
Op	aned	40.0%	40.0%	Open (24994-000,40.0%)
Ot	ner Drift		0.04 NR	Drift (24994-000,NR)
	stor,Unijunction ift	65.0%	65.0%	Sources:1 Drift (24994-000,65.0%)
Sh	orted	20.0%	20.0%	Short (24994-000,20.0%)
Ope	ened	15.0%	15.0%	Open (24994-000,15.0%)
	ing Handwheel.Assembly rroded	50.0%	50.0%	Sources:1 Corroded-Broken/Damaged (25101-000,Qty:1)
Bi	nding/Sticking	50.0%	50.0%	Worn - Binding/Sticking (25101-000,Qty:1)
	ing Lock Assy shing Failure	42.9%	42.9%	Sources:1 Worn Bushing - Excessive Play (25101-000,Qty:3)
Ex	cessive Play	14.3%	14.3%	Excessive Play (25101-000,Qty:1)
Bi	nding/Sticking	14.3*	14.3%	Gears Binding - Inop/Unserviceable (25101-000,Qty:1)
Br	oken	14.3%	14.3%	Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Se	al/Gasket Failure	14.3%	14.3%	Seals Worn - Worn Out (25101-000,Qty:1)
lube Bri	oken	40.5*	27.98	Sources:2 Broken (20609~000,Qty:53)
	cessive Play	36.4%		Worn - Excessive Play (25101-000, Qty:1)
	ened	10.0%		Opened (20609-000,Qty:13)
-	cked/Fractured	8.4%		Cracked/Fractured (20609-000,Qty:11)
	orted	3.18		Short (20609-000, qty:4)
	; of Spec.	1.5%		Out of Tolerance (20609-000, Qty:2)
~41		1.01	~· * *	and of forgeneral (reach analgelie)

FMD-91			Failure Distribution Summaries 3-253
Part Failure Desc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Tube Metal Assembly Broken	100.0%	33.3%	Scurces:1 Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1)
Induced		33.3%	Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1)
Unknown		33.31	Unknown (25101-000,Qty:1)
Tube, Cannon Worn	40.0%	33.3%	Sources:1 Worn Out (25101-000,Qty:1) (25101-000,Qty:3)
Excessive Play	20.0%	16.73	Worn - Excessive Play (25101-000,Qty:1)
Cracked/Fractured	20.0%	16.7%	Cracked (25101-000,Qty:1)
Broken	20.04	16.7%	Broken/Damaged (25101-C00,Qty:1)
Induced		16.7%	Caused By Other Failure-Broken/Damaged (25101-000,Qty:1)
Tube,Electron Drift	46.6%	45.3%	Sources:3 Drift (20609-000,Qty:2,036) (24992-000,30.0%), Change or loss of parameters (24997-000,NR)
Opened	21.9%	21.3%	Open (24992-000,35.0%), Opened (20609-000,Qty:257)
Unstable Operation	12.8%	12.5%	Unstable (24992-000,25.0%)
Noisy	9.6%	9.3%	Noisy (20609-000,Qty:292) (24992-000,10.0%)
Shorted	6.5%	6.3%	Short (20609-000, Quy: 426)
Contaminated	2.1%	2.1%	Contaminated (20609-000, Qty:140)
Leaking	0.4%	0.4%	Leaking (20609-000,Qty:26)
Unknown	*****	2.7%	Unknown (20609-000, Qty: 180)
Other Open Cathode		0.0% NR	Open cathode (24997-000, NR)
Tube,Electron,Microwave,TWT Decreased Output Power	60.7%		Sources:6 Low Output Power (25015-000,21.0%), Low Power & High Helix Current (25015-000,45.0%), Cathode-Decreasing Emission (23185-037,35.0%), Output Power Decrease-Cathode Activity Degradation (17950-030,21.0%) (18800-001,50.8%), Output Power Decrease & Helix Current Increase (17950-030,45.3%) (18800-001,28.2%), Low Power Output (23546-000,Qty:6) (23546-001,22.0%) (23546-001,39.0%), Low RF Power (23546-000,Qty:120), Gain Variations (23546-001,6.0%) (23546-001,11.0%)
High Helix Current	9.5%		High Helix Current (25015-000,18.0%), Helix Current Increase (17950-030,17.5%) (18800-001,10.0%), Excessive Helix Current (23546-000,Qty:11), Increased Helix Current (23546-000,Qty:2)
Mechanical Failure	8.5%		Windows - Leakage (23185-037,2.0%), Pressure Leak at Waveguide Transistion (23546-000,Qty:19), Output Window Cracked (23546-000,Qty:2), Mechanical Damage (23546-000,Qty:2), Potting Failure (23546-000,Qty:140), Cracked Window (23546-001,1.0%) (23546-001,4.0%), Oil Leak (23546-001,4.0%) (23546-001,8.0%), Physical Damage

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art Failure ssc. Mode/Mech	Norm Dist.	Fail	Data Source(s)/Details
<pre>ibe,Electron,Microwave,TWT (cont Mechanical Failure (continued</pre>			
			(23546-001,2.0%) (23546-001,11.0%), Virtual Leak (23546-001,1.0%) (23546-001,4.0%), Vacuum Leak (23546-001,3.0%)
Open Helix	8.4%	7.04	Filament Open/Short (23185-037,14.0%), Helix - Open (23185-037,8.0%), Open Helix (23546-000,Qty:1), Open Helix Output (23546-000,Qty:150), Open Input Helix (23546-000,NR)
Gun Failure	6.34	5.24	Open Heater (23546-000,Qty:4) (23546-000,Qty:15), Low Cathode Activity (23546-000,Qty:140), Ion Pump Failure (23546-001,1.0%) (23546-001,2.0%), Gun Failure (23546-001,4.0%) (23546-001,5.0%), Gun Change (23546-001,4.0%) (23546-001,5.0%)
Noise/Oscillations	3.4%	2.8%	Noise/Oscillators (25015-000,16.0%), Osciilations (23546-001,2.0%)
Poor Focus	3.24	2.6%	Poor Focus (23546-000,Qty:120)
Unknown		7.8%	Unknown (17950-030,16.2%) (18800-001,11.0%) (23546-000,Qty:10) (23546-001,1.0%) (23546-001,1.0%) (23546-001,4.0%) (23546-001,5.0%) (23546-001,6.0%) (23546-001,20.0%)
Induced		0.4*	Workmanship (23546-001,2.0%) (23546-001,3.0%)
Other (<%3) Magnetic Strength Change	*	9.0% 1.8%	Magnets - Change Strength (23185-037,11.0%)
Attenuation Change		1.7%	Attenuator-Change Attenuation (23185-037,10.0%)
Arcing/Sparking		1.5%	Focus Electronics - Arcing (Anode - Case) (23185-037,9.0%), Tube Arcing (23546-000,Qty:2)
Abnormal Saturation		1.2%	Saturation Not Nominal (23546-001,2.0%) (23546-001,12.0%)
Collector Failure		1.1*	Collectors-Open/Short (23185-037,5.0%), Collector Shorted (23546-000,Qty:2), TWT Collector Potting (23546-000,Qty:4), Collector Fault (23546-001,1.0%) (23546-001,1.0%)
Anode Openned		0.7%	Anode Open (23185-037,4.0%)
Connector Failure		0.3%	Connectors-Wear (23185-037,2.0%)
Body Current		0.2%	Body Current (23546-001,1.0%) (23546-001,2.0%)
Power Conditioner Failure		0.1%	Electronic Power Conditioner Failure (23546-000,Qty:6)
Electrode Leakage		0.1%	Interelectrode Leakage (23546-000,Qty:5)
RF Leakage		<0.1%	RF Leakage (23546-001,1.0%)
Inoperative Phaser		<0.18	Inoperative Phaser (23546-000,Qty:1)
Degaused Magnet Failure		<0.1%	Degaused Magnet (23546-000, gty:1)
Grid-Cathode Short		<0.1%	Grid-Cathode Short (23546-000,Qty:1)

FMD-91 Part Failure	Norm	Fail	Failure Distribution Summaries
Was Mode/Mach	Dist.	Dist.	Source (s) /Details
Electron, Modulator	50.94	44.28	Sources:1 Diodes, Rectifiers, and Transistors (23546-001,44.2%)
IC Failure	19.0%	16.5	Hybrids and I.C.'s (23546-001,16.5%)
Capacitor Failure	16.6%	14.5%	Capacitors (23546-001,14.5%)
Resistor Failure	10.84	9.44	Resistors (23546-001,9.4%)
Connector Failure	2.18	1.94	Connectors-Electrical- (23546-001,1.9%)
Relay Failure	0.6*	0.5%	Relays, Magnets, Solenoids (23546-001,0.5%)
Unknown		12.0%	Unknown (23546-001,1.9%) (23546-001,2.7%) (23546-001,7.4%)
Induced		1.1%	Templates, Printed Wiring Boards (23546-001,1.1%)
ube,Electron,Receiving Induced		<0.1%	Sources:1 Envelope degradation-Excess Heat (24417-000,NR)
Other Excessive Heat	<i></i>	100.0% NR	Filament / Heater Degradation-Excess Heat (24417-000,NR)
Gas Evolvement		NR	Gas Evolvement-Excess Heat (24417-000,NR)
Gas Cleanup		NR	Gas Cleanup (24417-000,NR)
ube,Electron,Subminiature Induced	*****	90.0%	Sources:1 Degradation (gm, lhk, lp, etc.) (24993-000,90.0%)
Unknown		10.0%	Unknown (24993-000,10.0%)
ube,Gimbal Loose	100.0%	71.4%	Sources:1 Loose (25101-000,Qty:2), Internal Failure - Loose (25101-000,Qty:3)
Induced		14.3%	Improper Maintenance - Out Of Adjustment (25101-000,Qty:1)
Unknown		14.3%	Unknown (25101-000, gty:1)
ubing,End Out of Adjustment	63. <b>6%</b>	63.64	Sources:1 Out Of Adjustment - Found In TI/PMCS/Insp (25101-000,Qty:1), Out Of Adjustment - Out Of Synch (25101-000,Qty:13)
Broken	27.3	27.3	Broken/Damaged (25101-000,Qty:6)
Bent/Dented/Warped	9.14	9.14	Warped/Bent - Broken/Damaged (25101-000,Qty:1), Collapsed/Bent (25101-000,Qty:1)

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rt	Failure	Norm	Fail	Data
SC.	Mode/Mech	Dist.		Source(s)/Details
lve (	Summary)			1999-1999-1999-1999-1999-1999-1999-199
	king	50.0%		
	l/Gasket Failure	12.78		
	ding/Sticking	10.34		
	d/Deteriorated	10.0%		
	rious/False Operation	9.01		
Val	ve Actuator Failure	8.1%		
lve				Sources:6
	king	44.0%	24.64	External Loak (24990-000,15.0%) (24992-000,31.6%), Passing
				(Internal) (24990-000,60.0%), Internal Loak
				(24992-000,4.2%), Leaking (20609-000,Qty:2,193)
				(20609-000, Qty: 38)
				(20609-000, Qry:36)
5	l/Gasket Failure	14.9%	0 26	Tensoner Costing (18642-000 10 68) Cost Worn Out
369	II GASKEL FALLUEE	T4+34	0.34	Improper Sealing (19542-000,12.5%), Seal Worn Out (19542-000,37.5%)
				(1), (1), (1), (1), (1), (1), (1), (1),
Val	ve Actuator Failure	12.14	6.8%	Valve Actuators (24996-000,81.2%)
Ope	ned	8.8%	4.9%	Open (24992-000,29.5%), Opened (20609-000,Qty:1)
Clo	sed	7.84	4.4*	Close (24992-000,26.2%), Stuck Closed (20609-000,Qty:1)
Bin	ding/Sticking	6.34	3.5%	<pre>Sticking (24990-000,20.0%), Bind (24992-000,0.1%), Binding (20609-000,Qty:65)</pre>
Deg	raded Operation	6.0%	3.34	Degraded (24996-000,40.0%)
Unk	nown		35.41	Unknown (19542-000,12.5%) (19542-000,25.0%) (20609-000,Qty:70) (20609-000,Qty:2,660) (23038-001,Qty:1) (24996-000,60.0%)
	er (<\$5)		8.8%	
	Cracked/Fractured		2.18	Cracks On Body (19542-000,12.5%), Cracked/Fractured (20609-000,Qty:2)
	Valve Mechanism Failure		1.6%	Valve Mechanism (24996-000,18.7%)
	F			
	Improper Flow		1.4%	Blocking (24990-000,5.0%), Improper Flow (20609-000,Qty:201)
:	Premature Open		1.48	Premature (24992-000,8.2%)
1	Out of Adjustment		1.0%	Out of Adjustment (20609-000,Qty:333) (20609-000,Qty:21)
	Worn		0.9%	Worn Gut (20609-000,Qty:328), Fatigue (20609-000,Qty:1)
	Intermittent Operation		0.2%	Intermittent (20609-000,Qty:58) (20609-000,Qty:2)
	No Operation			No Operation (20609-000,Qty:50)
	Contaminated			Contaminated (20609-000, Qty: 33)
	Dut of Spec.			Out of Specification (20609-000,Qty:19)
	Noisy			Noisy (20609-000,Qty:8)
	Stuck Open			Stuck Open (20609-000,Qty:6)
	Instable Operation		<u.1%< td=""><td>Unstable (20609-000,Qty:3)</td></u.1%<>	Unstable (20609-000,Qty:3)

	D-91 Failure Distribution Summaries 3-257						
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details			
	Actuator urious/False Operation	100.00	90.00	Sources:1 Spurious (24990-000,90.0%)			
Un	known	an vit 😄 💷 41 64	10.0	Unknown (24990-000,10.0%)			
	Air Control aking	100.08	100.0%	Sources:1 Catastrophic-External Laakage (18175-000,100.0%) (18175-000,100.0%) (18175-000,100.0%)			
	By-Pass emature Operation	70.0%	70.0%	Sources:1 Premature Operation (24992-000,70.0%)			
Гe	aking	30.0%	30.0%	External Leak (24992-000,30.0%)			
Valve, Cl	Check osed	50.0%	50.6%	Sources:1 Close (24992-000,50.0%)			
Op	ened	50.0%	50.0%	Open (24992-000,50.0%)			
	Check & Relief ed/Deteriorated	55.6%	50.0%	Sources:1 Valve Seat Deterioration (24993-000,50.0%)			
Bi	nding/Sticking	44.4%	40.0*	Poppets Sticking (Open Or Closed) (24993-000,40.0%)			
Uni	known		10.0%	Unknown (24993-000,10.0%)			
	Check,PWR aking	100.0%	100.0%	Sources:1 Catastrophic-Internal Leakage (18175-000,91.0%) (18175-000,91.0%) (18175-000,92.0%), Catastrophic-External Leakage (18175-000,8.0%) (18175-000,9.0%) (18175-000,9.0%)			
	Control osed	50.0%	50.0%	Sources:1 Close (24992-000,50.0%)			
Ope	ened	50.0%	50.0%	Open (24992-000,50.0%)			
/alve,( Sea	Core al/Gasket Failure	100.0%	33.3*	Sources:1 Seels Worn - Internal Moisture (25101-000,Qty:1)			
Inc	duced		66.7%	<pre>Improper Installation - Broken/Damaged (25101-000,Qty:1), Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1)</pre>			

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3-258 Failure Distribution	Summaries		F	'MD-91
Part Failure		Fail	Data	
Desc. Mode/Mech	Dist.	Dist.	Source(s)/Details	
/alve,Fill & Check			Sources:1	
Opened	50.0%	50.0%	Opan (24992-000,50.0%)	
Closed	50.0%	50.0%	Close (24992-000,50.0%)	
Valve,Filling Leaking	50.0%	50.08	Sources:2 External Leak (24992-000,100.0%)	
HEARING	50:01			
Cracked/Fractured	25.0%	25.0%	Cracked/Split-Leaking Hydraulic Oil (25101-000,Qty:1)	
Bent/Dented/Warped	25.0%	25.0%	Warped/Bent - Leaking Hydraulic Oil (25101-000,Qty:1)	
alve,Fuel			Sources:1	
Leaking	60.9%	60.9%	Internal Leak (24992-000,31.5%), External Leak (24992-000,30.0%)	
Opened	15.8%	15.8%	Open (24992-000,16.0%)	

Closed	15.8%	15.8% Close (24992-000,16.0%)
Binding/Sticking	7.4%	7.4% Bind (24992-000,7.5%)

Valve,Fuel,Main Assembly		Sources:1
Opened	50.0%	50.0% Open (24992-000,50.0%)
Closed	50.0%	50.0% Close (24992-000,50.0%)

Valve, Hydraulic (Summary)	
Leaking	77.2%
Stuck Closed	5.9%
Closed	5.8%
Opened	5.8%
Stuck Open	5.4%

Valve,Eydraulic Unstable Operation	45.0%	Sources:1 45.0% Unstable (20609-000,Qty:9)
Leaking	20.0%	20.0% Leaking (20609-000,Qty:4)
Stuck Closed	15.0%	15.0% Stuck Closed (20609-000,Qty:3)
Stuck Open	5.0\$	5.0% Stuck Open (20609-000,Qty:1)
Out of Spec.	5.0%	5.0% Out of Specification (20609-000,Qty:1)
Intermittent Operation	5.0%	5.0% Intermittent (20609-000,Qty:1)
Improper Flow	5.0%	5.0% Improper Flow (20609-000,Qty:1)

FMD-91			Failure Distribution Summaries		
Part Failure Desc. Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details		
Valve, Hydraulic, Actuator Leaking	75.0%	75.0%	Sources:1 External Leak (24992-000,75.0%)		
Opened	10.0%	10.0%	Open (24992-000,10.0%)		
Closed	10.0%	10.0%	Close (24992-000,10.0%)		
Corroded	5.0%	5.0%	Corroded (24992-000,5.0%)		
Valve,Hydraulic,Ball Leaking	54.2%	54.2%	Sources:1 Leaking (20609-000,Qty:13)		
Stuck Open	29.2%	29.2%	Stuck Open (20609-000,Qty:7)		
No Operation	8.3%	8.3%	No Operation (20609-000,Qty:2)		
Out of Spec.	4.28	4.2%	Out of Specification (20609-000,Qty:1)		
Noisy	4.2%	4.2%	Noisy (20609-000,Qty:1)		
			Sources:1		
Valve,Hydraulic,Bellows Diaphragm Leaking	58.1%	5 <b>3.2%</b>	Sources:1 Leaking (20609-000,Qty:25)		

Leaking	58.1%	53.2% Leaking (20609-000,Qty:25)	3.2% I	
Cracked/Fractured	14.0%	12.8% Cracked/Fractured (20609-000,Qty:6)	2.8% (	
Intermittent Operation	11.6%	10.6% Intermittent (20609-000,Qty:5)	0.6% 1	
Out of Spec.	7.0%	6.4% Out of Specification (20609-000,Qty:3)	6.4% (	)
No Operation	4.7%	4.3% No Operation (20609-000,Qty:2)	4.3% 1	
Stuck Open	4.78	4.3% Stuck Open (20609-000,Qty:2)	4.3% \$	
Other (<%4) Displaced		8.5% 2.1% Displaced (20609-000,Qty:1)		
Noisy		2.1% Noisy (20609-000,Qty:1)	2.1% 1	
Stuck Closed		2.1% Stuck Closed (20609-000,Qty:1)	2.1% 5	
Unstable Operation		2.1% Unstable (20609-000,Qty:1)	2.1% (	

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Valve,Hydraulic,Check Leaking	85.2%	Sources:1 80.9% Leaking (20609-000,Qty:144)
Stuck Open	5.9%	5.6% Stuck Open (20609-000,Qty:10)
Cracked/Fractured	3.6%	3.4% Cracked/Fractured (20609-000,Qty:6)
Improper Flow	3.0%	2.8% Improper Flow (20609-000,Qty:5)
Intermittent Operation	2.4*	2.2% Intermittent (20609-000,Qty:4)
Other (<%3) Stuck Closed		5.1% 1.7% Stuck Closed (20609-000,Qty:3)
Out of Spec.		1.7% Out of Specification (20609-000,Qty:3)
Unstable Operation		1.1% Unstable (20609-000,Qty:2)

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3-260	Failure Distribution Sum				FMD-9
art esc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
	Hydraulic,Check (continued) her (continued)				
	Collapsed		0.6%	Collapsed (20609-000,Qty:1)	
	Hydraulic,Gate Shear aking	63.0%	61.5%	Sources:1 Leaking (20609-000,Qty:216)	
	uck Closed	16.3%		Stuck Closed (20609-000, Qty:56)	
St	uck Open	9.3%	9.1%	Stuck Open (20609-000,Qty:32)	
Cr	acked/Fractured	4.1%	4.0%	Cracked/Fractured (20609-000,Qty:14)	
Ou	t of Spec.	3.8%	3.7%	Out of Specification (20609-000,Qty:13)	
Ou	t of Adjustment	3.5%	3.4%	Out of Adjustment (20609-000,Qty:12)	
Ot	her (<\$2) Intermittent Operation		2.3% 0.9%	Intermittent (20609-000,Qty:3)	
	Improper Flow		0.6%	Improper Flow (20609-000,Qty:2)	
	Breach		0.6%	Breach (20609-000,Qty:2)	
	Seized		0.3%	Seized (20609-000,Qty:1)	
	Hydraulic,Globe Rotary aking	56.6*	48.0%	Sources:1 Leaking (20609-000,Qty:98)	
St	uck Open	17.3%	14.7%	Stuck Open (20609-000,Qty:30)	
St	uck Closed	12.7%	10.8%	Stuck Closed (20609-000,Qty:22)	
No	Operation	7.5%	6.4%	No Operation (20609-000,Qty:13)	
In	termittent Operation	5.8%	4.9%	Intermittent (20609-000,Qty:10)	
Uni	known		0.5%	Unknown (20639-000, Qty:1)	

Other (<%5)	14.7%
Cracked/Fractured	3.9% Cracked/Fractured (20609-000,Qty:8)
Out of Spec.	3.4% Out of Specification (20609-000,Qty:7)
Unstable Operation	3.4% Unstable (20609-000,Qty:7)
Out of Adjustment	2.5% Out of Adjustment (20609-000,Qty:5)
Improper Flow	1.5% Improper Flow (20609-000,Qty:3)

Valve,Hydraulic,Manual Leaking	Sources:1 50.0% 47.1% Leaking (206	509-000, Qty:8)
Cracked/Fractured	18.8% 17.6% Cracked/Frac	tured (20609-000,Qty:3)
Unstable Operation	6.3% 5.9% Unstable (20	609-000,Qty:1)
Out of Spec.	6.3% 5.9% Out of Speci	fication (20609-000,Qty:1)
Out of Adjustment	6.3% 5.9% Out of Adjus	stment (20609-000,Qty:1)

FMD-				Failure Distribution Summaries 3-26
Part Desc.	Failure Mode/Msch	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Hydraulic, Manual (continued) iay	6.3	5.9	Noisy (20609-000,Qty:1)
No	Operation	6.34	5.91	No Operation (20609-000,Qty:1)
Uni	knovn		5.9%	Unknown (20609-000,Qty:1)
	Hydraulic,Needle t of Spec.	66.7%	66.74	Sources:1 Out of Specification (20609-000,Qty:8)
Sti	uck Open	16.7%	16.7%	Stuck Open (20609-000,Qty:2)
Lei	aking	16.7%	16.7%	Leaking (20609-000,Qty:2)
	Hydraulic,Plug aking	30.4	28.04	Sources:1 Leaking (20609-000,Qty:7)
Stu	uck Closed	21.7%	20.0%	Stuck Closed (20609-000, Qty:5)
Out	t of Adjustment	17.4%	16.0%	Out of Adjustment (20609-000,Qty:4)
No	Operation	13.0%	12.08	No Operation (20609-000,Qty:3)
Out	t of Spec.	8.7%	8.0%	Out of Specification (20609-000,Qty:2)
Imp	proper Flow	8.7%	8.0%	Improper Flow (20609-000,Qty:2)
Otł	ner (<\$5) Stuck Open		8.0% 4.0%	Stuck Open (20609-000,Qty:1)
	Intermittent Operation		4.0%	Intermittent (20609-000,Qty:1)
	Hydraulic,Relief Aking	100.0%	72.7%	Sources:1 Leaking (20609-000,Qty:8)
Unk	nown		27.3	Unknown (20609-000,Qty:3)
	lydraulic,Servo king	60.0%		Sources:1 Leaking (20609-000,Qty:12)
	Operation	20.0%		No Operation (20609-000,Qty:4)
	table Operation			Unstable (20609-000,Qty:2)
	ck Closed			Stuck Closed (20609-000,Qty:2)

art Failure esc. Mode/Mech alve,Hydraulic,Soler Stuck Closed		Fail Dist.	Data
			Source(s)/Details
		100.0%	Sources:1 Stuck Closed (20609-000,Qty:2)
alve,Ignition Closed	50.0%	50.0%	Sources:1 Close (24992~000,72.5%)
Leaking			External Leak (24992-000,50.0%)
Opened	15.5%	15.5%	Open (24992-000,22.5%)
alve, Interconnect Leaking	53.0%	53.0%	Sources:1 External Leak (24992~000,53.0%)
Opened	23.5%	23.5%	Open (24992-000,23.5%)
Closed	23.5%	23.5%	Close (24992-000,23.5%)
alve,Manual Control Leaking	91.7%	91.7%	Sources:2 Leak (24992-000,83.3%), External Leakage (18175-000,100.0%) (18175-000,100.0%) (18175-000,100.0%)
Mechanical Failur	e 8.4%	8.44	Mechanical Failure (24992-000,16.7%)
alve,Motor Control Leaking	65.3%	65.3%	Sources:1 Catastrophic-External Leakage (18175-000,57.0%) (18175-000,62.0%) (18175-000,77.0%)
Plugged	34.7%	34.7%	Catastrophic-Plugged (18175-000,23.0%) (18175-000,38.0%) (18175-000,43.0%)
alve,Oil Leaking	66.7%	28.6%	Sources:1 Leaking Hydraulic Oil (25101-000,Qty:2)
Seal/Gasket Failu	re 35.3%	14.34	Seals Worn - Leaking Hydraulic Oil (25101-000,Qty:1)
Induced		42.9%	Abnormal Operation (25101-000,Qty:1), Improper Installation - Leaking Hydraulic Oil (25101-000,Qty:1), Improper Maintenance - Leaking Hydraulic Oil (25101-000,Qty:1)
Unknown		14.3%	Unknown (25101-000,Qty:1)
alve,Operator,Electr Degraded Operation		30.0%	Sources:1 Degraded (18175-000,60.0%)
Premature/Delayed	Actuation 30.0%	30.0%	Degraded - Premature Or Delayed Actuation (18175-000,60.0%)
Spurious Opening	21.0%	21.0%	Catastrophic-Spurious Opening (18175-000,21.0%) (18175-000,21.0%)
Spurious Closing	19.04	19.0%	Catastrophic-Spurious Closing (18175-000,19.0%) (18175-000,19.0%)

	-91			Failure Distribution Summaries 3-
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist	Data Source(s)/Details
	Operator, Electric Motor, Com			Sources:1
PI	remature/Delayed Actuation	60.0%	60.0%	Degraded - Premature Or Delayed Actuation (18175-000,60.0%)
Sp	purious Opening	20.0%	20.0%	Catastrophic-Spurious Opening (18175-000,20.0%)
Sr	purious Closing	20.0%	20.0%	Catastrophic-Spurious Closing (18175-000,20.0%)
	Operator,Electric Solenoid Purious Closing	65.0 <b>%</b>	57.2%	Sources:1 Catastrophic-Spurious Closing (18175-000,20.0%) (18175-000,65.0%) (18175-000,65.0%) (18175-000,68.0%) (18175-000,68.0%)
Sp	purious Opening	20.0%	17.6%	Catastrophic-Spurious Opening (18175-000,4.0%) (18175-000,4.0%) (18175-000,20.0%) (18175-000,30.0%) (18175-000,30.0%)
Pr	remature/Delayed Actuation	15.0%	13.2%	Degraded - Premature Or Delayed Actuation (18175-000,5.0%) (18175-000,5.0%) (18175-000,28.0%) (18175-000,28.0%)
Ir	nduced		12.0%	Degraded - Premature Or Delayed Acutation (18175-000,60.0%)
alve,	POW	96 79	06 78	Sources:1 Leaking Internal or External (25464-000,Qty:1)
10	<b>GALI</b> 19	20.71	30./1	(25464-000,Qty:28)
Dr	fift	3.3%	3.3%	Fluctuates, Unstable or Errati (25464-000,Qty:1)
	Pilot			Sources:1
Cl	osed	50.0%	50.0%	Close (24992-000,50.0%)
qO	ened	50.0%	50.0%	Open (24992-000,50.0%)
	Pneumatic (Summary)			
Lei	oken aking	22.1% 20.0%		
-	ened o <b>se</b> d	16.6% 16.6%		
Spi	urious Opening	12.4%		
Spi	urious Closing	12.4%		
	Pneumatic urious Opening	46.4%	42.5%	Sources:1 Catastrophic-Spurious Opening (18175-000,42.C%) (18175-000,43.0%)
Sp	urious Closing	44.8%	41.0%	Catastrophic-Spurious Closing (18175-000,40.0%) (18175-000,42.0%)
Pre	amature/Delayed Actuation	8.74	8.04	Degraded - Premature Or Delayed Actuation (18175-000,16.0%)
Inc	iuced		8.5%	Degraded - Premature Or Delayed Actuation (18175-000,17.0%)

esc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Pneumatic, Actuator purious Closing	35 . 3%	33.5%	Sources:1 Catastrophic-Spurious Closing (18175-000,20.0%) (18175-000,47.0%)
s	purious Opening	33.24	31.58	Catastrophic-Spurious Opening (18175-000,20.0%) (18175-000,43.0%)
P	remature/Delayed Actuation	31.6%	30.0%	Degraded - Premature Or Delayed Actuation (18175-000,60.0%)
I	nduced		5.0%	Degraded - Premature Or Delayed Actuation (18175-000,10.0%)
	,Pneumatic,Actuator,Diaphrag purious Opening		50.0%	Sources:1 Catastrophic-Spurious Opening (18175-000,43.0%)
	purious Closing			Catastrophic-Spurious Closing (18175-000,43.0%)
	nduced			Degraded - Premature Or Delayed Actuation (18175-000,NR)
	,Pneumatic,Actuator,Diaphragn purious Opening			Sources:1 Catastrophic-Spurious Opening (18175-000,40.0%) (18175-000,40.0%) (13175-000,40.0%) (18175-000,40.0%) (18175-000,40.0%) (18175-000,47.0%)
S	purious Closing	49.8%	40.8%	Catastrephic-Spurious Closing (18175-000,40.0%) (18175-000,40.0%) (18175-000,40.0%) (18175-000,40.0%) (18175-000,40.0%) (18175-000,45.0%)
I	nduced		18.0%	Degraded - Premature Or Delayed Actuation (18175-000,8.0%) (19175-000,20.0%) (18175-000,20.0%) (18175-000,20.0%) (18175-000,20.0%), Degraded - Premature Or Delayed Acuation (16175-000,20.0%)
	,Pneumatic,Actuator,Double Ad			Sources:1
	purious Opening			Catastrophic-Spurious Opening (18175-000,42.0%)
	purious Closing nduced			Catastrophic-Spurious Closing (18175-000,42.0%) Degraded - Premature Or Delayed Actuation (18175-000,16.0%)
	,Pneumatic,Actuator,Self Oper purious Position Change		70.0%	Sources:1 Catastrophic-Spurious Position Change (18175-000,70.0%)
Iı	nduced		30.0%	Degraded - Premature Or Delayed Actuation (18175-000, 30.0%)
	Pneumatic,Ball Baking	40.0%	40.0%	Sources:1 Leaking (20609-000,Qty:2)
St	uck Open	20.0%	20.0%	Stuck Open (20609-000,Qty:1)
No	<b>Operation</b>	20.0%	20.0%	No Operation (20609-000,Qty:1)
Ir	cermittent Operation	20.0%	20.0%	Intermittent (20609-000,Qty:1)

FM			New	17	Failure Distribution Summaries	3-265
Part Desc		ailure ode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	
Valv	re, Pn Leak	eumatic,Bellows Diaphragm ing	70.9%	68.28	Sources:1 Leaking (20609-000,Qty:144)	
	Out	of Spec.	9.98	9.5%	Out of Specification (20609-000,Qty:20)	
	Stuc	k Open	6.94	6.6%	Stuck Open (20609-000,Qty:14)	
	No O	peration	5.9%	5.78	No Operation (20609-000,Qty:12)	
	Stuc	k Closed	3.9%	3,8%	Stuck Closed (20609-000,Qty:8)	
	Crac	ked/Fractured	2.5%	2.4	Cracked/Fractured (20609-000,Qty:5)	
1		r (<\$3) ntermittent Oppration		3.8% 1.4%	Intermittent (20609-000,Qty:3)	
	B	reach		1.4%	Breach (20609-000, Qty:3)	
	Sj	purious/False Operation		0.5%	False Response (20609-000, Qty:1)	
	D:	isplaced		0.5%	Displaced (20609-000,Qty:1)	
	e,Pn Close	aumatic,Bleed ad	50.0%	50.0%	Sources:1 Close (24992-000,50.0%)	
(	Opene	ad	50.0%	50.0%	Open (24992-000,50.0%)	
	e,Pne Leak:	aumatic,Check Ing	57.94	56.4%	Sources:1 Leaking (20609-000,Qty:22)	
1	Stuc)	c Open	15.8%	15.4%	Stuck Open (20609-000, Qty:6)	
(	Out d	of Adjustment	7 <b>.9</b> %	7.78	Out of Adjustment (20609-000,Qty:3)	
1	No Op	peration	7 <b>.9%</b>	7.7%	No Operation (20609-000,Qty:3)	
:	Stuc)	Closed	5.3%	5.1%	Stuck Closed (20609-000, Qty:2)	
:	Spuri	ious/False Operation	2.6%	2.6%	False Response (20609-000, uty:1)	
1	Displ	Laced	2.6%	2.6%	Displaced (20609-000,Qty:1)	
τ	Unkno	D WTI		2.6%	Unknown (20609-000,Qty:1)	
	e,Pne Leaki	umatic,Gate Shear ng	62.5%	55.6%	Sources:1 Leaking (20609-000,Qty:25)	
5	Stuck	Open	17.5%	15.6%	Stuck Open (20609-000, Qty:7)	
c	Out c	of Spec.	10.0%	8.94	Out of Specification (20609-000,Qty:4)	
5	Stuck	Closed	5.0%	4.4%	Stuck Closed (20609-000, Qty:2)	
c	Dut o	f Adjustment	5.0%	4.48	Out of Adjustment (20609-000,Qty:2)	
τ	Jnkno	wn		2.28	Unknown (20609-000,Qty:1)	
c		(<\$4) stable Operation	****	8.91 2.21	Unstable (20609-000,Qty:1)	

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-266	Failure Distribution Sum	maries			FMD-9
art esc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details	_
	Pneumatic, Gate Shear (contin	ued)			······································
UE	her (continued) No Operation		2.2	No Operation (20609-000,Qty:1)	
	Improper Flow		2.2	Improper Flow (20609-000,Qty:1)	
	Cracked/Fractured		2.24	Cracked/Fractured (20609-000,Qty:1)	
	Pneumatic,Globe Rotary Baking	65 2 <b>b</b>	56 28	Sources:1 Leaking (20609-000,Qty:159)	
	uck Closed	11.14		Stuck Closed (20609-000, Qty:27)	
	it of Spec.	10.2		Out of Specification (20609-000, Qty:25)	
	uck Open	7.04		Stuck Open (20609-000,Qty:17)	
	stable Operation	6.64		Unstable (20609-000, Qty:16)	
Ot	her (<\$5) Seized		13.8% 3.2%	Seized (20609-000, Qty:9)	
	Out of Adjustment		3.2*	Out of Adjustment (20609-000,Qty:9)	
	No Operation		3.24	No Operation (20609-000,Qty:9)	
	Cracked/Fractured		2.1	Cracked/Fractured (20609-000, 2ty:6)	
	Intermittent Operation		1.8%	Intermittent (20609-000,Qty:5)	
	Corroded		0.4%	Corroded (20609-000,Qty:1)	
•	Pneumatic,Needle uck Closed	50.0%	50.0%	Sources:1 Stuck Closed (20609-000,Qty:1)	
Sp	purious/False Operation			False Response (20609-000, Qty:1)	
	Pneumatic,Plug aking	60.04	60.0%	Sources:1 Leaking (20609-000, Qty:3)	
	uck Open			Stuck Open (20609-000, Qty:2)	
	Pneumatic, Pressure Regulator osed		E0 04	Sources:1 Close (24992-000,50.0%)	

Opened 50.0% 50.0% Open (24992-000,50.0%)

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FMD-	And the second		19 . 1 .	Failure Distribution Summaries 3-26
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
	Pneumatic, Purge, Stem oken	100.0%	66.7%	Sources:1 Broken/Damaged (25101-000,Qty:1), Broken Damaged (25101-000,Qty:1)
In	duced	*****	33.3%	Dropped - Broken/Damaged (25101-000,Qty:1)
/alve.	Pressure Test			Sources:1
	ened	68.5%	68.5%	Open (24992-000, 68.5%)
Le	aking	21.5%	21.5%	External Leak (24992-000,12.5%), Internal Leak (24992-000,9.0%)
C1	osed	10.0%	10.0%	Close (24992-000,10.0%)
	Prevalve æned	50.0%	50.0%	Sources:1 Open (24992-000,50.0%)
	osed			Close (24992-000,50.0%)
	Regulator	52.00	52.00	Sources:1
	aking wened			External Loak (24992-000,53.0%) Open (24992-000,23.5%)
-	csed			Close (24992-000,23.5%)
	Relief (Summary) emature Open	58.3%		
	aking	17.0%		
	ift	13.5%		
	chanical Failure en - Close	9.2% 2.0%		
	Relief emature Open	85.08	85.08	Sources:2 Premature (24992-000,70.0%), Catastrophic-Premature Open
		03.04	00.04	(19175-000,100.0%)
Le	aking	15.0%	15.0%	External Leak (24992-000,30.0%)
	Relisf, Pressure ift	30.8%	30.8%	Sources:1 Drift (24992-000,69.0%)
Le	aking	30.8%	30.8%	Leak (24992-000,69.0%)
Me	chanical Failure	30.8%	30.8%	Mechanical Failure (24992-000,69.0%)
Op	en - Close	7.74	7.78	Open - Close (24992-000,17.2%)

	ailure Distribution S	Norm	Fail	Data	
	de/Mech	Dist.		Data Source(s)/Details	
alve,Rel Drift	ief, Thermal	45.4	45.4	Sources:1 Drift (24992-000,45.4%)	
Leaki	ng	45.4	45.4%	Leak (24992-000,45.4%)	
Mecha	nical Failure	9.2%	9.24	Mechanical Failuer (24992-000,9.2%)	
'alve,Saf Prema	ety ture Open	100.0%	100.0%	Sources:1 Catastrophic-Premature Open (18175-000,100.0%)	
alve,Seq Leaki		61.5%	61.5%	Sources:1 Internal Leak (24992-000,31.5%), External Leak (24992-000,30.0%)	
Opene	d	16.0%	16.0%	Open (24992-000,16.0%)	
Close	d	16.0%	16.0%	Close (24992-000,16.0%)	
Bindi	ng/Sticking	6.54	6.5%	Bind (24992-000,6.5%)	
/alve,Ser Elect	vo rical Failure	40.0%	40.0%	Scurces:1 Electrical (24992-000,40.0%)	
Mecha	nical Failure	40.0%	40.0%	Mechanical (24992-000,40.0%)	
Leaki	ng	20.0%	20.0%	Leak (24992-000,20.0%)	
/alve,Sol Mecha	enoid nical Failure	50.0%	50 <b>.0%</b>	Sources:1 Mechanical (24992-000,50.0%)	
Elect	rical Failure	25.0%	25.0%	Electrical (24992-000,25.0%)	
Leaki	ng	25.0%	25.0%	Leak (24992-000,25.0%)	
alve,Thr Close	ottling,Bipropell d	57.9%	57.9 <b>%</b>	Sources:1 Close (24992-000,73.5%)	
Leaki	ng	23.64	23.6%	External Leak (24992-000,30.0%)	
Opene	d	18.5%	18.5%	Open (24992-000,23.5%)	
alve,Ven Opene		50.0%	50.0%	Sources:1 Open (24992-000,50.0%)	
Close	đ	50.0%	50.08	Close (24992-000,50.0%)	

D		No	W-43	Failure Distribution Summaries 3-26
	ailure ode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Vibrator Cont	act Failure	80.0%	80.0%	Sources:1 Contact Failures (24993-000,80.0%)
Spri	ng Failure	15.0%	15.0%	Spring Fatigue (24993-000,15.0%)
0 <b>pe</b> n	ed	5.0%	5.0%	Open Winding (24993-000,5.0%)
Vidicon Indu	ced		<0.1%	Sources:1 Degradation (22540-000,NR)
Othe S	r eal/Gasket Failure		100.0% NR	Deterioration of Seal (2254C-000,NR)
с	racked/Fractured		NR	Microcracks in Tube Envelope (22540-000,NR)
C	ontaminated		NR	Contaminated Internal Tube Environment (22540-000,NR)
O;	pen Filament		NR	Open Filament (22540-000,NR)
I	mage Lag		NR	Image Lag (22540-000,NR)
B	looming		NR	Blooming (22540-000, NR)
lasher, Ko Loose	-	40.0%	40.0%	Sources:1 Loose Screw(s) - Excessive Play (25101-000,Qty:2)
Exce	ssive Play	40.0%	40.0%	Excessive Play (25101-000,Qty:1), Broken/Separated - Excessive Play (25101-000,Qty:1)
Out d	of Adjustment	20.0%	20.0%	Out Of Adjustment - Binding/Sticking (25101-000,Qty:1)
<b>asher, L</b> oose		50.0%	20.0%	Sources:1 Loose Nut(s) - Abnormal Operation (25101-000,Qty:2)
Crac)	ed/Fractured	25.0%		Cracked/Split-Broken/Damaged (25101-000,Qty:1)
Broke				Broken/Separated - Abnormal Operation (25101-000, Qty:1)
Induc	ced			<pre>Fell Off Or Lost - Missing (25101-000,Qty:1), Improper Maintenance - Missing (25101-000,Qty:1), Improper Installation - Missing (25101-000,Qty:1) (25101-000,Qty:1), Improper Installation - Fnd In TI/PMCS/INSP (25101-000,Qty:1), Improper Maintenance - Broken/Damaged (25101-000,Qty:1)</pre>
heel Broke	n	71.4%	55.64	Sources:1 Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:3), Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:1)
Bent/	Dented/Warped	28.6%		Collapsed/Bent (25101-000,Qty:1), Warped/Bent - Collapsed/Bent (25101-000,Qty:1)
Unkno	)WD		11.14	Unknown (25101-000,Qty:1)
Induc	ed		11.18	Improper Operatoin - Collapsed/Bent (25101-000,Qty:1)

art	Failure	Norm	Fail	Data
esc.	Mode/Mech	Dist.	Dist.	Source(s)/Details
heel Assembly Bent/Dented/Warped		73.54	71.4	Sources:1 Collapsed/Bent (25101-000,Qty:1) (25101-000,Qty:4) (25101-000,Qty:20)
Wo	rn	20,6%	20.0%	Worn Out (25101-000,Qcy:6), Worn - Worn Out (25101-000,Qty:1)
Cu	t/Scarred/Punctured	2.94	2.91	Cut/Scraped (25101-000,Qty:1)
Br	oken	2.94	2.94	Missing Rubber (25101-000,Qty:1)
Ur	known		2.91	Unknown (25101-000,Qty:1)
heel,Reinforced Broken		65.1%	57.1%	Sources:1 Brcken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2) (25101-000,Qty:12), Part Struck/Damaged - Broken/Damaged (25101-000,Qty:1), Part Struck/Damaged - Inop/Unserviceable (25101-000,Qty:1)
Be	nt/Dented/Warped	32.6%	28.6%	Collapsed/Bent (25101-000,Qty:4) (25101-000,Qty:4) (25101-000,Qty:5), Warped/Bent - Broken/Damaged (25101-000,Qty:1)
Cu	t/Scarred/Punctured	2.3%	2.0%	Cut-Leaking Air (25101-000,Qty:1)
In	duced		6.1%	Caused By Other Failure-Inop/Unserviceable (25101-000,Qty:1), Caused By Other Failure-Collapsed/Bent (25101-000,Qty:1), Item Abuse/Neglect - Collapsed/Bent (25101-000,Qty:1)
Un	known		6.1%	Unknown (25101-000,Qty:1) (25101-000,Qty:2)
	Susp,Grp/Actuatr acked/Fractured	79.1%	63.1%	Sources:1 Cracked Wold-Cracked (25101-000,Qty:2), Cracked (25101-000,Qty:1) (25101-000,Qty:3) (25101-000,Qty:44), Normal Operater Failure - Cracked (25101-000,Qty:2), Poor Design - Cracked (25101-000,Qty:1)
Bi	nding/Sticking	9.0%	7.14	Binding/Sticking (25101-000,Qty:3), Internal Failure - Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:2)
Br	oken	3.0%	2.4%	Broken/Damaged (25101-000,Qty:1), Studs Broken - Broken Bolt(s) (25101-000,Qty:1)
Co	rroded	3.0%	2.4%	Corroded-Inop/Unserviceable (25101-000,Qty:2)
Cr	eep	3.0%	2.48	<pre>Internal Failure - Creep (25101-000, Qty:1), Creep (25101-000, Qty:1)</pre>
Sk	ipping	3.0%	2.41	Internal Failure - Skips (25101-000,Qty:1), Skips (25101-000,Qty:1)
In	duced	<b>a</b> n <b>a</b> n an an an an an	10.7%	Lack Of Maintenance - Noisy (25101-000,Qty:1), Poor Design - Noisy (25101-000,Qty:1), Improper Installation - Stripped Gear/Spline (25101-000,Qty:7)
Uni	known		4.84	Unknown (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1)
Oti	ner (<\$3) Out of Adjustment		4.8% 1.2%	Out Of Adjustment - Binding/Sticking (25101-000,Qty:1)
	No Operation	,	1.24	Poor Design - Inop/Unserviceable (25101-000, Qty:1)

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	91			Failure Distribution Summaries 3-2
Part Desc.	Failure Mode/Mech	Norm Dist.	Fail Dist.	Data Source(s)/Details
Wheel, Susp, Grp/Actuatr (continued) Other (continued) Noisy			1.2	Noisy (25101-000,Qty:1)
	Excessive Play		1.24	Worn - Excessive Play (25101-000,Qty:1)
Window Cr	acked/Fractured	50.0%	40.0%	Sources:1 Croacked (25101-000,Qty:1), Window - Part Struck/Damaged - Cracked (25101-000,Qty:1)
Be	ent/Dented/Warped	50.0%	40.0%	Warped/Bent - Leaking Nitrogen (25101-000,Qty:2)
In	duced		20.0%	Vibration - Missing (25101-000,Qty:1)
	7,Optical duced		100.0%	Sources:1 Item Abuse/Neglect - Broken/Damaged (25101-000,Qty:1), Lack Of Maintenance - Internal Moisture (25101-000,Qty:1)
	cessive Play	29.1%	26.7%	Sources:1 Excessive Play (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2), Worn - Excessive Play (25101-000,Qty:2) (25101-000,Qty:6), Worn Shaft/Keyway - Excessive Play (25101-000,Qty:1) (25101-000,Qty:2), Improper Adjustment - Excessive Play (25101-000,Qty:1)
Br	oken	23.64	21.7%	Broken/Damaged (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:8), Broken/Separated - Inop/Unserviceable (25101-000,Qty:1)
Be	nt/Dented/Warped	14.54	13.34	Warped/Bent - Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:3), Warped/Bent - Excessive Play (25101-000,Qty:1) (25101-000,Qty:1), Collapsed/Bent (25101-000,Qty:1)
Lo	ose	12.7%	11.74	Worn - Loose (25101-000,Qty:1), Loose (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:4)
Ou	t of Adjustment	10. <b>9%</b>	10.0%	Out Of Adjustment - Binding/Sticking (25101-000,Qty:1), Out Of Adjustment - Excessive Play (25101-000,Qty:1) (25101-000,Qty:3), Out Of Adjustment - Out Of Adjustment (25101-000,Qty:1)
Bi	nding/Sticking	7.34	6.74	Binding/Sticking (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2)
Wo	rn	1.84	1.7%	Worn - Inop/Unserviceable (25101-000,Qty:1)
Un	known		8.34	Unknown (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:1) (25101-000,Qty:2)

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## SECTION 4 DATA SOURCES

#### FMD-91

#### 4.0 DATA SOURCES

This section contains brief descriptions of the data sources used in this publication. The source descriptions below reference only the information extracted from the source and do not attempt to describe the full scope of the source. They are presented in numerical order by RAC library Document Number (five digit followed by a three digit number).

#### 10722-000 Source Proprietary.

<u>Abstract</u>: A collection of failure analysis reports ranging in date from 1984 to 1990. The data represents both fielded parts and lab test/inspection failures for a wide range of part types.

#### 12702-000 Reliability Qualification Test of a Horizontal Situation Indicator Set

<u>Abstract</u>: Failure information for each failure identified during the reliability qualification test of the AN/AJN-18 Horizontal Situation Indicator Set. The report was prepared by Rockwell International Collins Radio Group in January, 1976.

#### 13591-000 Reliability Model for Miniature Blowers per MIL-B-23071B

<u>Abstract</u>: RADC Technical Report (RADC-TR-75-178). Information about the failure modes and mechanisms of MIL-B-23071B blowers. The report is dated July 1975.

### 13740-000 Quantification of Printed Circuit Board (PCB) Connector Reliability

<u>Abstract</u>: This source is a RADC Technical Report (RADC-TR-77-433). Included is information concerning the failure mechanisms related to PCB Connectors. The report is dated January 1978.

#### 13741-000 Crimp Connection Reliability

<u>Abstract</u>: This source is a RADC Technical Report (RADC-TR-78-15). Included is information concerning the failure modes and mechanisms found in crimp connections. The document is dated January 1978.

#### **13933-000 Development of Nonelectronic Part Cyclic Failure Rates**

<u>Abstract</u>: This source is a RADC Technical Report (RADC-TR-77-417). Contained is information concerning failure modes and mechanisms of selected non-electronic components. The report is dated December 1977.

#### 4-2 Data Sources

## **17867-000 Source Proprietary**.

<u>Abstract</u>: This data source is from Reliability Improvement Warranty maintenance records on various equipments in the F-16 aircraft.

## 17950-030 **Failure Mode Analysis and Life Time Estimation of Traveling Wave Tubes**, Nakamura, S., and Kawashima, F.

<u>Abstract</u>: 1980 International Symposium for Testing and Failure Analysis. This paper contains information regarding failure modes and mechanisms for GW52 Traveling Wave Tubes.

## 18175-000 IEEE Standard 500-1984 (1984)

<u>Abstract</u>: This document deals with collected reliability data on electrical, electronic, sensing and mechanical equipment used in nuclear-power generating stations.

## 18364-000 VLSI Device Reliability Models

<u>Abstract</u>: This is an RADC Technical Report (RADC-TR-84-182). Included is a discussion of failure modes and mechanisms specifically related to VLSI integrated circuits. The date of the report is December 1984.

18503-007 **Reliability of Fuse Collection Hardware in Subways**, Meyerhoff, N.J., and Kozoil, J.R.

<u>Abstract</u>: 1984 Proceedings Annual Reliability and Maintainability Symposium. This paper presents failure mode data of a BART change machine.

18504-021 Analysis of the FA-18 Hornet Flight Control Computer Field Mean Time Between Failure, Griffin, P.

> <u>Abstract</u>: . 1985 Proceedings Annual Reliability and Maintainability Symposium. This paper presents observed field failure distribution of the system.

18800-001 Reliability of Traveling Wave Tubes for use in Microwave Communications Systems NEC Research and Development, Harada, A., Niihama, S. and Tsuchida, H.

<u>Abstract</u>: Number 67, 1982. This paper details the observed field failure modes and mechanisms for Ghz TWTs.

#### FMD-91

## 19542-000 RADC Nonelectronic Reliability Notebook

<u>Abstract</u>: This source is a RADC Technical Report (RADC-TR-85-194). Included in this document is malfunction data and frequency of occurrence information for a wide range of nonelectronic parts. The distributions were based on part failure data accumulated over all use environments. The report is from 1985.

## 20609-000 Nonelectronic Parts Reliability Data, NPRD-3

<u>Abstract</u>: Produced by the Reliability Analysis Center. Contains previously published failure mode distributions for a wide range of part types. This document is dated 1985.

### 22540-000 Reliability Modeling of Critical Electronic Devices

<u>Abstract</u>: This source is a RADC Technical Report (RADC-TR-83-108). It described the failure modes and mechanisms associated with various electrical and nonelectronic part types. The report is dated February 1983.

### 23037-000 COFT Program - A Tailored R/M Approach

<u>Abstract</u>: This source contains the detailed backup data for the 1988 R/M Proceedings paper.

### 23038-000 Source Proprietary.

<u>Abstract</u>: The data in these sources is from a U.S. Army maintenance system on selected components in various Army aircraft. The time period of data collected was January 1979 to June 1982. The aircraft corresponding to each source number is:

23038-001	AH-1S
23038-002	OH-58A
23038-003	OH-58C
23038-004	CH-47C
23038-005	UH-1H
23038-006	UH-60A

## 23185-037 Satellite Traveling Wave Tubes Reliability Controls, Behonann, F.F.

<u>Abstract</u>: 1982 Proceedings Annual Reliability and Maintainability Symposium. This document summarizes failure mode data from life tests by analyzing the contribution of each of the TWTs constituent parts.

Data Sources

#### 4-4 Data Sources

## 23413-000 Impact of Fiber Optics on System Reliability and Maintainability

<u>Abstract</u>: This source is a RADC Technical Report (RADC-TR-88-124). The report details failure occurrences experienced in fiber optic cables from December 1984 to January 1986. It also covers the basic failure mechanisms associated with fiber optic cables.

## 23459-008 Reliability of Plastic Encapsulated Logic Circuits, Olson, C.

<u>Abstract</u>: Quality and Reliability International Vol. 5, No. 1, 1989. This paper presents failure modes and mechanisms observed in high temperature tests and high humidity tests performed by various vendors.

# 23546-000Reliability Design Criteria for High Power Tubes-Review of Tube and TubethroughRelated Technology

23546-002

<u>Abstract</u>: This source is a RADC Technical Report (RADC-TR-88-304). This document includes failure mode distributions for a variety of tube types used in the ALQ-135, ALQ-119, DSCS-11, etc. Data encompasses both field and factory return data. The report is dated February 1989.

## 23935-000 VHSIC/VHSIC-Like Reliability Prediction Modeling

<u>Abstract</u>: This source is a RADC Technical Report (RADC-TR-89-177). Included in this document is data concerning the failure mode/mechanism distributions, and number of observed failures under given test types for VHSIC/VHSIC-Like CMOS devices. The document is dated October 1989.

## 24250-037 Accounting for Soft Errors in Memory Reliability Prediction, Miller, J.E., Hecht, H., and Maries, S.F.

<u>Abstract</u>: 1989 Proceedings Annual Reliability and Maintainability Symposium. This paper analyzes memory soft errors and quantifies typical distributions of failures between rows, columns, single cell, etc.

## 24417-000 General Electric Component Technology and Standardization Manual

through 24417-002 <u>Abstract</u>: This document describes the most common failure modes and mechanisms for many electrical, electro-mechanical, and mechanical part types. The document is dated May 1989.

## FMD-91 Data Sources

## 24990-000 Reliability and Maintainability In Perspective, Smith, D.J.

<u>Abstract</u>: This source contains information concerning the failure mode distributions of many electrical, electro-mechanical, and mechanical part types. The report was published in 1985.

## 24991-000 Source Proprietary.

<u>Abstract</u>: The data from this source is from a previous internal Reliability Analysis Center Study.

## 24992-000 Information for Reliability Prediction

<u>Abstract</u>: This source is from a General Electric Technical Memorandum written by the Apollo Support Department in May of 1964. The data presented encompasses a wide range of part types.

### 24993-000 MIL-HDBK-338

<u>Abstract</u>: This data comes from MIL-HDBK-338 which give the failure mode distributions for a wide range of part types. This edition of MIL-HDBK-338 is dated October 15, 1984.

### 24994-000 European Space Agency (ESA) Specification

<u>Abstract</u>: This is a specification of the European Space Agency (ESA) which provides the failure mode distributions of electrical parts, electromechanical parts, and some mechanical parts for reliability prediction on ESA programs. Data is from February 1976.

## 24995-000 Source Proprietary.

<u>Abstract</u>: This source is a previously published RAC study on microcircuit device reliability trend analysis, dated 1985. The data presented is based on laboratory and field failure data which provide a distribution of observed frequencies of failure for each mode. The study references various microcircuit part types (digital SSI, MSI, LSI, linear, interface, memory and VLSI).

## 24996-000 Source Proprietary.

<u>Abstract</u>: This source contains failure rate and failure mode data on various industrial part types. Published in 1988.

4-5

#### 4-6 Data Sources

## 24997-000 Source Proprietary.

<u>Abstract</u>: This source contains reliability data on computer, telephone, and electronic parts. Published in 1987.

#### 25000-000 Rome Laboratory Study of Part Failure Modes, L.J. Gubbins

<u>Abstract</u>: This discusses the failure modes and their accelerating stresses for a full range of part types. The report is based on field data collected from certain ground electronic equipments and from individual part tests.

#### **25001-000 Source Proprietary**.

<u>Abstract</u>: This source is a compilation of failure analysis reports on a variety of part types.

### 25014-000 Discrete Semiconductor Device Reliability, DSR-4

<u>Abstract</u>: This source is published by the Reliability Analysis Center and includes failure mode and mechanism data on of various discrete semiconductor device types. The data has been compiled from reports of reliability demonstration tests conducted in accordance with MIL-STD-781. The document is dated 1988.

## 25015-000 **Source Proprietary**

<u>Abstract</u>: This was a RAC study performed for the USAF. It involved deriving microcircuit failure mode distributions from the RAC's entire failure event data base and applying these distributions to an FMECA. This source also contains failure mode distributions for traveling wave tubes and various microwave devices. These distributions came from the summarization of vendor failure data from 15 manufacturers of microwave devices. The report is dated July 7,1988.

#### 25016-000 Reliability Data for Electronic and Electromechanical Components

<u>Abstract</u>: The data from this source was extracted from a Jet Propulsion Laboratory Technical Report . (NASA Tech Brief 74-10230, April 1975). It contains failure mode and mechanism data on various electronic and electromechanical part types.

## FMD-91 Data Sources 4-7 25007.000 Field Failure Batema (FERB) Failure Analysis Description 4-7

## 25027-000 Field Failure Return Program (FFRP) Failure Analysis Reports

<u>Abstract</u>: This data source is a collection of failure analysis reports from the studies conducted by the Field Failure Return Program (FFRP). Studies include those performed by Rome Laboratory during the initial pilot study effort, reports submitted to the program by external sources, and studies conducted by the Reliability Analysis Center. These studies deal primarily with semiconductor devices and range in date from 1986 to the 1991.

## 25028-000 Failure Modes and Mechanisms in GaAs FETs

<u>Abstract</u>: This source is a RADC Technical Report Information included detailed GaAs FET failure modes and mechanisms under given test conditions and environments. The report is dated December 1990.

## 25029-000 Source Proprietary.

<u>Abstract</u>: This data source is from failure analysis performed on M2716QM EPROM's. Date of the report is 12/06/84.

## 25030-000 Source Proprietary.

<u>Abstract</u>: Data from this source is analysis of inspection failures on transformers that was collected over a 2 year period.

## 25031-000 Reliability Physics Symposium Papers

through

25034-000 <u>Abstract</u>: These data sources are various papers concerning failure mode and mechanism distributions of microcircuits, taken from the 1978 Reliability Physics Symposium.

## 25035-001 GE/AESD Component Engineering Seminar

<u>Abstract</u>: This data was taken from of the 1985 GE/AESD Component Engineering Seminar. Data included deals with the distribution of failure mechanisms observed in microcircuits for each year from 1970 to 1984.

## 25036-000 Handbook of Reliability Prediction Procedures for Mechanical Equipment, Ploe, R.J., and Skewis, W.H

<u>Abstract</u>: DTRC-90/010 (May 1990). In addition to reliability models this document contains a discussion of the predominant failure modes/mechanisms for mechanical parts.

#### 4-8 Data Sources

## 25037-000 An Assessment of Gallium Arsenide Device Quality and Reliability

<u>Abstract</u>: Published by the Reliability Analysis Center. Includes a discussion of failure modes and mechanisms for GaAs MMIC's, digital and discrete components.

#### 25038-000 Source Proprietary.

<u>Abstract</u>: This data source is from a previous internal RAC study to quantify the failure mode distributions of selected electronic, and electromechanical part types.

#### 25101-000 Artillery Sample Data Collection

<u>Abstract</u>: This data was summarized from a M102 Artillery Sample Data Collection (SDC) printout, received from the United States Army, concerning the M102 and M102-HIP Howitzers. The data sample represents the component part failures of the M102 / M102-HIP system and their mode of failure during a given time period in 1990.

#### 25464-000 Air Forces Maintenance Database, MODAS

<u>Abstract</u>: This data source is from the Air Forces Maintenance Database MODAS and contains part failure mode data extracted from the How Malfunction code contained in MODAS. Data was collected on the F-15 aircraft in 1990.

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