

<p>FIGURE I</p>		<p>FIGURE II</p>		<p>TEST PORT CAP</p>	
<p>FIGURE III - indicators for Below Panel Mounting MS-90386-1-2-5-6-9-11-101-102-105-106-109-111</p>					
<p>FIGURE IV - Indicators for Above Panel Mounting MS-90386-3-4-7-8-10-12-103-104-107-108-110-112</p>					
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<p>P.A. NAVY - AS Other Cust</p>		<p>TITLE</p> <p>INDICATOR, ELAPSED TIME, ELECTROCHEMICAL, (MERCURY) 115 VOLT AC, 50/2400 HERTZ, 28 VOLT DC OR 5 VOLT DC</p>		<p>MILITARY STANDARD</p> <p>MS90386(AS)</p>	
<p>PROCUREMENT SPECIFICATION MIL-I-81219(AS)</p>		<p>SUPERSEDES:</p>		<p>SHEET 1 OF 3</p>	

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TABLE I

MS DASH NUMBER		PANEL MOUNT- ING 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 YAC	1000	10	358	442	50	5
-2	-2H	BELOW	28 YDC	1000	10	358	442	50	5
-3	-3H	ABOVE	115 YAC	1000	10	358	442	50	5
-4	-4H	ABOVE	28 YDC	1000	10	358	442	50	5
-5	-5H	BELOW	115 YAC	5000	10	71	89	50	5
-6	-6H	BELOW	28 YDC	5000	10	71	89	50	5
-7	-7H	ABOVE	115 YAC	5000	10	71	89	50	5
-8	-8H	ABOVE	28 YDC	5000	10	71	89	50	5
-9	-9H	BELOW	5 YDC	1000	10	358	442	50	5
-10	-10H	ABOVE	5 YDC	1000	10	358	442	60	5
-11	-11H	BELOW	5 YDC	5000	10	71	89	50	5
-12	-12H	ABOVE	5 YDC	5000	10	71	89	50	5
-101	-101H	BELOW	115 YAC	1000	40	350	440	100	10
-102	-102H	BELOW	28 YDC	1000	40	350	440	100	10
-103	-103H	ABOVE	115 YAC	1000	40	350	440	100	10
-104	-104H	ABOVE	28 YDC	1000	40	350	440	100	10
-105	-105H	BELOW	115 YAC	5000	20	70	88	100	10
-106	-106H	BELOW	28 YDC	5000	20	70	88	100	10
-107	-107H	ABOVE	115 YAC	5000	20	70	88	100	10
-108	-108H	ABOVE	28 YDC	5000	20	70	88	100	10
-109	-109H	BELOW	5 YDC	1000	40	350	440	100	10
-110	-110H	ABOVE	5 YDC	1000	40	350	440	100	10
-111	-111H	BELOW	5 YDC	5000	20	70	88	100	10
-112	-112H	ABOVE	5 YDC	5000	20	70	88	100	10

REQUIREMENTS:DIMENSIONS: ALL DIMENSIONS ARE IN INCHES. TOLERANCES, UNLESS OTHERWISE SPECIFIED, ARE ± 0.015 .

POWER CONSUMPTION: RATED VOLTAGE PER TABLE I, THE POWER CONSUMPTION SHALL NOT EXCEED 50 MILLI-WATTS.

LIFE ACCURACY: ACCURACY SHALL BE 3% FOR MS90386-1 THRU -12, AND 5% FOR MS90386-101 THRU -112 FROM -20°C TO 85°C. THIS ACCURACY SHALL BE MAINTAINED UNDER THE FOLLOWING CONDITIONS:

MS90386-1, -3, -5, -7, -101, -103, -105, -107 115 VOLTS $\pm 13V$ (50-2,400 Hz)
 MS90328-2, -4, -6, -8, -102, -104, -106, -108 23 TO 29 VOLTS (DC)
 MS90328-9, -10, -11, -12, -109, -110, -111, -112 4.95 TO 5.05 VOLTS (DC)

WEIGHT: WEIGHT SHALL NOT EXCEED 0.1 OUNCE.

TIME RANGE: THE TOTAL TIME READOUT OF THE INDICATOR SHALL BE IN ACCORDANCE WITH THE VALUES FROM TABLE I. THERE SHALL BE TWENTY SCALE DIVISIONS WITH EACH DIVISION ONE-TWENTIETH OF FULL SCALE VALUE. SCALE LENGTH SHALL BE 0.650 INCH. SCALE DESIGNATIONS SHALL APPEAR ON THE FRONT FACE OF THE INDICATOR PER FIGURE 1.

REVISED (C) FOR CHANGES SEE SHEETS 1, 2 AND 3

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(MERCURY) 115 VOLT AC, 50/2400 HERTZ,
28 VOLT DC OR 5 VOLT DC

MILITARY STANDARD

MS90386(AS)

PROCUREMENT SPECIFICATION
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SUPERSEDES:

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OPERATIONAL CHECK:

1. OPERATION OF THE INDICATING CELL SHALL BE DETERMINED AT 25°C BY MEASURING VOLTAGE BETWEEN TEST TERMINAL (CENTER TERMINAL) AND THE INPUT/TEST TERMINAL (NEAREST PLUS SIGN) WITH THE INDICATOR ENERGIZED AT RATED VOLTAGE. THE MEASURED VOLTAGE SHALL BE LESS THAN V CELL MAXIMUM AS SHOWN IN TABLE I. CAUTION! DO NOT SHORT TEST TERMINAL TO INPUT TERMINAL. ACCIDENTAL MOMENTARY GROUNDING OR THE APPLICATION OF ANY POTENTIAL TO THE TEST TERMINAL (CENTER TERMINAL) MAY CAUSE PERMANENT DAMAGE. IT IS SUGGESTED THAT THE PTFE CAP BE LEFT IN-PLACE ON THE TEST TERMINAL AND THAT A SMALL SHARP PROBE BE INSERTED THROUGH THE END PORT IN THE PTFE CAP.
2. OPERATION OF THE INTERNAL CURRENT SOURCE SHALL BE DETERMINED BY PLACING AN EXTERNAL 100 OHM PRECISION RESISTOR (IN PARALLEL WITH THE INTERNAL INDICATING CELL) BETWEEN TEST AND INPUT/TEST TERMINALS. WITH NORMAL INPUT POWER APPLIED, THE MEASURED VOLTAGE BETWEEN THE TEST TERMINAL AND THE INPUT/TEST TERMINAL SHALL BE WITHIN THE RANGE OF V REG 100 OHM AS SHOWN IN TABLE I.

OPERATING TEMPERATURE RANGE: -20°C TO 85°C (SEE NOTE 7)

STORAGE TEMPERATURE RANGE: -80°C TO 85°C

MECHANICAL SHOCK: 50g UNIT SHALL BE TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 213, TEST CONDITION A (50g, 11ms).
100g UNIT SHALL BE TESTED IN ACCORDANCE WITH MIL-STD-202, METHOD 213, TEST CONDITION C.

PART NUMBERS: INDICATORS WITH AN H FOLLOWING THE PART NUMBER SHALL BE DESIGNATED FOR HORIZONTAL MOUNTING (SEE FIGURE 1).

THERMAL SHOCK: MIL-STD-202 METHOD 107 FOR THE FOLLOWING NUMBER OF CYCLES: MS90386-1 TO -12 5 CYCLES
MS90386-101 TO -112 10 CYCLES
(SEE TABLE I)

TEST TERMINAL CAP: THE TEST TERMINAL CAP SHALL BE MADE OUT OF POLYTETRAFLUOROETHYLENE (PTFE).

THE FOLLOWING NAMEPLATE DATA SHALL APPEAR ON THE OUTER SURFACE OF THE CASE:

MANUFACTURER'S NAME	NOMINAL POWER (WATTS)
MANUFACTURER'S MODEL NUMBER	MILITARY NUMBER
NOMINAL VOLTAGE	CODED DATE
	POLARITY SYMBOL (DC METERS)

THE COLORS SHALL BE AS SHOWN BELOW:

FACEPLATE	- BLACK
NUMERALS	- WHITE ON BLACK BACKGROUND
SCALE	- BLACK ON WHITE BACKGROUND

NOTES:

1. THIS STANDARD ESTABLISHES THE OVER-ALL DIMENSIONS AND DETAIL ENGINEERING REQUIREMENTS FOR MINATURE SIZE ELAPSED TIME INDICATORS.
2. THERE IS NO PREFERRED MOUNTING ATTITUDE. INDICATOR MAY BE MOUNTED ON ANY AXIS AND READ DIRECTLY WITHOUT REMOVAL.
3. INDICATION OF ELAPSED TIME, FOR STANDARD INDICATORS, SHALL BE READ FROM THE SCALE USING THE LOWER EDGE OF THE MOVING INDICATOR GAP. ELAPSED TIME IS READ FROM THE INDICATOR WITH THE SCALE TO THE LEFT OF THE GAP AND THE NUMBERS TO THE RIGHT. FOR HORIZONTAL MOUNTED INDICATORS, ELAPSED TIME IS READ USING THE LEFT EDGE OF THE GAP AND THE NUMBERS TO THE TOP.
4. VOLTAGE REGULATION FOR 28 VOLT DC AND 115 VOLT AC INDICATORS IS OBTAINED BY A REGULATOR, SELF CONTAINED IN THE INDICATOR, WHICH IS FREQUENCY INSENSITIVE FROM 50 TO 2400 Hz.
5. THE 5 VOLT DC INDICATORS PER MS90386-9 THRU -12 AND -109 THRU -112 DO NOT HAVE AN INTERNAL VOLTAGE REGULATOR AND MUST BE USED WITH PRECISION LOGIC POWER SUPPLIES.
6. MS90386-1 THRU -12 AND -1H THRU 12H ARE INACTIVE FOR NEW DESIGN. HIGHER SHOCK RESISTANT INDICATORS-101 THRU -112 AND -101H THRU -112H ARE INTERCHANGEABLE WITH MS90386-1 THRU -12 AND 1H THRU -12H MECHANICALLY, ELECTRICALLY AND DIMENSIONALLY EXCEPT FOR THE TEST LIMITS AS SHOWN IN TABLE I.
7. INDICATORS MAY BE INSTALLED IN EQUIPMENT WITH AN OPERATING TEMPERATURE RANGE OF -55°C TO 85°C WITH ACCURATE OPERATION FROM -20°C TO 85°C WHEN ENERGIZED.
8. IN THE EVENT OF A CONFLICT BETWEEN THE TEXT OF THIS STANDARD AND THE REFERENCES CITED HEREIN, THE TEXT OF THIS STANDARD SHALL TAKE PRECEDENCE.
9. REFERENCED GOVERNMENT (OR NON-GOVERNMENT) DOCUMENTS OF THE ISSUE LISTED IN THAT ISSUE OF THE DEPARTMENT OF DEFENSE INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) SPECIFIED IN THE SOLICITATION FORM A PART OF THIS STANDARD TO THE EXTENT SPECIFIED HEREIN.

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