

INCH-POUNDS

MS90386D
20 April 2009
SUPERSEDING
MS90386C(AS)
7 October 1987

DETAIL SPECIFICATION

INDICATOR, ELAPSED TIME, ELECTROCHEMICAL (MERCURY)
115 VOLT AC 50/2400 Hz, 28 VOLT DC OR 5 VOLT DC

Inactive for new design after 23 July 1997.

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this Military Specification Sheet and MIL-DTL-81219.

1 PART OR IDENTIFYING NUMBER (PIN)

1.1 PIN. The PIN is formed as follows:

MS90386 - X

Part description number per table I

Specification number

1.2 H designation. Indicators with an H designation are for horizontal mounting. Unless otherwise specified, a citation to a dash number represents both non-H and H designated indicators.

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1.3 Substitutions. -1 through -12 indicators are replaceable by the equivalent -100 series indicator (i.e. - a -1 indicator is replaceable by a -101 indicator). The units are mechanically, electrically and dimensionally the same except for the mechanical and thermal shock limits as given in table I.

2 REQUIREMENTS

2.1 Dimensional. The indicator shall conform to the dimensions given in figures 1 through 5 as required.

- a. All dimensions are in inches.
- b. Tolerances, unless otherwise specified, are ± 0.015

2.2 Weight. The indicator shall not exceed 0.1 ounce.

2.3 Time range. Total readout shall be in accordance with table I. The time scale shall be 0.650 inches long and have 20 equal divisions as shown in figure 1.

2.4 Operating temperature range. -20°C to 85°C. The indicator may also be used in equipment with an operating range of -55°C to 85°C with accurate operation above -20°C.

2.5 Storage temperature range. -80°C to 85°C.

2.6 Power consumption. Power consumption at the rated voltage per table I shall not exceed 50 milli-watts.

2.7 Life accuracy. Accuracy shall be $\pm 3\%$ for -1 through -12 and $\pm 5\%$ for -101 through -112 from -20°C to 85°C over the following conditions:

MS90386-1-3-5-7-101-103-105-107:	115Vac \pm 13Vac, 50 HZ to 2400 Hz
MS90373-2-4-6-8-102-104-106-108:	23Vdc to 29Vdc
MS9.386-9-10-11-12-109-110-111-112:	4.95Vdc to 5.05Vdc

2.8 Color. The indicators shall be of the following colors:

- a. Faceplate - black
- b. Numerals - white on black background
- c. Scale - black on white background

2.9 Test terminal cap. The test terminal cap shall be made of polytetrafluoroethylene (PTFE).

3 TESTS AND CHECKS

3.1 Mechanical shock. Indicators shall be tested in accordance with MIL-STD-202, Method 213. Test conditions shall be:

- a. -1 through -12 - condition A (50g, 11ms)
- b. -101 through -112 - condition C (100g, 6ms)

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3.2 Thermal shock. Indicators shall be tested in accordance with MIL-STD-202, Method 107 for the following number of cycles:

- a. -1 through -12 - 5 cycles
- b. -101 through -112 - 10 cycles

3.3 Operational check. Each indicator shall have the following operational checks performed.

3.3.1 Indicating cell. At 25°C and the indicator energized at its rated voltage, the voltage between the test terminal (center terminal) and the input/test terminal (terminal nearest “+” sign) shall be measured. The measured voltage shall be less than the “V Cell Maximum” as shown in table I.

CAUTION: Do not short the test terminal to the input terminal. Accidental momentary grounding or the application of any potential to the test terminal may cause permanent damage. It is suggested that the PTFE test cap be left in place on the test terminal and that a small sharp probe be inserted through the end port of the cap.

3.3.2 Internal current source. With an external 100 ohm precision resistor placed between the test and input/test terminals (in parallel with the indicating cell) and the indicator energized at its rated voltage, the voltage between the test terminal and input/test terminal shall be measured. The voltage shall be within the range of “V Reg 100 Ohms” as shown in table I.

4 IDENTIFICATION

4.1 Indicator. The indicator shall be marked with the following data on the outer surface:

- a. Manufacturer's name
- b. Manufacturer's model number
- c. Nominal voltage
- d. Nominal power (watts)
- e. PIN
- f. Coded date
- g. Polarity symbol (+) (dc indicators)

5 NOTES

5.1 There is no preferred mounting attitude. Indicator may be mounted on any axis and read directly without removal.

5.2 Indication of elapsed time, for vertical indicators, shall be read from the scale using the lower edge of the moving indicator gap. For horizontal indicators, the elapsed time is read from the left edge of the gap.

5.3 Voltage regulation for 28Vdc and 115Vac indicators is obtained by a regulator, self-contained in the indicator, which is frequency insensitive from 50 to 2,400 HZ.

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5.4 The 5Vdc indicators do not have an internal voltage regulator and must be used with precision logic power supplies.

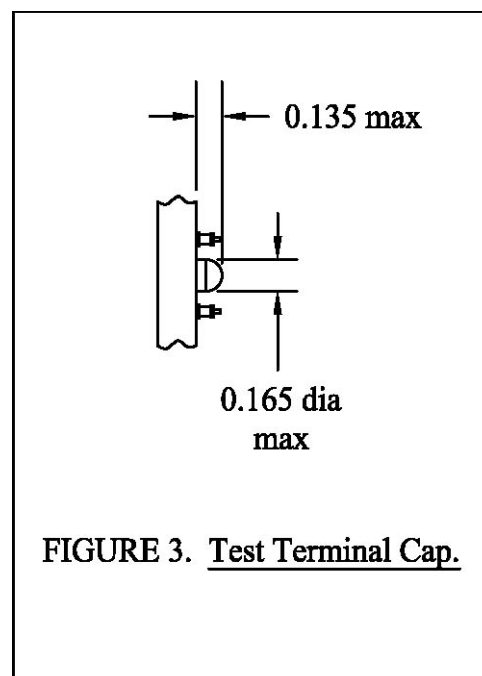
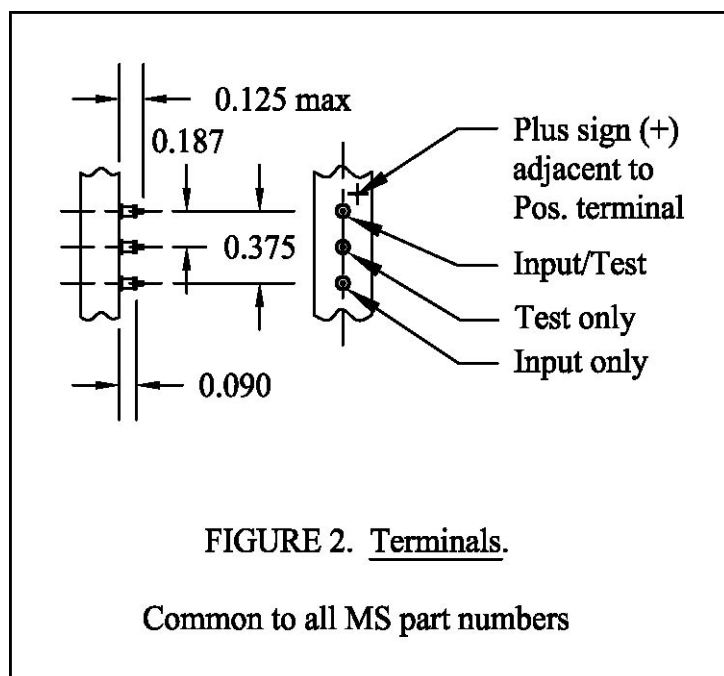
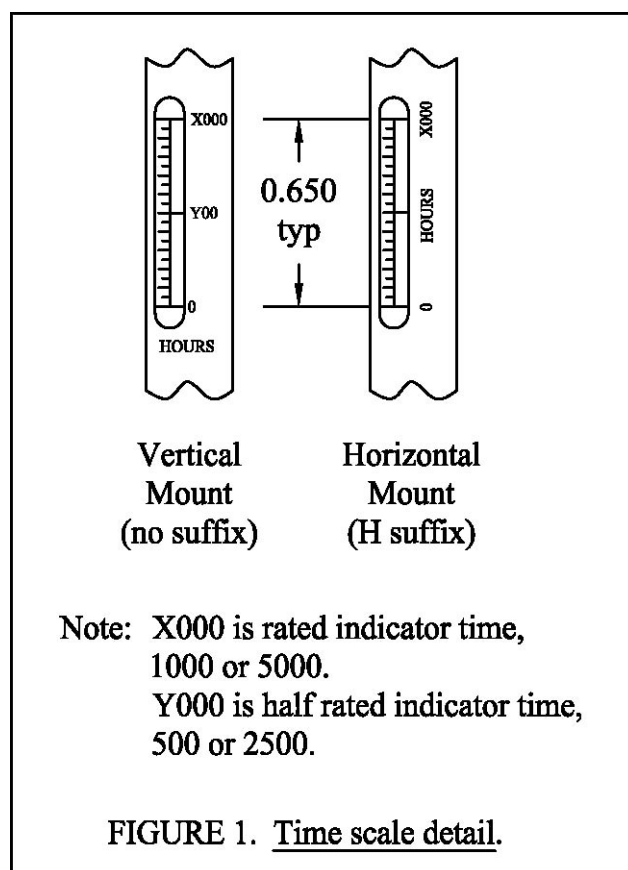
5.5 In the event of conflict between this specification and the references cited herein, This specification shall take precedence.

CHANGES FROM PREVIOUS ISSUE: No technical changes were made during this revision. Revision is to prepare a clean copy. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

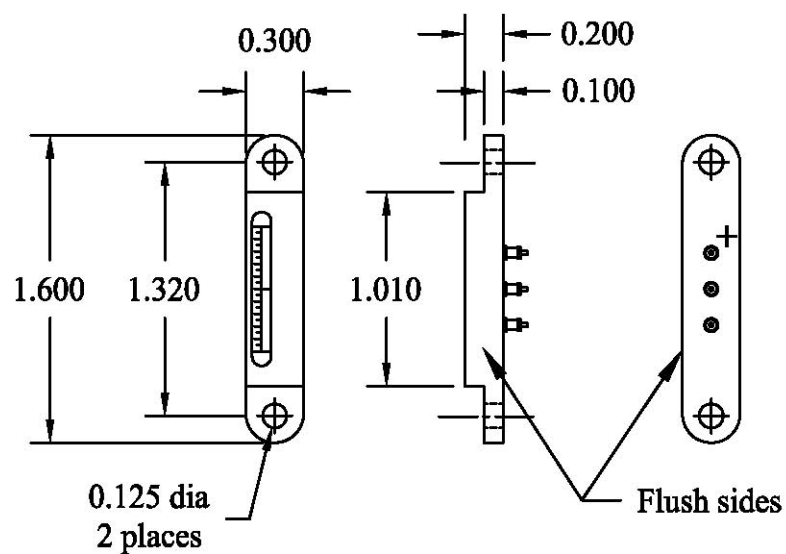
TABLE I. Timer specifications.

MS Dash Number		Panel Mounting Method	Rated Voltage	Hours Range	V Cell Maximum Millivolts DC	V Reg 100 Ohms, Microvolts		Shock Class (g)	Thermal Shock (Cycles)
Vertical	Horizontal					Min	Max		
-1	-1H	Below	115 Vac	1000	10	358	442	50	5
-2	-2H	Below	28 Vdc	1000	10	358	442	50	5
-3	-3H	Above	115 Vac	1000	10	358	442	50	5
-4	-4H	Above	28 Vdc	1000	10	358	442	50	5
-5	-5H	Below	115 Vac	5000	10	71	89	50	5
-6	-6H	Below	28 Vdc	5000	10	71	89	50	5
-7	-7H	Above	115 Vac	5000	10	71	89	50	5
-8	-8H	Above	28 Vdc	5000	10	71	89	50	5
-9	-9H	Below	5 Vdc	1000	10	358	442	50	5
-10	-10H	Above	5 Vdc	1000	10	358	442	50	5
-11	-11H	Below	5 Vdc	5000	10	71	89	50	5
-12	-12H	Above	5 Vdc	5000	10	71	89	50	5
-101	-101H	Below	115 Vac	1000	40	350	440	100	10
-102	-102H	Below	28 Vdc	1000	40	350	440	100	10
-103	-103H	Above	115 Vac	1000	40	350	440	100	10
-104	-104H	Above	28 Vdc	1000	40	350	440	100	10
-105	-105H	Below	115 Vac	5000	20	70	88	100	10
-106	-106H	Below	28 Vdc	5000	20	70	88	100	10
-107	-107H	Above	115 Vac	5000	20	70	88	100	10
-108	-108H	Above	28 Vdc	5000	20	70	88	100	10
-109	-109H	Below	5 Vdc	1000	40	350	440	100	10
-110	-110H	Above	5 Vdc	1000	40	350	440	100	10
-111	-111H	Below	5 Vdc	5000	20	70	88	100	10
-112	-112H	Above	5 Vdc	5000	20	70	88	100	10

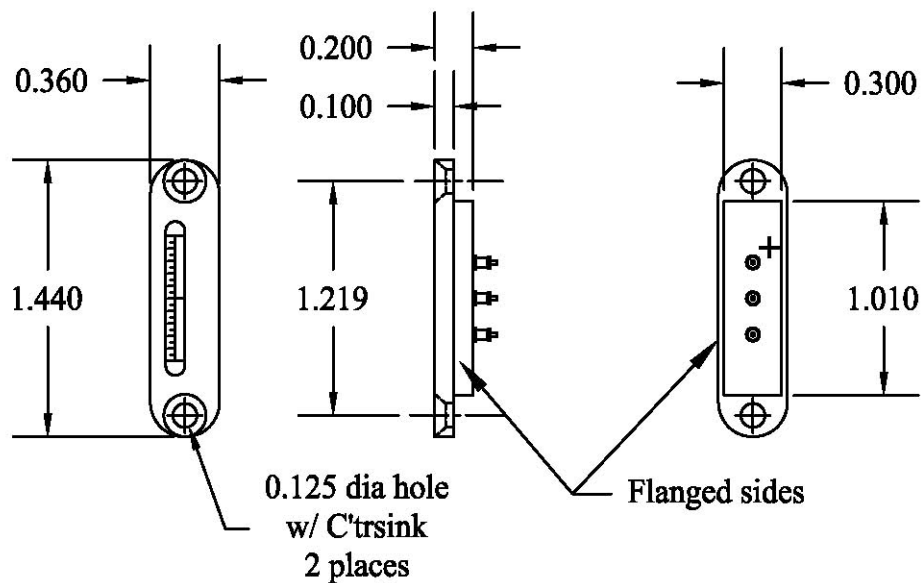
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FIGURE 4. Indicators for Below Panel Mounting.

MS90386-1-2-5-6-9-11-101-102-105-106-109-111

FIGURE 5. Indicators for Above Panel Mounting.

MS90386-3-4-7-8-10-12-103-104-107-108-110-112

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Custodian:
Navy – AS
Air Force – 71

Preparing Activity:
DLA - GS1

(Project 6645-2009-003)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST database at <http://assist.daps.dla.mil>.