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C. Wayne Ranow, NASA, KSC ECO	CLARENCE RANOW (4/9/2009)	04/07/2009

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KSC-STD-E-0011H

January 7, 2009

Supersedes
KSC-STD-E-0011G
June 7, 2000

**ELECTRICAL POWER RECEPTACLES
AND PLUGS,
STANDARD FOR**

CENTER OPERATIONS DIRECTORATE

National Aeronautics and
Space Administration

John F. Kennedy Space Center



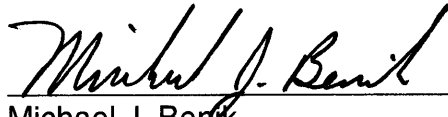
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**ELECTRICAL POWER RECEPTACLES
AND PLUGS,
STANDARD FOR**

Approved:

A handwritten signature in black ink, reading "Michael J. Benik", is written over a horizontal line.

Michael J. Benik
Director, Center Operations

JOHN F. KENNEDY SPACE CENTER, NASA

TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1.	SCOPE	1
2.	APPLICABLE DOCUMENTS.....	1
2.1	Governmental.....	1
2.1.1	Standards.....	1
2.2	Nongovernmental.....	2
3.	REQUIREMENTS.....	2
3.1	Grouping	2
3.2	Utilization of Tables	2
3.2.1	Service.....	2
3.2.2	Rating.....	2
3.2.3	Symbol	3
3.2.4	Wiring Diagram – Facility	3
3.2.4.1	Receptacle	3
3.2.4.2	Plug	3
3.2.5	Wiring Diagram - Ground Support Equipment (GSE)	3
3.2.5.1	Plug	3
3.2.5.2	Receptacle	3
3.2.6	Catalog Number	3
3.2.7	Insert Representation.....	3
3.2.8	Reverse Service.....	4
3.2.9	Limitations	4
3.3	Abbreviations.....	4
3.4	Request for Waivers.....	4
3.4.1	Requests	4
3.4.2	Construction Contractor	4
3.5	Ordering Data.....	4
4.	QUALITY ASSURANCE PROVISIONS.....	5
4.1	Supplier	5
4.2	Construction Contractor.....	5

KSC-STD-E-0011H

TABLE OF CONTENTS (cont)

<u>Section</u>	<u>Title</u>	<u>Page</u>
5.	PREPARATION FOR DELIVERY	6
6.	NOTES.....	6
6.1	Special Hazardous Conditions Requirement	6
6.2	Intended Use	6

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
1	Nonhazardous Area (Indoor/Outdoor) Receptacles	7
2	Hazardous Area, Class 1, Division 1, Group B, C, D Explosionproof Receptacles	20
3	Hazardous Area, Class 1, Division 1, Group C, D Explosionproof Receptacles	25
4	Not To Be Used for New Design [Nonhazardous Area (Indoor/Outdoor) Receptacles]	28
5	Receptacle/Plug Cross-Reference Chart	36

ABBREVIATIONS AND ACRONYMS

AH	Arrow Hart
AP	Appleton
CH	Crouse Hinds
dc	Direct Current
GSE	Ground Support Equipment
HU	Hubbell
Hz	Hertz
KSC	John F. Kennedy Space Center
ME	Meltric
NCL	Not Catalog Listed
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
PN	Pyle National
RS	Russellstoll
VT	Vantage Technology
WP	Waterproof
WT	Watertight
NASA	National Aeronautics and Space Administration

ELECTRICAL POWER RECEPTACLES AND PLUGS, STANDARD FOR

1. SCOPE

This standard is to be used by the John F. Kennedy Space Center (KSC) design and maintenance organizations for internal operations and as a technical document to specify requirements in KSC design contracts. This standard (1) identifies those electrical power receptacles that shall be used when designing new or modifying existing facilities and identifies receptacles that shall be used for installation on portable ground support equipment, (2) establishes a standard for symbols to be used in drawings, and (3) provides pertinent data for each receptacle. Receptacles included are for 60-hertz (Hz) applications in hazardous and nonhazardous areas. The term "receptacle" in this sense shall be understood to include plugs, which are also identified by this Standard.

2. APPLICABLE DOCUMENTS

The following documents form a part of this document to the extent specified herein. When this document is used for procurement, including solicitations, or is added to an existing contract, the specific revision levels, amendments, and approval dates of said documents shall be specified in an attachment to the Solicitation/Statement of Work/Contract.

2.1 Governmental

2.1.1 Standards

John F. Kennedy Space Center (KSC), National Aeronautics and Space Administration

KSC-STD-E-0002

Hazardproofing of Electrically Energized
Equipment, Standard for

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specified procurement functions should be obtained from the procuring activity or as directed by the Contracting Officer.)

KSC-STD-E-0011H

2.2 Nongovernmental

National Fire Protection Association (NFPA)

NFPA 70

National Electrical Code (NEC)

(Application for copies should be addressed to the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.)

National Electrical Manufacturers Association (NEMA)

NEMA WD-1

General Purpose Wiring Devices

NEMA WD-6

Wiring Devices – Dimensional Specifications

(Application for copies should be addressed to the National Electrical Manufacturers Association, 155 East 44th Street, New York, NY 10017)

3. REQUIREMENTS

3.1 Grouping - The receptacles have been grouped by intended application, as follows:

- a. Nonhazardous areas - Table 1
- b. Hazardous areas Class I, Division 1, Groups B, C, and D - Table 2
- c. Hazardous areas Class I, Division 1, Groups C and D - Table 3

3.2 Utilization of Tables - To properly utilize the above-referenced tables, the following explanatory information is given. Note that the voltage rating shown in the table heading may be lower than the manufacturer's stated voltage.

3.2.1 Service - The application tables have been subdivided to indicate the service for which each group of receptacles was selected. This service is indicated by voltage, frequency, and number of phases, wires, and poles.

3.2.2 Rating - The information shown in the rating column is the maximum allowable amperage of each receptacle, plus other applicable data.

3.2.3 Symbol - The information shown in the symbol column applies only to facility receptacles and shall be shown on the drawing and in the legend with rating. The legend shall also include all requirements of this standard and referenced documents. As an alternate method, the requirements of this standard may be included in the contract specification, in which case the contract shall be referenced in the legend.

3.2.4 Wiring Diagram – Facility

3.2.4.1 Receptacle - The devices shown in the receptacle column will normally be installed in or on the wall of a fixed structure and fed from a load center or substation. Therefore, this receptacle is normally energized and shall have a female insert. The diagrams in this column show socket arrangement and assigned function such as ground, neutral, and phase.

3.2.4.2 Plug - The devices shown in the plug column will mate with the corresponding facility receptacles. The diagrams in this column show pin arrangement and assigned function such as ground, neutral, and phase.

3.2.5 Wiring Diagram - Ground Support Equipment (GSE)

3.2.5.1 Plug - These devices will usually be installed on the same cable as the plug listed under 3.2.4 Wiring Diagram - Facility. This cable and the plug will serve as an interface between the facility power source and the GSE load. If this cable is mated with the facility receptacle, the contacts of the GSE plug will be energized; therefore, this GSE plug must have a reverse service female insert. The diagrams in this column show pin arrangement and assignment.

3.2.5.2 Receptacle - The devices shown in the receptacle column will be installed on GSE and will serve as the connection point for power cables. Since the contacts of these receptacles are not exposed while energized, this GSE receptacle has a male insert. The diagrams in this column show pin arrangement and assignment.

3.2.6 Catalog Number - Receptacles and plugs are identified by listing one or more catalog numbers; however, all catalog numbers available for a specific insert and optional mounting configurations are not necessarily listed. The manufacturer's catalog should be consulted for specific technical information on alternative mounting configurations available for the listed receptacles and for the listed plugs. Receptacle and plug configuration other than those listed in this standard may be utilized as determined by specific application. However, no change is permitted in receptacle mating, pin arrangement, and keying for a particular service as listed in this standard by catalog number.

3.2.7 Insert Representation - The pins (male inserts) on receptacles and plugs are represented by shaded areas. The sockets (female inserts) on receptacles and plugs are represented by unshaded areas.

KSC-STD-E-0011H

3.2.8 Reverse Service - In situations where the exposed pins of a plug selected for facility use would be energized when the receptacle and plug are disconnected, reverse-service connectors shall be used. The normal-usage symbol with a subscript letter “R” indicates reverse-service requirement. The plugs and receptacles for GSE use were selected to prevent the exposure of “energized” pins when the plugs and receptacles are not mated. The letters “S” and “P” appear frequently in part numbers. “S” indicates that the plug or receptacle has a female (socket) insert and the contacts are not exposed when this device is not mated to its counterpart. The “P” indicates that the plug or receptacle has a male (pin) insert and the contacts are exposed when the device is not mated to its counterpart.

3.2.9 Limitations - For reasons of unavailability, obsolescence, or product improvement, certain devices previously listed (which may remain in service) are no longer listed for new designs. These are shown in Table 4.

3.3 Abbreviations – See the Abbreviations and Acronyms List for the abbreviations used in the tables.

3.4 Requests for Waivers - The requirements set forth in this standard are not intended to be totally restrictive. The purpose is to achieve standardization of receptacles and plugs throughout KSC. Receptacles and plugs not listed in this Standard that are electrically and physically interchangeable with those identified in this Standard may be substituted if they are approved in writing by properly executed waivers. Requests for waivers of any requirements of this Standard must be supported by technical justification.

3.4.1 Requests – The KSC organization shall direct requests to:

Center Operations Directorate
Mechanical/Electrical Branch, Mail-code: TA-B3
John F. Kennedy Space Center, NASA
Kennedy Space Center, Florida 32899

3.4.2 Construction Contractors – The KSC construction contractors shall direct requests to the responsible administrative contracting officer:

Procurement Office
John F. Kennedy Space Center, NASA
Kennedy Space Center, Florida 32899

3.5 Ordering Data - When this Standard is referenced in a technical document in a KSC contract, the title and number of this standard shall be specified as a part of that document. Where NEMA configurations are shown, these devices shall be specification grade as manufactured by Hubbell, Pass and Seymour; General Electric; Arrow-Hart; Bryant; and others.

4. QUALITY ASSURANCE PROVISIONS

Designers preparing design specifications shall include inspection and test requirements to ensure the provisions of the specifications conform to all applicable requirements of this Standard. Both the supplier and the construction contractor shall establish a quality control system to perform sufficient inspection and tests of all items of work to ensure compliance with this Standard, NEMA standards, and NFPA 70 standard with respect to materials, workmanship, construction, and functional performance. When receptacles are purchased under the provisions of this Standard, the following minimum inspection and test requirements shall apply.

4.1 Supplier - The supplier shall:

- a. Inspect finished work for size, pin arrangement, and quality of workmanship.
- b. Provide protection and controls necessary to prevent damage or deterioration prior to packaging and shipping.
- c. Ensure the quality of the fabricated articles is maintained and damage, deterioration, loss, and substitution are prevented.
- d. Package and mark the finished articles in a manner to ensure safe arrival and ready identification at destination.

4.2 Construction Contractor - The construction contractor shall:

- a. Upon receipt, inspect to detect damage in transit.
- b. Inspect the complete assembly for proper type, size, and pin configuration.
- c. Provide the protection, periodic inspection, and controls necessary to prevent damage or deterioration during handling or storage.
- d. Conduct operating tests after the receptacle installation is complete and at such time as the Contracting Officer may direct and verify power supply voltage and proper connection of all receptacle pins. These tests shall include (but not be limited to) a continuity test between the receptacle grounding pin and earth ground (or objects known to be adequately grounded to the earth) by a path independent of the power neutral.
- e. Verify phase rotation for each three-phase receptacle by testing with a phase-rotation meter. The phase rotation for all three phase receptacles shall be as shown on the wiring diagram using the ground pin or neutral as a reference.

5. PREPARATION FOR DELIVERY

KSC-STD-E-0011H

There are no applicable requirements.

6. NOTES

6.1 Special Hazardous Conditions Requirement - In addition to the NEC hazardous locations requirements, refer to KSC-STD-E-0002 Hazardproofing of Electrically Energized Equipment for special hazardous location requirements.

6.2 Intended Use - This Standard is intended for use in the selection of plugs and receptacles for new installation by KSC design and maintenance organizations and by designers performing under KSC contracts. It is not intended that existing plugs and receptacles be modified for the sole purpose of conforming to this standard.

NOTICE: The Government drawings, specifications, and/or data are prepared for the official use by, or on the behalf of, the United States Government. The Government neither warrants these Government drawings, specifications, or other data, nor assumes any responsibility or obligation, for their use for purposes other than the Government project for which they were prepared and/or provided by the Government, or an activity directly related thereto. The fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded, by implication or otherwise, as licensing in any manner the holder or any other person or corporation, nor conveying the right or permission, to manufacture, use, or sell any patented invention that may related thereto.


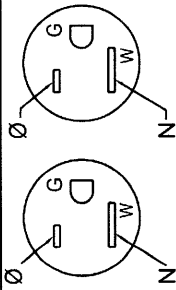
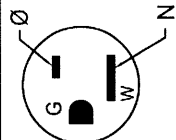
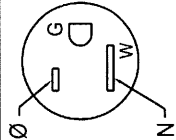
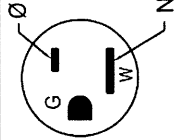

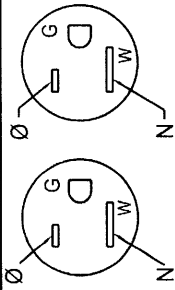
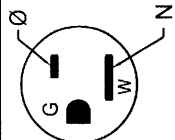

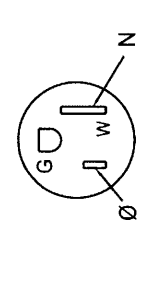
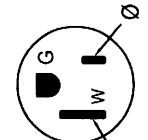
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Kennedy Space Center, FL 32899

PREPARING ACTIVITY:

John F. Kennedy Space Center
Center Operations Directorate
Mechanical/Electrical Branch


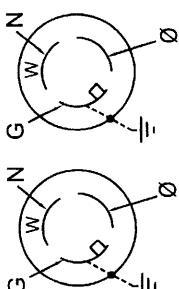
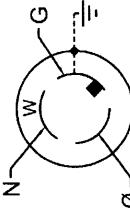

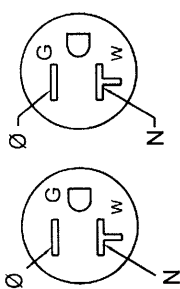
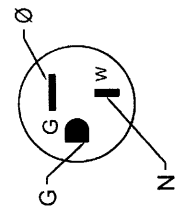

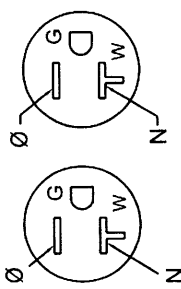
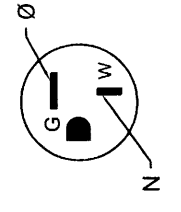
Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles

120V, 60 Hz, single phase, 3 wire, 2 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
15A duplex (indoor only)		 NEMA 5-15R, duplex	 NEMA 5-15P	 NEMA 5-15R	 NEMA 5-15P
15A duplex weatherproof (hinged flap cover)		 NEMA 5-15R, duplex	 NEMA 5-15P	N/A	N/A
15A flush floor outlet (indoor only)		 NEMA 5-15R with mounting strap	 NEMA 5-15P	N/A	N/A

FACE VIEW OF RECEPTABLES AND PLUGS SHOWN


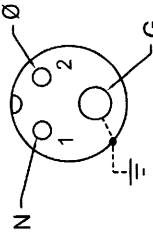


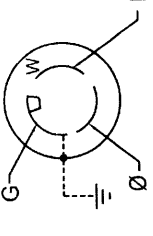
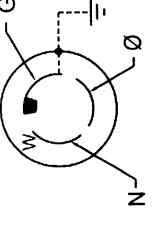

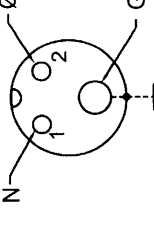
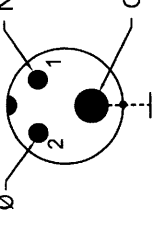
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Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)

120V, 60 Hz, single phase, 3 wire, 2 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
15A duplex (indoor only), locking	 15	 NEMA L5-15R, duplex	 NEMA L5-15P	N/A	N/A
20A duplex (indoor only)	 20	 NEMA 5-20R, duplex	 NEMA 5-20P	N/A	N/A
20A duplex weatherproof (hinged flap cover)	 20 WP	 NEMA 5-20R, duplex	 NEMA 5-20P	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN


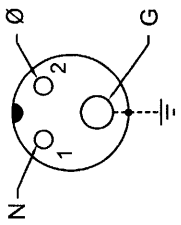
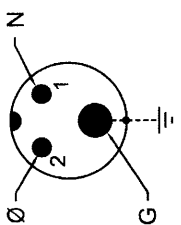
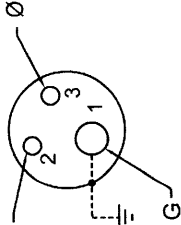
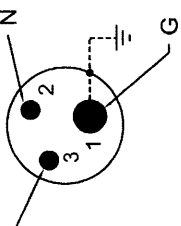

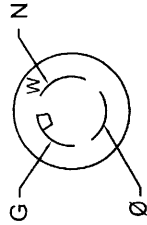
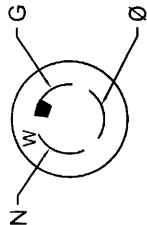

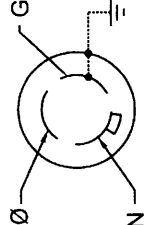
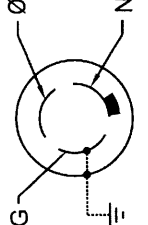
Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)

120V, 60 Hz, single phase, 3 wire, 2 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
20A waterproof		 <p>RS No. 3743</p>	 <p>RS No. 3720</p>	N/A	N/A
20A locking (indoor only)		 <p>NEMA L5-20R, grounding type</p>	 <p>NEMA L5-20P</p>	N/A	N/A
30A weathertight		 <p>RS No. 3756</p>	 <p>RS No. 3829</p>	N/A	N/A

FACE VIEW OF RECEPTABLES AND PLUGS SHOWN



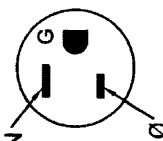

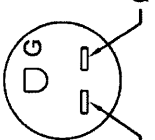
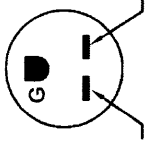
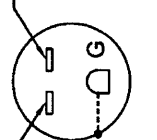
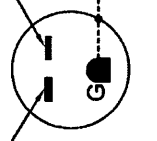

KSC-STD-E-0011H

Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)

120V, 60 Hz, single phase, 3 wire, 2 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A waterproof		 RS No. 3753	 RS No. 3750	 CH RPC121-150-S04AR RPC121-151-S04AR	 CH RPC221-127-P04AR
30A locking general purpose (indoor only), use F symbol for floor mounting	 30	 NEMA L5-30R	 NEMA L5-30P	N/A	N/A
50A TWIST-LOK, CORROSION RESISTANT	 50	 HU No. HBL63CM70 AH63CR70	 HU No. HBL63CM61 AH63CR61N	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN


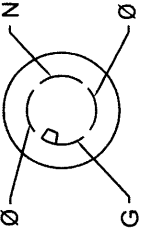
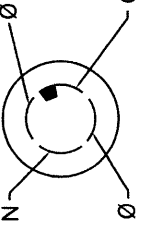

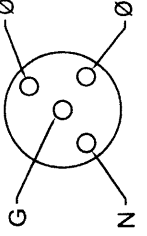
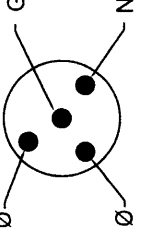

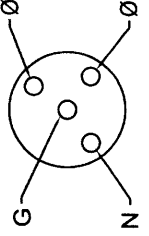
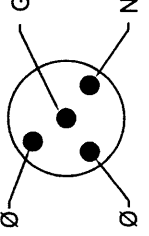
Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)

120V, 60Hz, single phase, 3 wire, 2 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
15A combination (indoor only)		 NEMA 5-15R	 NEMA 5-15P	N/A	N/A
		208V 60 Hz, single phase, 3 wire, 2 pole			
15A (indoor only)		 NEMA 6-15R	 NEMA 6-15P	N/A	N/A
		 NEMA 6-30R, grounding	 NEMA 6-30P, grounding	N/A	N/A
30A (indoor only)					

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

KSC-STD-E-0011H

Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)

208V, 60 Hz, single phase, 4 wire, 3 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A, locking	208V  30 1-PH	 NEMA L14-30R, grounding	 NEMA L14-30P, grounding	N/A	N/A
30A weathertight	208V  WT 30 1-PH	 RS No. DF3316FRAB0	 RS No. DS3316MP000	N/A	N/A
60A weathertight	208V  WT 60 1-PH	 RS No. DF6316FRAB0	 RS No. DS6316MP000	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)


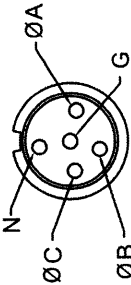

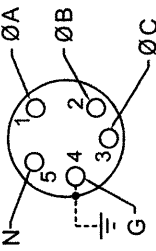
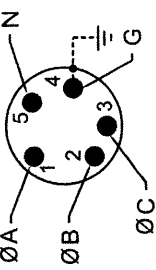

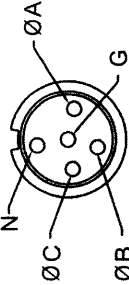
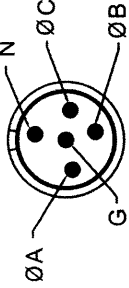

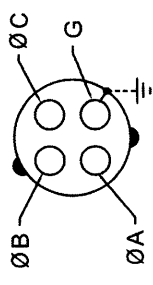
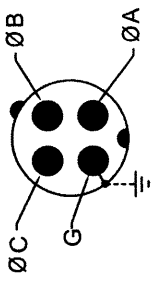
120/208V, 60 Hz, 3 phase, 5 wire, 4 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A (indoor only)		 NEMA L21-30R	 NEMA L21-30P	N/A	N/A
30A weathertight		 ▲▲ RS No. DF3516FRAB0	 ▲▲ RS No. DS3516MP000	N/A	N/A
60A weathertight		 ▲▲ RS No. DF6516FRAB0	 ▲▲ RS No. DS6516MP000	 PN ZPLML-2220-38SR ZPLML-2420-38SR	 PN ZRLP-20-38PR

▲▲ KEYING TO BE SET AT FACTORY BASED ON VOLTAGE ASSIGNMENT NUMBERS. RECEPTACLES AND PLUGS HAVE METALLIC SHELLS.

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

KSC-STD-E-0011H

Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)


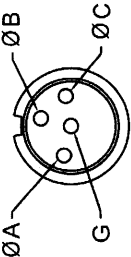

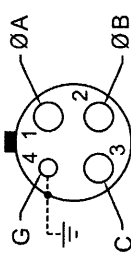
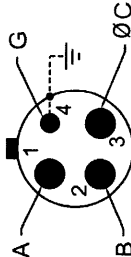
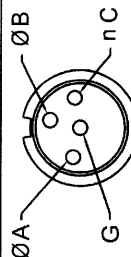
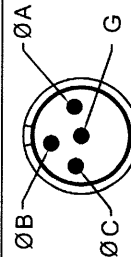
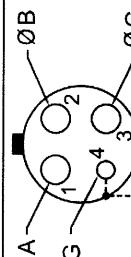
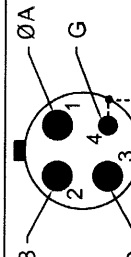
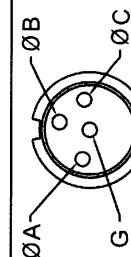
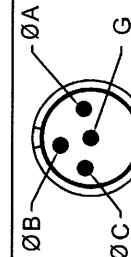
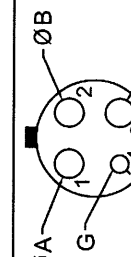
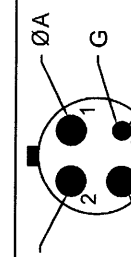
120/208V, 60 Hz, 3 phase, 5 wire, 4 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
100A weathertight					
		▲▲ RS No. DF1516FRAB0	▲▲ RS No. DS1516MP000	PN ZPLML-32C24-49SR ZPLML-34C24-49SR	PN ZRLP-C24-49PR
200A weathertight				N/A	N/A
		▲▲ RS No. DF2516FRAB0	▲▲ RS No. DS2516MP000		
480V, 60 Hz, 3 phase, 4 wire, 3 pole					
20A weathertight				N/A	N/A
		1 RS No. 8031	1 RS No. 8014		
▲▲ KEYING TO BE SET AT FACTORY BASED ON THE FOLLOWING					

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

Note: ¹ Rated at 600V AC

▲▲ KEYING TO BE SET AT FACTORY BASED
ON VOLTAGE ASSIGNMENT NUMBERS.
RECEPTACLES AND PLUGS HAVE
METALLIC SHELLS.

Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)

480V, 60 Hz, 3 phase, 4 wire, 3 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A weathertight 45° angle flap cover					
					
					

▲▲ KEYING TO BE SET AT FACTORY BASED
ON VOLTAGE ASSIGNMENT NUMBERS.
RECEPTACLES AND PLUGS HAVE
METALLIC SHELLS.

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

KSC-STD-E-0011H

Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)


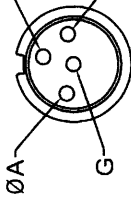
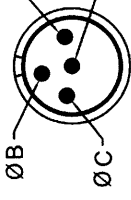

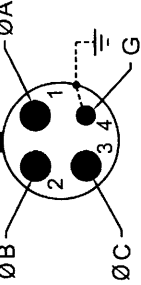







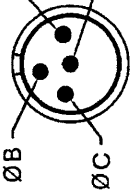
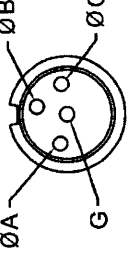
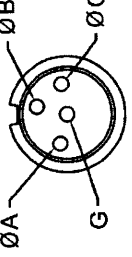
480V, 60 Hz, 3 phase, 4 wire, 3 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
200A weathertight 30° angle flap cover	 WT	 ▲▲ RS No. DF2404FRAB0	 ▲▲ RS No. DS2404MP000	 PN ZPLML-36C24-26SR ZPLML-38C24-26SR	 PN ZRLP-C24-26PR
200A watertight 30° angle with cup cap cover	 WTR	 ▲▲ RS No. DS2404MRAB0/ DS2CC	 ▲▲ RS No. DS2404FP000	N/A	N/A
400A weathertight 30° angle flap cover	 WT	 ▲▲ RS No. DF4404FRAB0	 ▲▲ RS No. DS4404MP000	N/A	N/A
FACE VIEW OF RECEPTABLES AND PLUGS SHOWN					
▲▲ KEYING TO BE SET AT FACTORY BASED ON VOLTAGE ASSIGNMENT NUMBERS. RECEPTABLES AND PLUGS HAVE METALLIC SHELLS.					

Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)

480V, 60 Hz, 3 phase, 4 wire, 3 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
400A watertight 30° angle with cup cap cover	 WTR	  ▲▲ RS No. DS4404MRAB0/ DS4CC	 ▲▲ RS No. DS4404FP000	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN



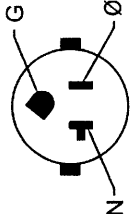

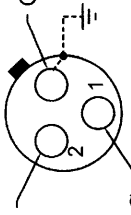
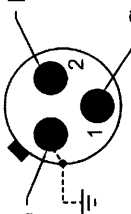

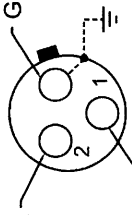

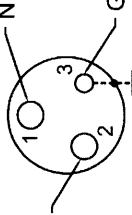

KSC-STD-E-0011H

Table 1. Nonhazardous Area (Indoor / Outdoor) Receptacles (cont)

250V, dc; 600V, 60 Hz; single phase, 4 wire, 3 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
60A waterproof with screw cap	<div><div>60</div><div>WP</div></div>	 RS No. 7324-78	 RS No. 7328-78	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN


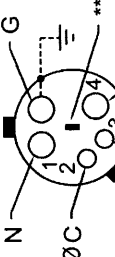

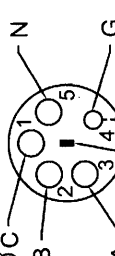


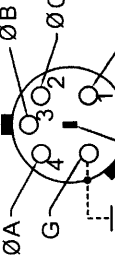

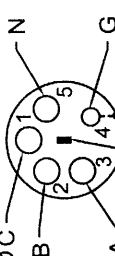


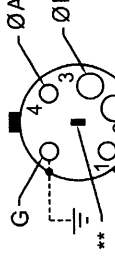

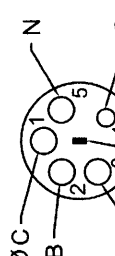

Table 2. Hazardous Area, Class I, Division 1, B, C, D Explosionproof Receptacles

120V, 60 Hz, single phase, 3 wire, 2 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
20A switch interlocked	 E (BCD)	 AP No. EFSCB175-2023 ECP-1523 CH No. ENP5201 ENP5151	 AP No. ECP-2023 ECP-1523 CH No. ENP5201 ENP5151	N/A	N/A
20A use switch interlocked (30A actual rating of receptacle)	 E (BCD)	 CH No. FSQC2320 FSQC3320	 CH No. APJ3385	N/A	N/A
30A switch interlocked	 E (BCD)	 CH No. FSQC2320-S4 FSQC3320-S4	 CH No. APJ3385-S4	 VT GB-1016-51SL GB-D1016-51SL	 VT GB-B1716-51PL GB-B1916-51PL GB-B1516-51PL

FACE VIEW OF RECEPTABLES AND PLUGS SHOWN

KSC-STD-E-0011H


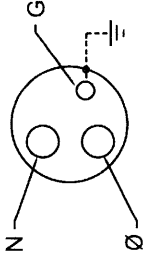


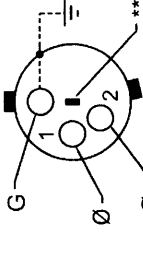
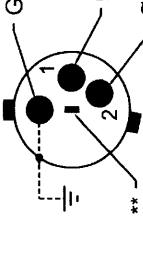

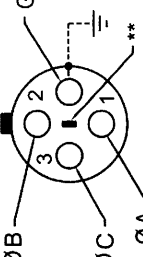
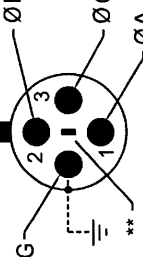
Table 2. Hazardous Area, Class I, Division 1, Group B, C, D Explosionproof Receptacles (cont)

120/208V, 60 Hz, 3 phase, 5 wire, 4 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A switch interlocked	 E (BCD)	 <p>CH No. BHR3583BW BHR3584BW</p>	 <p>CH No. BHP3583BW BHP3585BW</p>	 <p>VT GB-1020-36SL GB-D1020-36SL</p>	 <p>VT GB-B1720-36PL GB-B1920-36PL GB-B1520-36PL</p>
60A switch interlocked	 E (BCD)	 <p>CH No. BHR6584DW BHR6585DW</p>	 <p>CH No. BHP6585DW BHP6587DW</p>	 <p>VT GB-1024-29SL GB-D1024-29SL</p>	 <p>VT GB-B1724-29PL GB-B1924-29PL GB-B1524-29PL</p>
100A switch interlocked	 E (BCD)	 <p>CH No. BHR10585CW BHR10586CW</p>	 <p>CH No. BHP10585CW BHP10587CW</p>	 <p>VT GB-1028-23SL GB-D1028-23SL</p>	 <p>VT GB-B1728-23PL GB-B1928-23PL GB-B1528-23PL</p>

** - OPERATING LEVER FOR SWITCH INTERLOCK

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

Table 2. Hazardous Area, Class I, Division 1, Group B, C, D Explosionproof Receptacles (cont)


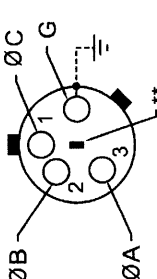
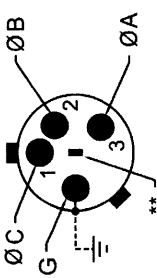
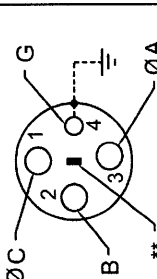
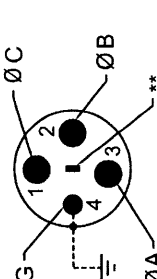

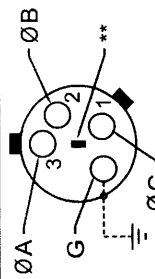
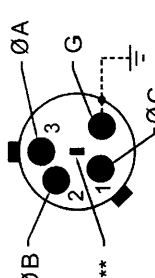
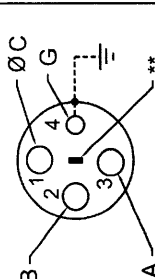
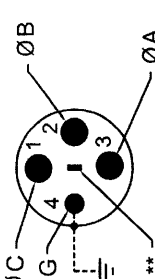

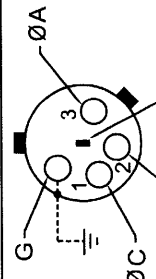
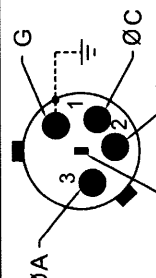
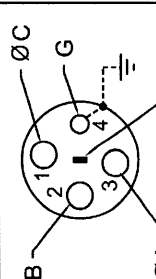
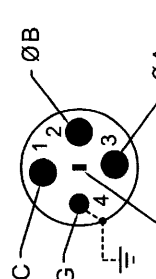
120V, 60 Hz, single phase, 3 wire, 2 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A	 E (BCD)	 VT GB-B1716-51SL GB-B1916-51SL GB-B1516-51SL	 VT GB-1016-51PL GB-D1016-51PL	N/A	N/A
208V, 60 Hz, single phase, 3 wire, 2 pole					
30A switch interlocked	208V  E (BCD) 1-PH	 CH No. BHR3382N BHR3383N	 CH No. BHP3383N BHP3385N	N/A	N/A
480V, 60 Hz, 3 phase, 4 wire, 3 pole					
20A use, switch interlocked (30A actual manufacturer's rating)	 E (BCD)	 CH No. FSQC2430 FSQC3430	 CH No. APJ3485	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

** - OPERATING LEVER FOR SWITCH INTERLOCK

KSC-STD-E-0011H


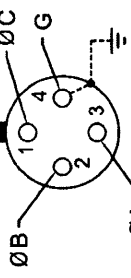

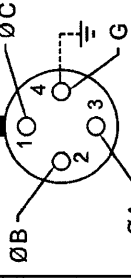


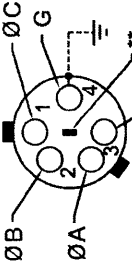

Table 2. Hazardous Area, Class I, Division 1, Group B, C, D Explosionproof Receptacles (cont)

480V, 60 Hz, 3 phase, 4 wire, 3 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A switch interlocked	 E (BCD)	 <p>CH No. BHRC3482D BHRC3483D</p>	 <p>CH No. BHP3483D BHP3485D</p>	 <p>VT GB-1016-23SL GB-D1016-23SL</p>	 <p>VT GB-B1716-23PL GB-B1916-23PL GB-B1516-23PL</p>
60A switch interlocked	 E (BCD)	 <p>CH No. BHRC6484D BHRC6485D</p>	 <p>CH No. BHP6483D BHP6485D</p>	 <p>VT GB-1020-40SL GB-D1020-40SL</p>	 <p>VT GB-B1720-40PL GB-B1920-40PL GB-B1520-40PL</p>
100A switch interlocked	 E (BCD)	 <p>CH No. BHRC10485D BHRC10486D</p>	 <p>CH No. BHP10485D BHP10487D</p>	 <p>VT GB-1024-39SL GB-D1024-39SL</p>	 <p>VT GB-B1724-39PL GB-B1924-39PL GB-B1524-39PL</p>

** - OPERATING LEVER FOR SWITCH INTERLOCK

FACE VIEW OF RECEPTABLES AND PLUGS SHOWN

Table 2. Hazardous Area, Class I, Division 1, Group B, C, D Explosionproof Receptacles (cont)


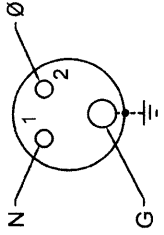
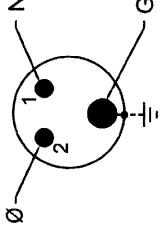
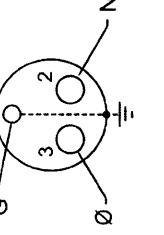
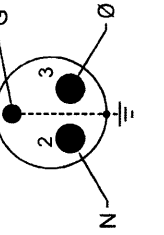

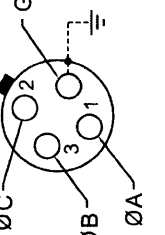
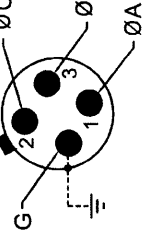
480V, 60 Hz, 3 phase, 4 wire, 3 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
200A	 E (BCD)	 VT GB-B1728-31SL GB-B1928-31SL GB-B1528-31SL	 VT GB-1028-31PL GB-D1028-31PL	 VT GB-1028-31SL GB-D1028-31SL	 VT GB-B1728-31PL GB-B1928-31PL GB-B1528-31PL
		120/208V, 400 Hz, 3 phase, 5 wire, 4 pole			
30A switch interlocked	 30 E (BCD)	 CH No. BHRC3583DW BHRC3584DW	 CH No. BHP3583DW BHP3585DW	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

** - OPERATING LEVER FOR SWITCH INTERLOCK

KSC-STD-E-0011H

Table 3. Hazardous Area, Class I, Division 1, Group C, D Explosionproof Receptacles


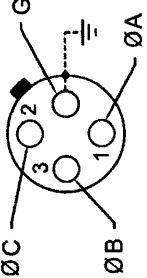


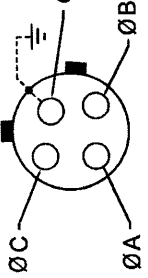
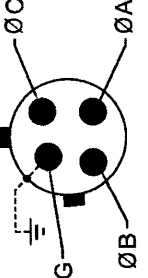
120V, 60 Hz, single phase, 3 wire, 2 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
20A	 E (CD)	 ¹ RS No. 4464FC ¹ RS No. 4464SC	 ¹ RS No. 4466	N/A	N/A
		 ² RS No. 4233BC	 ² RS No. 4237BC	N/A	N/A
480V, 60 Hz, 3 phase, 4 wire, 3 pole					
30A use (60A actual manufacturer's rating)	 E (CD)	 CH No. FSQC5640-S4	 CH No. APJ6485-S4	N/A	N/A
FC - FLAP COVER					

FC - FLAP COVER
SC - SCREW COVER

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

Note: ¹ Rated at 240V AC² Rated at 480V AC

Table 3. Hazardous Area, Class I, Division 1, Group C, D Explosionproof Receptacles (cont)

480V, 60 Hz, 3 phase, 4 wire, 3 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
60A	 E (CD)	 <p>CH No. FSQC5640</p>	 <p>CH No. APJ6485</p>	N/A	N/A
200A interlocked circuit breaker combination (Group D only)	 E (D)	 <p>CH No. EPC 604-2042- WT 200-3 CH No. EPC 605-2042- TT 200-3</p>	 <p>CH No. DP20468</p>	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

KSC-STD-E-0011H


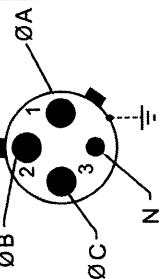
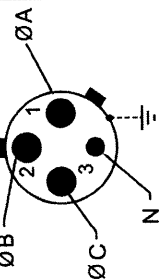

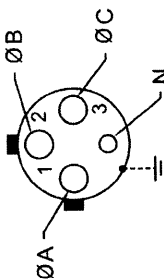
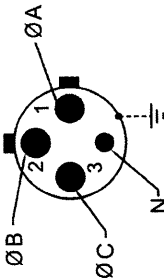

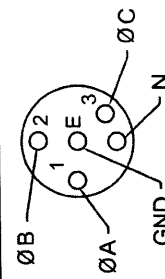
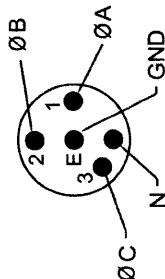
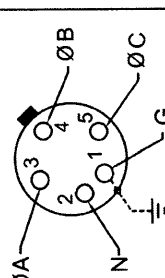
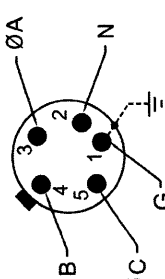
Table 4. Not to Be Utilized for New Design
[Nonhazardous Area (Indoor / Outdoor) Receptacles]

120V, 60 Hz, single phase, 3 wire, 2 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A, weathertight		 1 RS No. 3113W	 1 RS No. 3117W	N/A	N/A
120/208V, 60 Hz, 3 phase, 4 wire, 4 pole					
30A weathertight		 1 RS No. 3114W	 1 RS No. 3118W	N/A	N/A
60A weathertight		 1 RS No. 3124W-78	 1 RS No. 3128W-78	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN


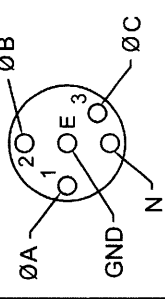
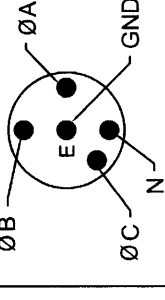

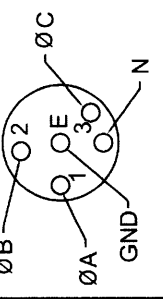
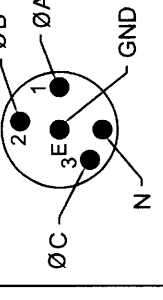

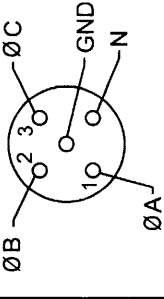
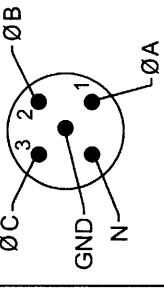
Note: 1 Rated at 480V AC

Table 4. Not to Be Utilized for New Design (cont)
[Nonhazardous Area (Indoor / Outdoor) Receptacles]

120/208V, 60 Hz, 3 phase, 4 wire, 4 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
100A weathertight	 WT	 1 RS No. 3134W-72	 1 RS No. 3138W-72	N/A	N/A
200A weathertight	 WT	 1 RS No. 3144W	 1 RS No. 3148W	N/A	N/A
120/208V, 60 Hz, 3 phase, 5 wire, 4 pole					
30A weathertight	 WT	 ▲ RS No. 3F0516AB	 ▲ RS No. 3MP516	 CH RPC133-153-S02AR RPC133-388-S02AR RPC133-389-S02AR	 CH RPC233-127-P02AR

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN ▲ KEYING TO BE SET AT FACTORY BASED ON VOLTAGE ASSIGNMENT NUMBERS.
Note: 1 Rated at 480V AC RECEPTACLES AND PLUGS HAVE NON-METALLIC SHELLS


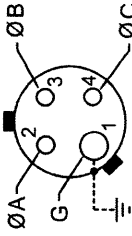
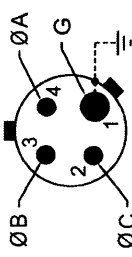

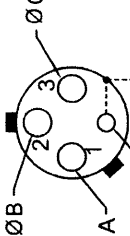
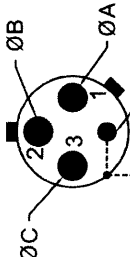

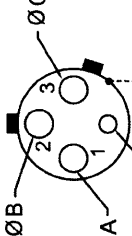

Table 4. Not to Be Utilized for New Design (cont)
[Nonhazardous Area (Indoor / Outdoor) Receptacles]

120/208V, 60 Hz, 3 phase, 5 wire, 4 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
60A weathertight	 WT	 ▲ RS No. 6F0516AB	 ▲ RS No. 6MP516	N/A	N/A
100A		 ▲ RS No. 10F0516AB	 ▲ RS No. 10MP516	N/A	N/A
200A		 ▲ RS No. DS2516FRAB0	 ▲ RS No. DS2516MP000	N/A	N/A
▲ KEYING TO BE SET AT FACTORY BASED ON VOLTAGE ASSIGNMENT NUMBERS. RECEPTACLES AND PLUGS HAVE NON-METALLIC SHELLS					
FACE VIEW OF RECEPTACLES AND PLUGS SHOWN					

▲ KEYING TO BE SET AT FACTORY BASED ON VOLTAGE ASSIGNMENT NUMBERS. RECEPTACLES AND PLUGS HAVE NON-METALLIC SHELLS

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

Table 4. Not to Be Utilized for New Design (cont)
[Nonhazardous Area (Indoor / Outdoor) Receptacles]

120/208V, 60 Hz, 3 phase, 4 wire, 3 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A weathertight 45° angle flap cover		 <p>¹ RS No. 7114 (keys @ 0° & 225°)</p>	 <p>¹ RS No. 7318</p>	N/A	N/A
60A weathertight 45° angle flap cover		 <p>¹ RS No. 7124-78 (keys @ 0° & 227°)</p>	 <p>¹ RS No. 7328-78</p>	N/A	N/A
100A weathertight 45° angle flap cover		 <p>¹ RS No. 7134W-72 (keys @ 0° & 108°)</p>	 <p>¹ RS No. 7138W-72</p>	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

Note: ¹ Rated at 600V AC

KSC-STD-E-0011H

Table 4. Not to Be Utilized for New Design (cont)
[Nonhazardous Area (Indoor / Outdoor) Receptacles]

480V, 60 Hz, 3 phase, 4 wire, 3 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
100A weathertight 45° angle flap cover		<p>¹ RS No. 7134-72 (keys @ 0° & 280°)</p>	<p>¹ RS No. 7138-72</p>	N/A	N/A
200A weathertight 45° angle flap cover		<p>¹ RS No. 7144W (keys @ 0° & 75°)</p>	<p>¹ RS No. 7148W</p>	N/A	N/A
200A weathertight 45° angle flap cover		<p>¹ RS No. 7144W (keys @ 0° & 75°)</p>	<p>¹ RS No. 7148W</p>	N/A	N/A

FACE VIEW OF RECEPTABLES AND PLUGS SHOWN

Note: ¹ Rated at 600V AC

Table 4. Not to Be Utilized for New Design (cont)
[Nonhazardous Area (Indoor / Outdoor) Receptacles]



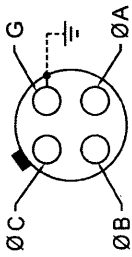

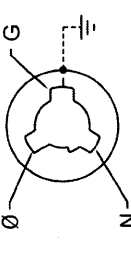


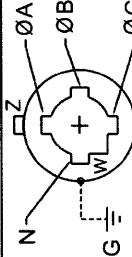
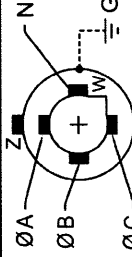
480V, 60 Hz, 3 phase, 4 wire, 3 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
200A weathertight 20° angle flap cover		<p>1 RS No. 7144</p>	<p>1 RS No. 7148</p>	N/A	N/A
200A weathertight 45° angle flap cover		<p>1 RS No. 7144R (keys @ 0° & 75°)</p>	<p>1 RS No. 7148R</p>	N/A	N/A
400A weathertight		<p>CH No. AREX4042210 AREX4042212 STYLE 2</p>	<p>CH No. AP404610 AP404612 STYLE 2</p>	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

Note: 1 Rated at 600V AC

KSC-STD-E-0011H

Table 4. Not to Be Utilized for New Design (cont)
[Nonhazardous Area (Indoor / Outdoor) Receptacles]

480V, 60 Hz, 3 phase, 4 wire, 3 pole (cont)					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
400A weathertight		 <p>CH No. AREX4042210 AREX4042212 STYLE 2 (SUFFIX S22)</p>	 <p>CH No. AP404610 AP404612 STYLE 2 (SUFFIX S22)</p>	N/A	N/A
120V, 400 Hz, single phase, 3 wire, 2 pole					
20A		 <p>¹ HU No. HBL23000G AH23000G</p>	 <p>¹ HU No. HBL23005GB AH23005N</p>	N/A	N/A
120/208V, 400 Hz, 3 phase, 4 wire, 4 pole					
30A		 <p>² HU No. HBL25403 AH25403</p>	 <p>² HU No. HBL25415B AH25415N</p>	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

Note: ¹ Rated at 480V AC
² Rated at 600V AC

Table 4. Not to Be Utilized for New Design (cont)
[Nonhazardous Area (Indoor / Outdoor) Receptacles]

208V, 60 Hz, single phase, 3 wire, 2 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A					
		CH No. RPC233-127-S02BR	CH No. RPC133-153-P02BR RPC133-388-P02BR RPC133-389-P02BR	CH No. RPC233-127-P02BR	CH No. RPC133-153-S02BR RPC133-388-S02BR RPC133-389-S02BR
[Hazardous Area, Class I, Division 1, Group B, C, D Explosionproof Receptacles]					
208V, 60 Hz, single phase, 3 wire, 2 pole					
RATING	FACILITY SYMBOL	WIRING DIAGRAM - FACILITY		WIRING DIAGRAM - GSE	
		RECEPTACLE	PLUG	PLUG	RECEPTACLE
30A	208V E (BCD)				N/A
		VT GB-B1716-51SL GB-B1916-51SL GB-B1516-51SL	VT GB-1016-51PL GB-D1016-51PL	N/A	N/A

FACE VIEW OF RECEPTACLES AND PLUGS SHOWN

KSC-STD-E-0011H

Table 5. Receptacle/Plug Cross-Reference Chart
(Meltric replacements for the Russellstoll R&S Series listed which has been discontinued)

R&S	MELTRIC
3F0516AB	33-30167-MA3
3MP516	33-31167
6F0516AB	33-60167-MA6
6MP516	33-61167
10F0516AB	33-90167-MA10
10MP516	33-91167

NOTE

The Meltric plugs and receptacles listed above shall only be used to mate existing Russellstoll plugs/receptacles listed which are no longer available as the R&S series.

KSC-STD-E-0011H

January 7, 2009

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER KSC-STD-E-0011	2. DOCUMENT DATE December 2, 2008
3. DOCUMENT TITLE Electrical Power Receptacles and Plugs, Standard for		
4. NATURE OF CHANGE <i>(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)</i>		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME <i>(Last, First, Middle Initial)</i>	b. ORGANIZATION	
c. ADDRESS <i>(Include Zip Code)</i>	d. TELEPHONE <i>(Include Area Code)</i>	7. DATE SUBMITTED
8. PREPARING ACTIVITY		
a. NAME Chief, Mechanical/Electrical Branch	d. TELEPHONE <i>(Include Area Code)</i> (321) 867-4002	
c. ADDRESS <i>(Include Zip Code)</i> National Aeronautics and Space Administration Mail Code: TA-B3 Kennedy Space Center, FL 32899		

KSC-STD-E-0011H