L-3 ELECTRODYNAMICS, INC.

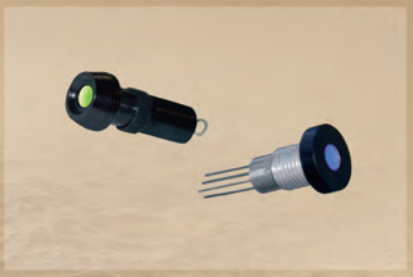
STATUS INDICATORS

RUGGEDIZED STATUS INDICATORS

COMMERCIAL | MILITARY

Event Counter / Hour Meter
ETIs

Filtered / NVIS
LEDs



Flag / Ball / Drum Display
Indicators

L-3 Electrodynamics, Inc.

Solid-state indicators provide system information

FEATURES

- Environmentally sealed
- Rugged packaging
- Pinpoint or wide-angle viewing area
- EMI shielding available
- Anti-reflective coating optional
- Panel mount & rear mount designs
- Models available to meet NVIS and MIL-Spec requirements
- Custom designs

FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 4

FIGURE 5

FIGURE 6

FIGURE 7

FIGURE 8

FIGURE 9

FIGURE 10

FIGURE 11

FIGURE 12

FIGURE 13

FIGURE 14

FIGURE 15

Fig. No.	Models	Environ Sealed	Panel Seal	Rear Mount	Panel Mount	Internal Resistors	Wide Operating Voltage	Night Vision	Infrared Secure	High Brightness	EMI Shielded	Tri-Color Bi-Color LED	Page No.
1	ML1600 ②	•			•	•							32
2	ML1610	•	•		•								32
3	ML1618 ④	•			•				•				34
4	ML1619 ④⑨	•			•				•		•		36
5	MLD1619 ④⑤	•			•				•		•		38
6/7	ML1620/ML1630 ②	•	•		•	•					•		40
6/7	ML1620-S/ML1630-S	•	•		•						•		42
6/7	ML1622/ML1632 ②	•	•		•	•					•	B	44
8/7	ML1623-S/ML1633-S ①②	•	•		•	•					•	B	46
9	ML1631 ⑧	•	•	•							•	T	48
10	ML1634	•	•	•							•	B	50
11	ML1635 ①	•	•	•							•	B	52
10	ML1636 ②	•	•	•		•					•		54
10	ML1636-U	•	•	•						•	•		56
10	ML1638 ③	•	•	•				•			•		58
11	ML1638 Bi-Color ①③	•	•	•				•			•	B	60
12	ML1640 ⑦	•	•		•						•		62
4	ML1662 ③	•	•		•			•			•		64
13	ML2030E ⑥	•	•		•						•		66
14	ML2031 ⑧	•	•		•						•	T	68
13	ML2038E ③	•	•		•			•			•		70
15	ML4036	•	•	•			•			•	•		72

Notes: ① 3-Leaded
② Internal Resistors for 5VDC to 28VDC usage.
③ MIL-L-85762A
④ CECOM Secure Lighting
⑤ Dimmable Filter feature
⑥ MIL-DTL-3661
⑦ DESC Drawing 85122
⑧ 4-Leaded
⑨ DESC Drawing 87019

This page consists of basic marketing information that is not defined as technical data under EAR Part 772.

Models ML1600 & ML1610

Designed for use as function indicators on aircraft, test equipment, machine tools and wherever severe environmental conditions need to be met.

FEATURES

- Performs in severe environments
- Low power use
- Long life
- High efficiency
- High visibility
- Rugged construction
- Readily mounted on panel

MECHANICAL SPECIFICATIONS

Case: Black anodized aluminum

Mounting: Front panel by 5/16"-32 nut and lockwasher

Weight: 1.5 grams with hardware

Seal: Environmentally sealed. Added front panel O-ring seal for model ML1610.

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS*

Absolute Maximum Ratings @Temp = 25°C				
Color		**Red**	**Yellow**	**Green**
Forward Voltage (VDC) typical @ 20 mA		1.9	2.0	2.1
Peak Forward Current (mA) ①		90	60	90
Max DC Forward Current (mA) ②		30	20	30
Reverse Voltage (VDC) @ I_R = 100 µA		5	5	5
Power Dissipation (mW)		135	85	135
Luminous Intensity (mcd) typical @ I_F = 10 mA ML1600	Non-diffused Diffused	60 7.0	50 8.0	70 5.2
Luminous Intensity (mcd) typical @ I_F = 10 mA ML1610	Non-diffused Diffused	22 5.4	14.7 5.7	10.6 4.2
Dominant Wave Length (nm) typical		626	585	569
Viewing Angle (2 Ø $^{1/2}$) typical	Non-diffused Diffused	35° 60°	35° 60°	24° 60°
Operating Temperature (°C)		-55 to +100	-55 to +100	-20 to +100
Storage Temperature (°C)		-55 to +100	-55 to +100	-55 to +100
Lead Soldering Temperature		260°C for 5 seconds		

Notes: ① Typical pulsing values: $t_p \leq 10$ µsec, Duty cycle = 10%
② For red and green, derate linearly from 50°C @ 0.5 mA/°C. For yellow, derate linearly from 50°C @ 0.2 mA/°C

*These characteristics reflect the baseline model. Variations may imply a difference in luminous characteristics and/or operability features. Please contact the EDI Sales Department for more information.

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ORDERING INFORMATION

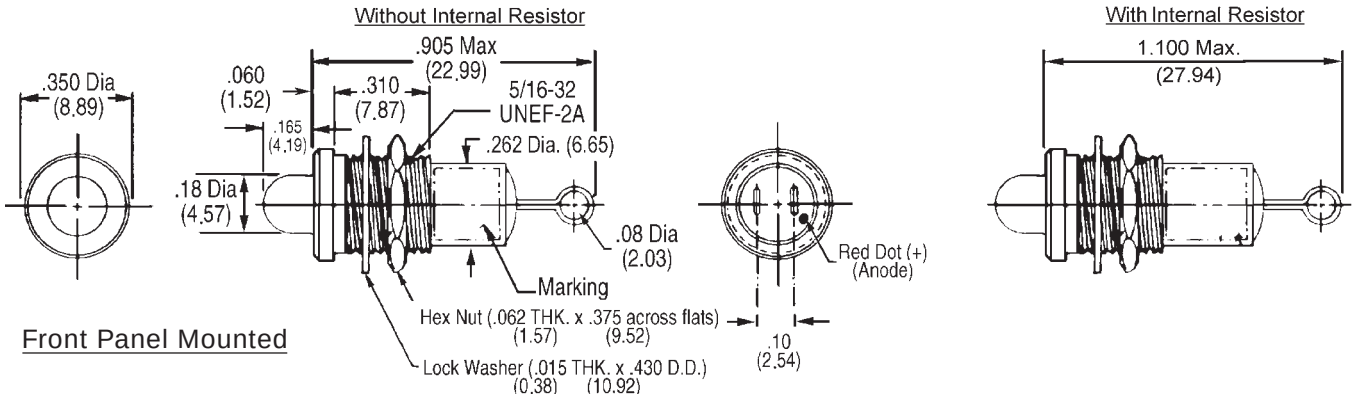
When ordering, show basic part number first, followed by the color of the LED, lens type, and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example:
A basic model with an O-ring panel seal, a yellow LED, a diffused lens, and loop terminals would be ML1610-Y-D-LT.

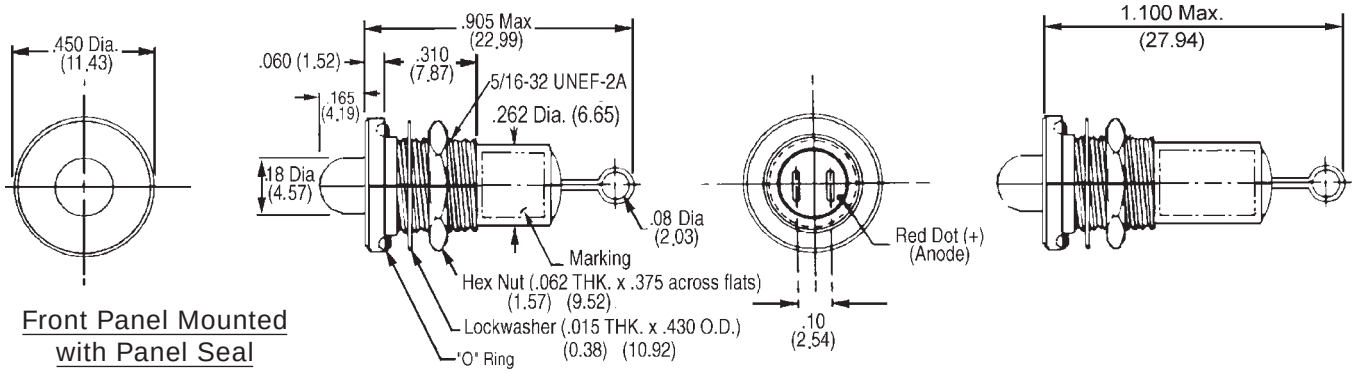
ML1610 - Y - D - LT - ( ) - ( )

Standard factory options are designated by "-Sxxx"

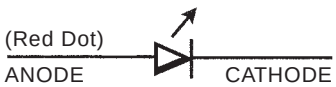
Basic Model Number	LED Color	Lens Type	Terminal Style	Internal Resistor
ML1600 (w/o O-ring)	R Red	ND Non-diffused	ST Straight Terminals	( ) No Resistor
ML1610 (with O-ring)	Y Yellow	D Diffused	LT Loop Terminals	5 5V
	G Green			24 24V



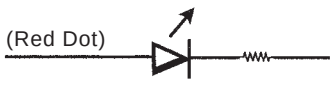
ML1600
Environmentally sealed – no O-ring



Recommended Mounting Hole



Schematic



Schematic with Internal Resistor

ML1610
Environmentally sealed – with front panel O-ring

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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MINIATURE LED INDICATOR
INFRARED SECURE

Model ML1618

This defense article is controlled under the International Traffic in Arms Regulations (ITAR) USML Category XII(e).

Developed for use as a function indicator, this solid-state lamp with infrared blocking lens is designed to meet the spectral requirements for Secure Lighting per DESC drawing 87019 and the U.S. Army Statement of Work. It is panel mountable with solderable leads, and includes press-lock mounting sleeve. Modified versions to meet MIL-L-85762A NVIS requirements as well as industrial requirements are available.

ML1618

FEATURES

- Infrared filtered
- Designed to meet CECOM secure lighting statement of work per DESC drawing 87019
- Environmentally sealed
- Colors: red, yellow, & green
- Quick panel mount seal, Press-lock
- Black contrasting bezel
- Non-MIL configurations available

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized

Mounting: Via Press-Lock bushing

Terminals: Solder loops

Weight: 1.5 grams with hardware

Seal: Environmentally sealed with front panel PTFE press-lock bushing

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

Seal Test: MIL-DTL-3661C; 30 PSIG

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C			
Color	**Red**	**Yellow**	**Green**
Forward Voltage (VDC) typical @ 20 mA	2.6	2.6	3
Peak Forward Current (mA) ①	90	60	90
DC Forward Current (mA) ②	30	20	30
Reverse Voltage (VDC) @ I_R = 100 µA	5	5	5
Power Dissipation (mW)	135	85	135
Luminous Intensity (mcd) typical @ I_F = 20 mA DC	6.0	6.0	6.0
Dominant Wave Length (nm) typical	626	585	569
Viewing Angle (2 Ø $^{1/2}$) typical	45°	45°	45°
Operating Temperature (°C)	-55 to +100	-55 to +100	-20 to +100
Storage Temperature (°C)	-55 to +100	-55 to +100	-55 to +100
Lead Soldering Temperature	260°C for 5 seconds		

Notes: ① Typical pulsing values: $t_p \leq 10$ µsec, Duty cycle = 10%
② For red and green, derate linearly from 50°C @ 0.5 mA/°C. For yellow, derate linearly from 50°C @ 0.2 mA/°C

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MINIATURE LED INDICATOR
INFRARED SECURE

This defense article is controlled under the International Traffic in Arms Regulations (ITAR) USML Category XII(e).

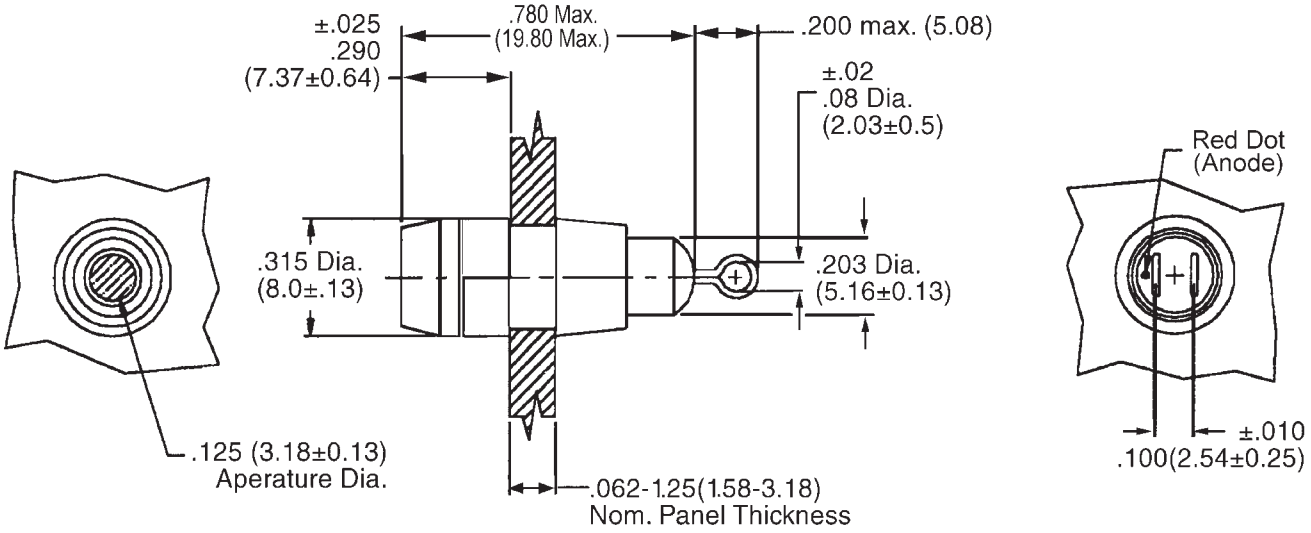
ORDERING INFORMATION

When ordering, show model number first, then color. If this is a special part, a factory assigned modification number will be added at the end. Consult the factory for special configurations.

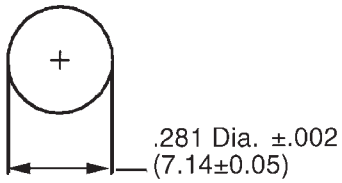
Example: Basic unit with standard green color would be model ML1618-G.

ML1618 - G

Basic Model Number	LED Color
ML1618	R Red
	Y Yellow
	G Green



Schematic



Recommended Mounting Hole

ML1618

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

Model ML1619

This defense article is controlled under the International Traffic in Arms Regulations (ITAR) USML Category XII(e).

Developed for use as a function indicator, this solid-state lamp with infrared blocking lens is designed to meet the requirements of Secure Lighting per DESC drawing 87019 and the U.S. Army Statement of Work. It is panel mountable with solderable leads and includes mounting hardware.

ML1619

FEATURES

- Designed to meet CECOM secure lighting statement of work.
- Environmentally sealed
- Optional EMI protection
- Colors: red, yellow, & green
- Panel mount seal

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized bezel with clear chromate body

Mounting: Front panel by 5/16"-32 nut and lockwasher

Weight: 1.5 grams with hardware

Seal: Environmentally sealed with front panel PTFE ring seal

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C			
Color	**Red**	**Yellow**	**Green**
Forward Voltage (VDC) typical @ 20 mA	1.9	2.1	2.2
Peak Forward Current (mA) ①	90	60	90
DC Forward Current (mA) ②	30	20	30
Reverse Voltage (VDC) @ I_R = 100 µA	5	5	5
Power Dissipation (mW)	135	85	135
Luminous Intensity (mcd) typical @ I_F = 10 mA DC	2.5	5	4
Dominant Wave Length (nm) typical	626	585	571
Viewing Angle (2 Ø $^{1/2}$) typical	32°	32°	32°
Operating Temperature (°C)	-55 to +100	-55 to +100	-20 to +100
Storage Temperature (°C)	-55 to +100	-55 to +100	-55 to +100
Lead Soldering Temperature	260°C for 5 seconds		

Notes: ① Typical pulsing values: $t_p \leq 10$ µsec, Duty cycle = 10%
② For red and green, derate linearly from 50°C @ 0.5 mA/°C. For yellow, derate linearly from 50°C @ 0.2 mA/°C

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LED INDICATOR
INFRARED SECURE

This defense article is controlled under the International Traffic in Arms Regulations (ITAR) USML Category XII(e).

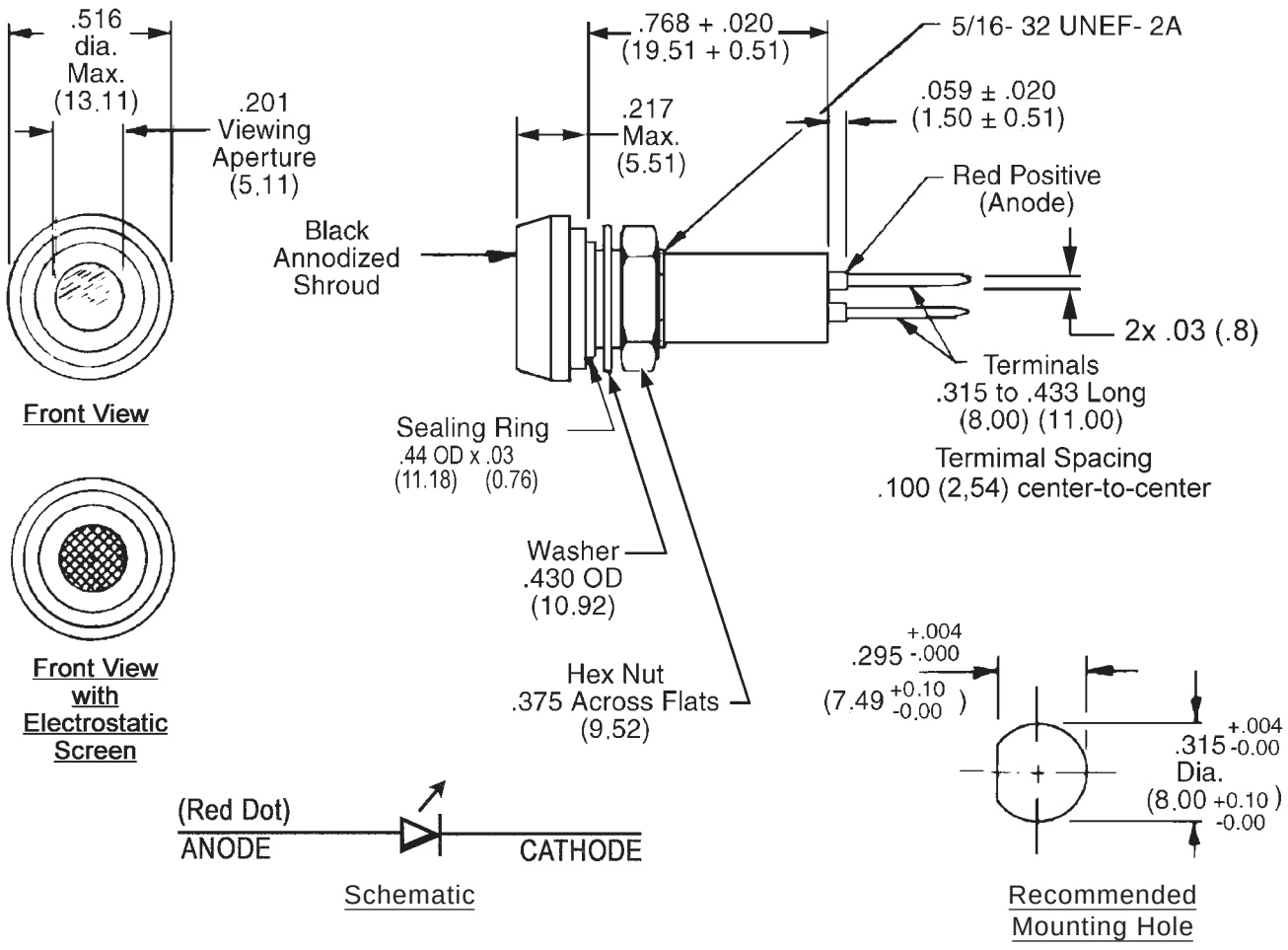
ORDERING INFORMATION

When ordering, show model number first, then LED color, EMI screen, body finish, and the terminal style desired. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with red LED with a screen would be model ML1619-R-1-2-1.

ML1619 - R 1 2 1 ()

Basic Model Number	LED Color	EMI Screen	Body / Finish Color	Terminal Style
ML1619	R Red	0 None	2 Clear Chromate	() Straight Tin Lead
	Y Yellow	1 Screen		2 Loop Terminals
	G Green			



ML1619

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

LED INDICATOR
DIMMABLE INFRARED SECURE

Model MLD1619

This defense article is controlled under the International Traffic in Arms Regulations (ITAR) USML Category XII(e).

Developed for use as a function indicator, this solid-state indicator provides reduced infrared emissions and variable dimming per CECOM statement of work. It is panel mountable with solderable leads and includes hardware. It can also be produced for non-mil applications.

MLD1619

FEATURES

- Designed to meet CECOM secure lighting statement of work
- Dimmable to 0.05 foot-lamberts
- Optional EMI protection screen
- Colors: red, yellow, & green
- Panel mount seal

MECHANICAL SPECIFICATIONS

Case: Aluminum, conductive clear chromate

Cap: Aluminum, black anodized

Mounting: Front panel by 5/16"-32 nut and lockwasher

Seal: Environmentally sealed with front panel PTFE ring seal and internal O-ring seal

Terminal Style: Straight tin/lead

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 50 Gs MIL STD 202, Method 213, Test Condition G

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C			
Color	**Red**	**Yellow**	**Green**
Forward Voltage (VDC) typical @ 20 mA	1.9	2.1	2.2
Peak Forward Current (mA) ①	90	60	90
DC Forward Current (mA) ②	30	20	30
Reverse Voltage (VDC) @ I_R = 100 µA	5	5	5
Power Dissipation (mW)	135	85	135
Luminous Intensity (fL) typical @ I_F = 20 mA DC	2.5	4.0	5.0
Dominant Wave Length (nm) typical	626	585	569
Viewing Angle (2 Ø $^{1/2}$) typical	30°	30°	30°
Operating Temperature (°C)	-55 to +100	-55 to +100	-20 to +100
Storage Temperature (°C)	-55 to +100	-55 to +100	-55 to +100
Lead Soldering Temperature	260°C for 5 seconds		

Notes: ① Typical pulsing values: $t_p \leq 10$ µsec, Duty cycle = 10%
② For red and green, derate linearly from 50°C @ 0.5 mA/°C. For yellow, derate linearly from 50°C @ 0.2 mA/°C

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LED INDICATOR

DIMMABLE INFRARED SECURE

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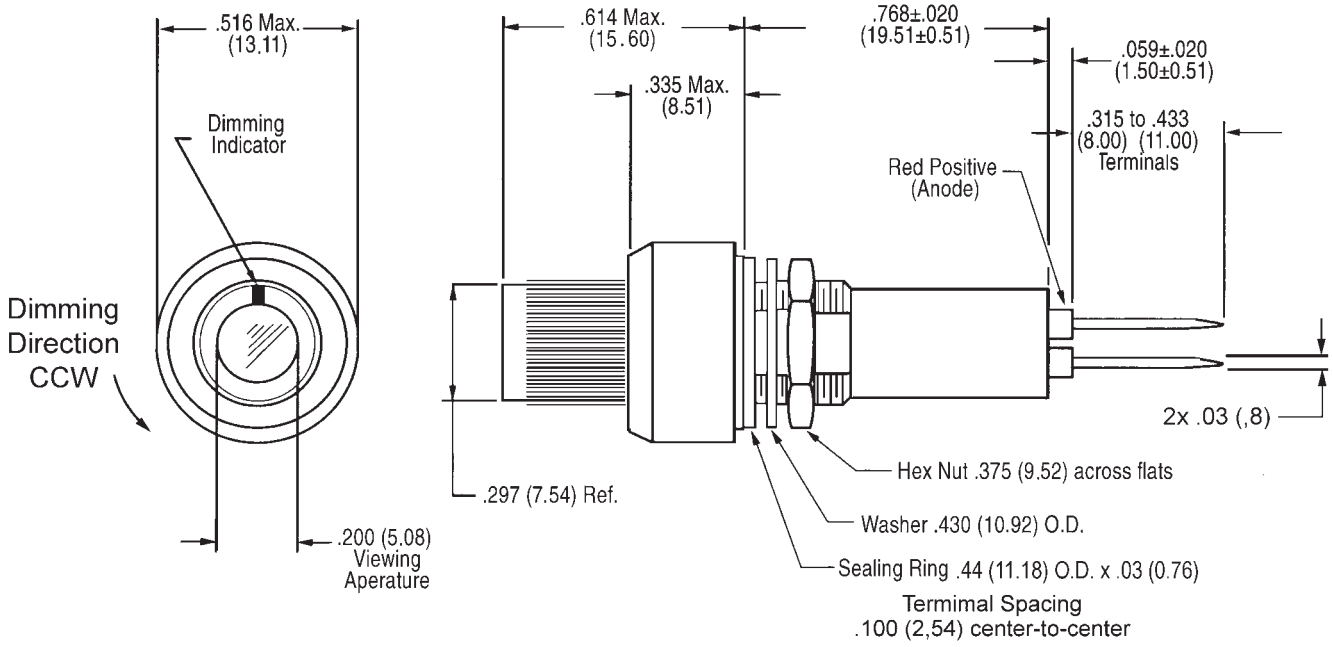
ORDERING INFORMATION

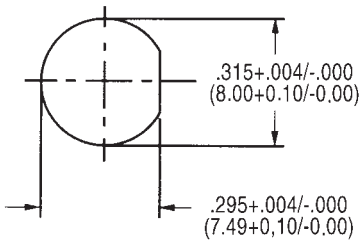
When ordering, show model number first, followed by EMI screen, LED color, lens type, and the terminal style desired. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with an EMI screen, red LED, a non-diffused lens, and straight terminals is MLD1619E-R-ND-ST.

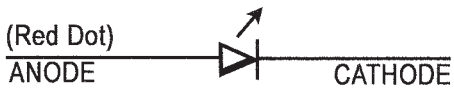
MLD1619E - R - ND - ST

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
MLD1619	( ) None	R Red	ND Non-diffused	ST Straight Leads
	E Screen	Y Yellow	D Diffused	
		G Green		





Recommended
Mounting Hole



Schematic

MLD1619

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

MINIATURE LED INDICATOR
PANEL MOUNT

Models ML1620 & ML1630

Designed for use as function indicators on aircraft, test equipment, machine tools, and wherever severe environmental conditions need to be met, especially vibration and EMI.

ML1620

ML1630E

FEATURES

- Performs in severe environments
- Low power use
- High efficiency
- Rugged construction
- Readily mounted on panel
- Optional EMI screen
- Optional internal resistor

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized front with conductive clear chromate back

Mounting: Front panel by 5/16"-32 nut and lockwasher

Seal: Environmentally sealed. Added front panel O-ring seal for model ML1630.

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS*

Absolute Maximum Ratings @Temp = 25°C				
Color		**Red**	**Yellow**	**Green**
Forward Voltage (VDC) typical @ 20 mA (no resistor)		1.9	2.1	2.2
Peak Forward Current (mA DC) ①		90	60	90
DC Forward Current (mA DC) ② (no resistor)		30	20	30
Reverse Voltage (VDC) @ I_R = 100 µA		5	5	5
Power Dissipation (mW)		135	85	135
Luminous Intensity (mcd) typical @ I_F = 10 mA DC	Non-diffused Diffused	60 12	40 12	50 12
Dominant Wave Length (nm) typical		626	585	569
Viewing Angle (2 Ø $^{1/2}$) typical	Non-diffused Diffused	30° 60°	30° 60°	30° 60°
Operating Temperature (°C)		-55 to +100	-55 to +100	-20 to +100
Storage Temperature (°C)		-55 to +100	-55 to +100	-55 to +100
Lead Soldering Temperature		260°C for 5 seconds		

Notes: ① Typical pulsing values: $t_p \leq 10$ µsec, Duty cycle = 10%
② For red and green, derate linearly from 50°C @ 0.5 mA/°C. For yellow, derate linearly from 50°C @ 0.2 mA/°C

*These characteristics reflect the baseline straight terminal model. Variations may imply a difference in luminous characteristics and/or operability features. Please contact the EDI Sales Department for more information.

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MINIATURE LED INDICATOR
PANEL MOUNT

ORDERING INFORMATION

When ordering, show basic part number first, then EMI screen, LED color, lens type, and voltage desired. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with an O-ring panel seal, an EMI screen, a red LED, a diffused lens, straight leads, and no internal resistor would be ML1630E-R-D-ST.

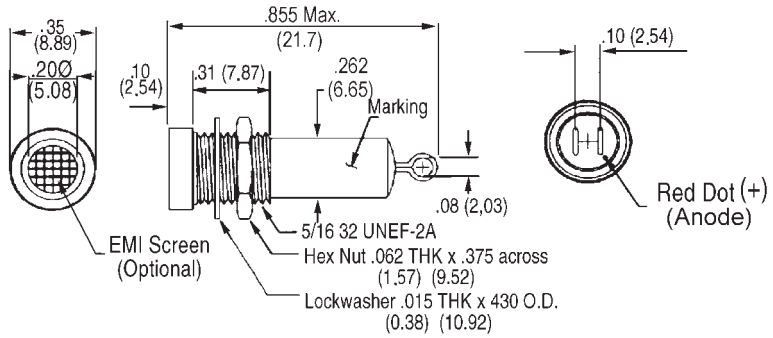
ML1630E - R - D - ST - ( ) - ( )

Standard factory options are designated by "-Sxxx"

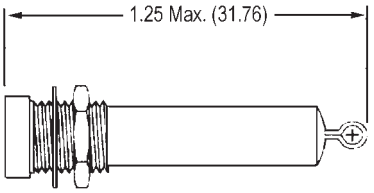
Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style	Internal Resistor
ML1620 (w/o O-ring)	( ) None	R Red	ND Non-diffused	ST Straight Leads	( ) No Resistor
ML1630 (with O-ring)	E Screen	Y Yellow	D Diffused	LT Loop Terminals	5 5V*
		G Green			12 12V*
					14 14V*
					24 24V*
					28 28V*

*Operating temperature for internal resistor option is -40°C to +85°C

Case Length without Internal Resistor

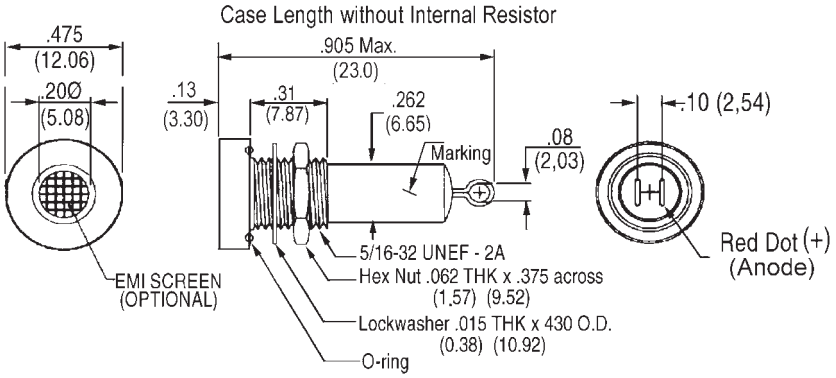


Case Length with Internal Resistor

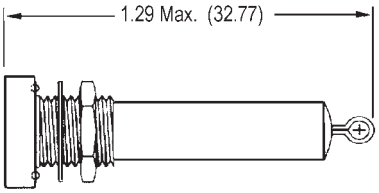


ML1620

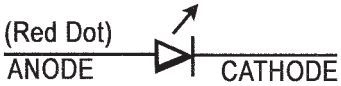
Case Length without Internal Resistor



Case Length with Internal Resistor



Recommended Mounting Hole



Schematic

Schematic with Internal Resistor

ML1630

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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MINIATURE LED INDICATOR
PANEL MOUNT

Models ML1620-S & ML1630-S

Designed for use as function indicators on aircraft, test equipment, machine tools, and wherever severe environmental conditions need to be met, especially vibration and EMI.

ML1620-S

ML1630E-S

FEATURES

- Performs in severe environments
- Low power use
- High efficiency
- High luminosity
- Rugged construction
- Readily mounted on panel
- Optional EMI screen

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized front with conductive clear chromate back

Mounting: Front panel by 5/16"-32 nut and lockwasher

Seal: Environmentally sealed. Added front Panel O-ring seal for model ML1630.

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C				
Color		**Red**	**Yellow**	**Green**
Forward Voltage (VDC) typical @ 20 mA		1.9	2.1	2.2
DC Forward Current (mA DC)		30	30	25
Reverse Voltage (VDC) @ I_R = 100 µA		5	5	5
Power Dissipation (mW) ①		100	105	105
Luminous Intensity (mcd) typical @ I_F = 20 mA DC	Diffused	250	300	40
Dominant Wave Length (nm) typical		640	588	568
Viewing Angle (2 Ø $^{1/2}$) typical	Diffused	60°		
Operating Temperature (°C)		-40 to +85		
Storage Temperature (°C)		-55 to +100		
Lead Soldering Temperature		260°C for 5 seconds		

Notes: ① Power derating: derate linearly from 25°. For Green and Yellow: -1.2mW/°C. For Red: -1.3mW/°C

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ORDERING INFORMATION

When ordering, show basic part number first, then EMI screen, LED color, and lens type. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

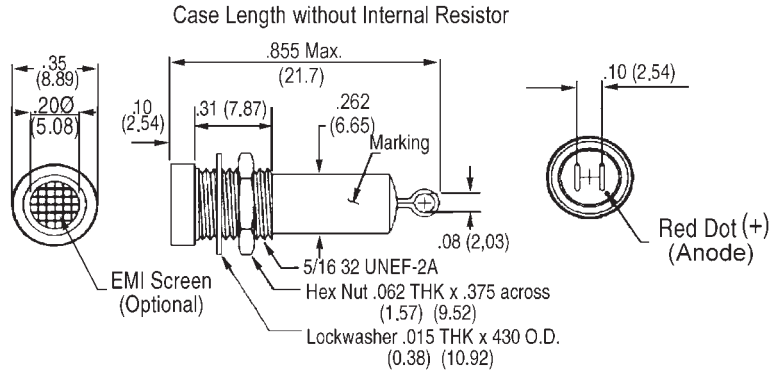
Example: Basic model with an O-ring panel seal, an EMI screen, a red LED, a diffused lens, and straight leads would be ML1630E-SR-D-ST.

ML1630E - SR - D - ST - ( ) - ( )

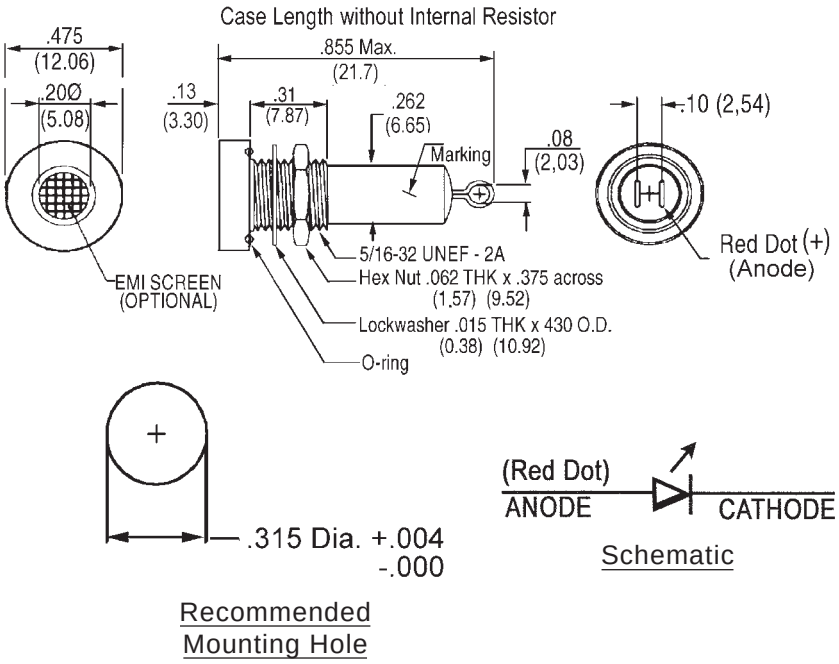
Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style	Internal Resistor
ML1620 (w/o O-ring)	( ) None	SR Red	ND Non-diffused	ST Straight Leads	( ) No Resistor
ML1630 (with O-ring)	E Screen	SY Yellow	D Diffused	LT Loop Terminals	5 5V*
		SG Green			12 12V*
					14 14V*
					24 24V*
					28 28V*

*Operating temperature for internal resistor option is -40°C to +85°C



ML1620-S



ML1630-S

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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LED INDICATOR
BI-COLOR PANEL MOUNT

Models ML1622 & ML1632

Designed for use as function indicators on aircraft, test equipment, machine tools and wherever severe environmental conditions need to be met, especially vibration and EMI.

FEATURES

- Multiple status indication within a single package
- Performs in severe environments
- Low power use
- Rugged construction
- Panel mounted
- Optional EMI screen
- Internal resistor available

ML1622

ML1632E

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized front with clear chromate back

Mounting: Front panel by 5/16"-32 nut and lockwasher

Seal: Environmentally sealed. Added front panel O-ring seal for model ML1632.

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS*

Absolute Maximum Ratings @Temp = 25°C						
Color	**Red / Green**		**Yellow / Green**		**Super Red / Super Green**	
Forward Voltage (VDC) typical @ 20 mA	2.1	2.1	2.1	2.1	1.85	2.2
Peak Forward Current (mA) ①	150	150	150	150	155	140
DC Forward Current (mA)	30	25	30	25	30	25
Power Dissipation (mW) ②	105	105	105	105	75	62.5
Luminous Intensity (mcd) typical @ I_F = 20 mA	30	20	20	20	100	30
Dominant Wave Length (nm) typical	625	568	588	568	640	568
Viewing Angle (2 Ø $^{1/2}$) typical	60°					
Operating Temperature (°C)	-40 to +85					
Storage Temperature (°C)	-55 to +100				-40 to +85	
Lead Soldering Temperature	260°C for 5 seconds					

Notes: ① Typical pulsing values: $t_p \leq 10$ µsec, Duty cycle = 10%
② Derate at 1.6 mW/°C above +25°C Ambient

*These characteristics reflect the baseline model. Variations may imply a difference in luminous characteristics and/or operability features. Please contact the EDI Sales Department for more information.

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LED INDICATOR

BI-COLOR PANEL MOUNT

ORDERING INFORMATION

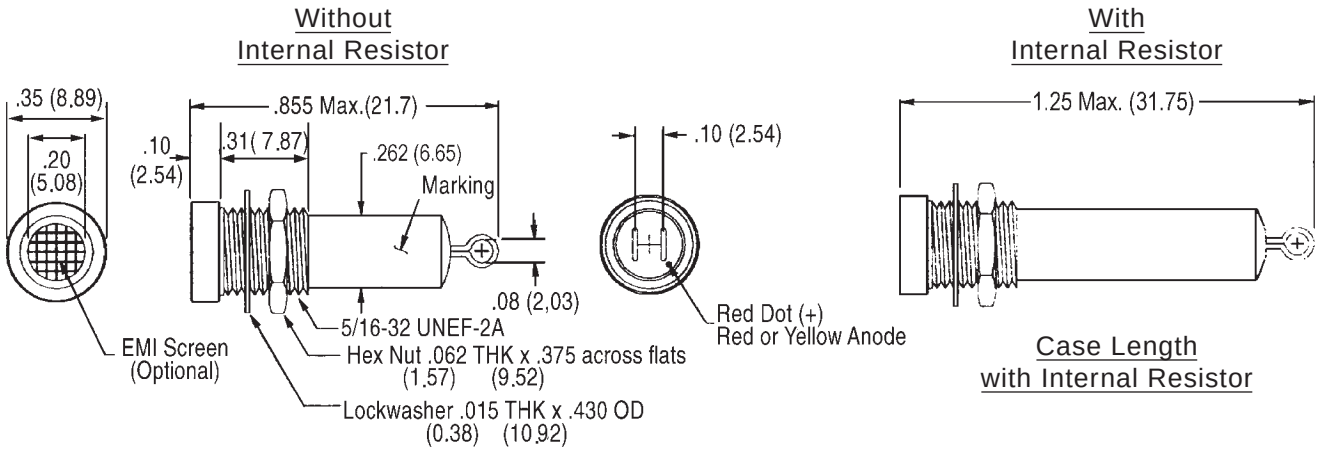
When ordering, show basic part number first, then EMI screen, LED color, lens type, terminal style, and voltage. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with O-ring panel seal, an EMI screen, with a yellow/green LED, a diffused lens, loop terminals, and 24 volt internal resistor would be an ML1632E-Y/G-D-LT-24.

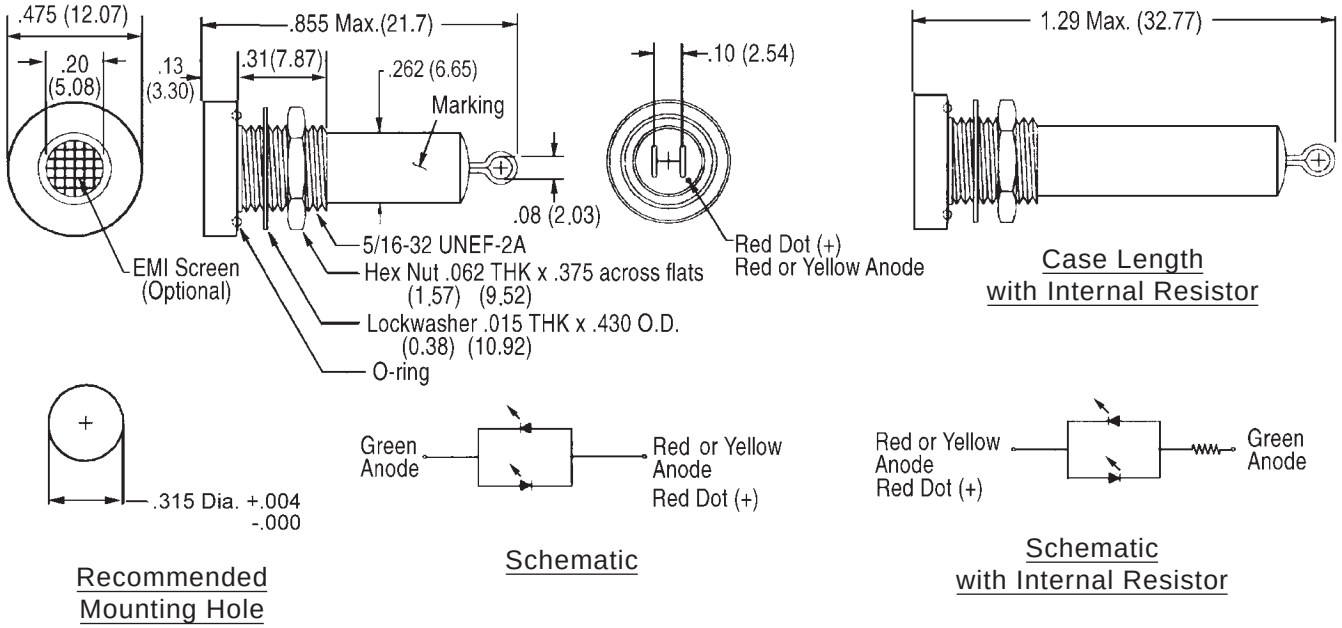
ML1632E - Y/G - D - LT - 24 - ( )

Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style	Internal Resistor
ML1622 (w/o O-ring)	( ) None	R/G Red/Green	D Diffused	ST Straight Leads	( ) No Resistor
ML1632 (with O-ring)	E Screen	Y/G Yellow/Green		LT Loop Terminals	5 5V
					12 12V
					14 14V
					24 24V
					28 28V



ML1622



ML1632
with front panel O-ring

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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Models ML1623-S & ML1633-S

Designed for use as function indicators on aircraft, test equipment, machine tools and wherever severe environmental conditions need to be met, especially vibration and EMI.

ML1623-S

ML1633E-S

FEATURES

- Multiple status indication within a single package
- Performs in severe environments
- Low power use
- Rugged construction
- Panel mounted
- Optional EMI screen

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized front with clear chromate back

Mounting: Front panel by 5/16"-32 nut and lockwasher

Seal: Environmentally sealed. Added front panel O-ring seal for model ML1633.

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C					
Color		**Red / Green**		**Yellow / Green**	
Forward Voltage (VDC) typical @ 20 mA		1.7	2.2	2.1	2.2
Peak Forward Current (mA) ①		150	150	150	150
DC Forward Current (mA)		30	25	30	25
Reverse Voltage (VDC) @ I_R = 100 µA		5	5	5	5
Power Dissipation (mW) ②		100	105	100	105
Luminous Intensity (mcd) typical @ I_F = 20 mA DC	Non-diffused Diffused	500 200	140 60	NA 150	NA 60
Dominant Wave Length (nm) typical		640	568	588	568
Viewing Angle (2 Ø $^{1/2}$) typical	Non-diffused Diffused	30° 60°		30° 60°	
Operating Temperature (°C)		-40 to +85		-40 to +85	
Storage Temperature (°C)		-55 to +100		-55 to +100	
Lead Soldering Temperature		260°C for 5 seconds			

Notes: ① Typical pulsing values: $t_p \leq 10$ µsec, Duty cycle = 10%
② Derate at 1.6 mW/°C above +25°C Ambient

*These characteristics reflect the baseline model. Variations may imply a difference in luminous characteristics and/or operability features. Please contact the EDI Sales Department for more information.

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LED INDICATOR

THREE LEAD BI-COLOR PANEL MOUNT

ORDERING INFORMATION

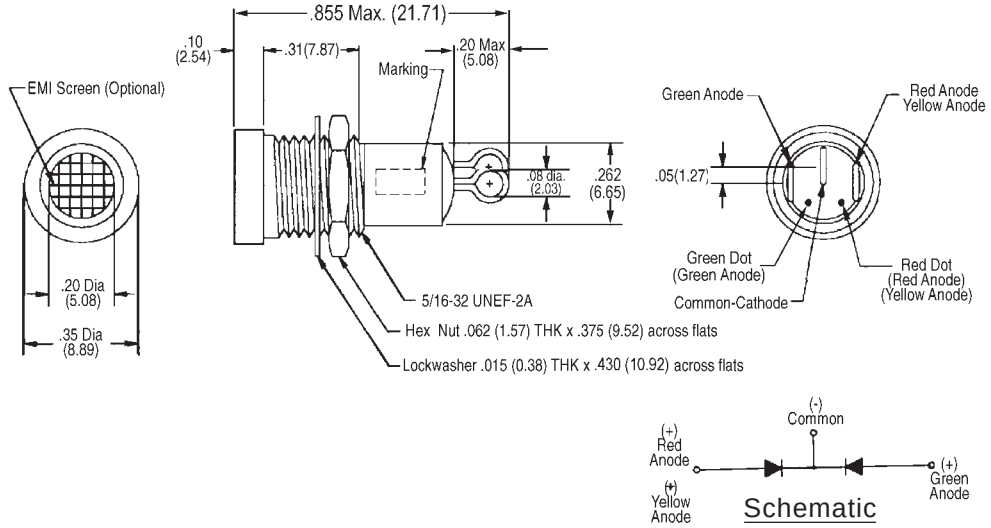
When ordering, show model number first, followed by EMI screen, then LED color, lens type, and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model without an O-ring panel seal, with an EMI screen, a yellow/green LED, a diffused lens, and loop terminals would be an ML1623E-SY/SG-D-LT.

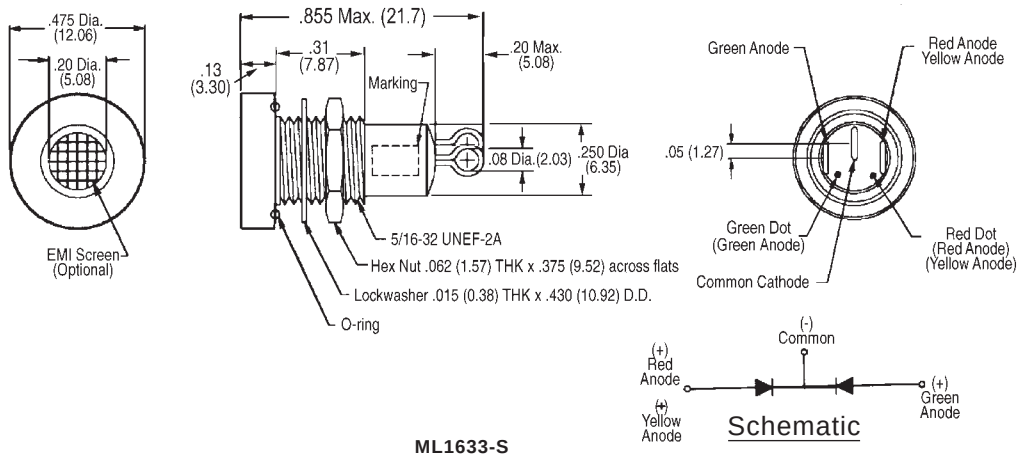
ML1623E - SY/SG - D - LT - ( )

Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
ML1623 (w/o O-ring)	( ) None	SR/SG Red/Green	ND Non-diffused	ST Straight Leads
ML1633 (with O-ring)	E Screen	SY/SG Yellow/Green	D Diffused	LT Loop Terminals



ML1623-S



ML1633-S
with front panel O-ring

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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Model ML1631

Developed for use as a status indicator, the ML1631 was designed to survive in the most severe environments. The small size and rugged package make it ideal for applications where status indication is critical to the operation of your equipment. The environmentally sealed case includes an O-ring panel seal that insures the integrity of your system. The ML1631 comes complete with fluorosilicone O-ring and mounting hardware.

ML1631E

FEATURES

- Multiple status indication within a single package
- Ideal for rugged environments
- Environmentally sealed
- Panel-mount seal
- Colors: red, green and blue
- Compact case design
- EMI screen
- Decorative bezel
- Wide viewing angle

MECHANICAL SPECIFICATIONS

Case: Aluminum Clear chromate
Mounting: Rear-mount by 5/16"-32 nut and lockwasher
O-Ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C			
Color	**Red**	**Green**	**Blue**
Forward Voltage (VDC) typical @ 20 mA	1.9	3.3	3.3
DC Forward Current (mA) ①	30	25	30
Reverse Voltage (VDC) @ I_R = 100 µA	5	5	5
Power Dissipation (mW)	75	102	120
Luminous Intensity (mcd) typical @ I_F = 20 mA	60	125	85
Dominant Wave Length (nm) typical	630	525	465
Viewing Angle	130°		
Operating Temperature (°C)	-40 to +85		
Storage Temperature (°C)	-55 to +100		
Lead Soldering Temperature	260°C for 5 seconds		

Notes: ① Derate linearly from 25°C @ -0.4 mA/°C.

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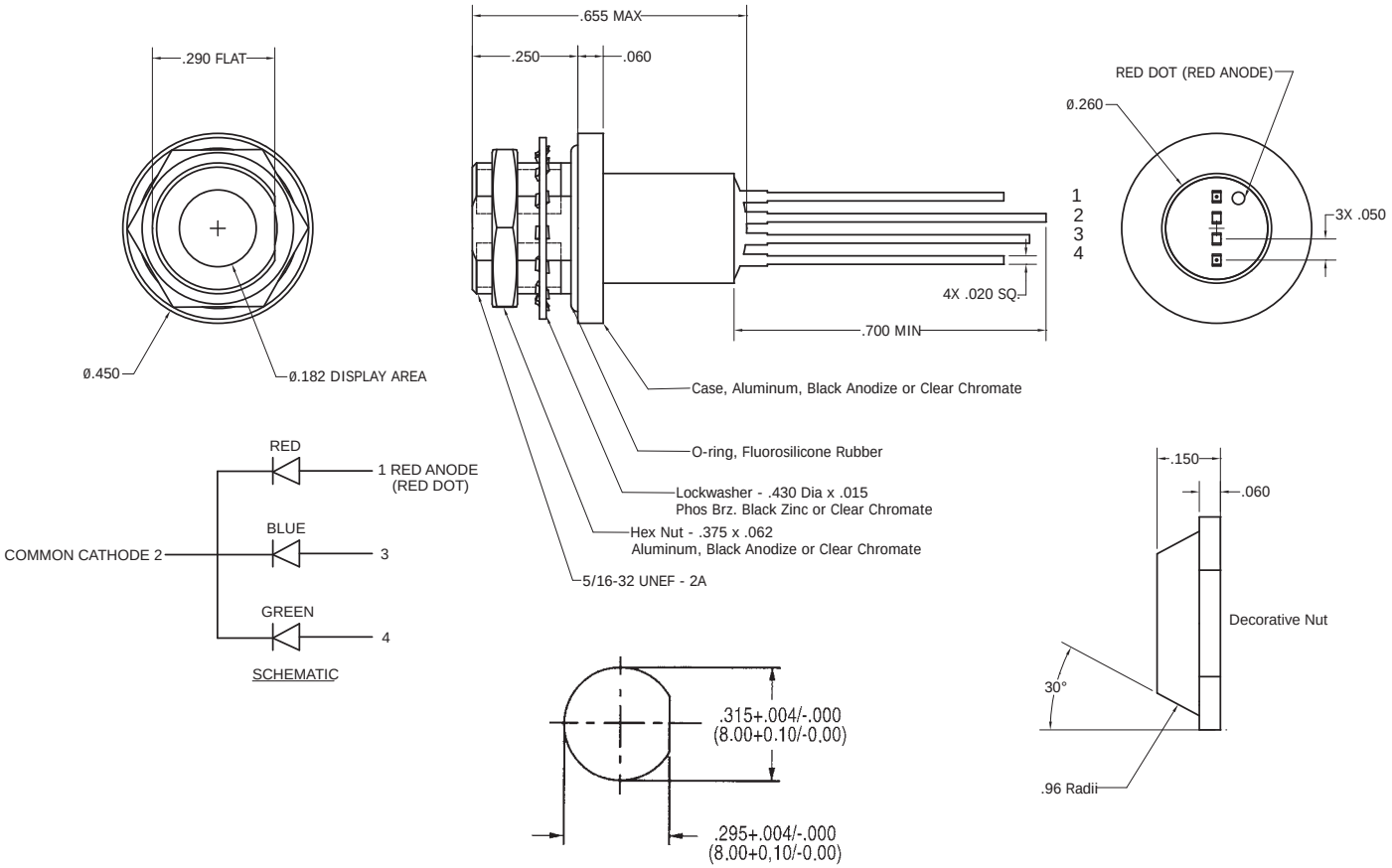
ORDERING INFORMATION

When ordering, show model number first, followed by EMI screen, then LED colors, lens style, and terminal style. If this part requires customization, a special factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with an EMI screen, with a red/green/blue LED, a diffused lens, and straight leads would be ML1631E-RGB-D-ST.

ML1631E - RGB - D - ST

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
ML1631	E Screen	RGB Red, Green, Blue	D Diffused	ST Straight Leads



ML1631

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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LED INDICATOR
BI-COLOR REAR-MOUNT

Model ML1634

Designed for use as function indicators on aircraft, test equipment, machine tools and wherever severe environmental conditions need to be met, especially vibration and EMI.

FEATURES

- Multiple status indication within a single package
- Performs in severe environments
- Colors: red/green, yellow/green
- Rugged construction
- Panel mounted
- Optional EMI screen
- Decorative bezel

MECHANICAL SPECIFICATIONS

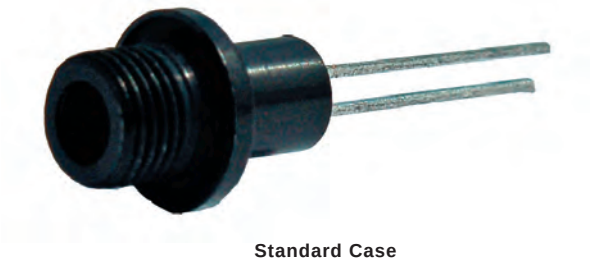
Case: Aluminum, black anodized, standard. Clear chromate case with EMI screen option.

Mounting: Rear-mount by 5/16"-32 nut and lockwasher

Seal: Environmentally sealed. Added front panel fluorosilicone O-ring.

Panel Thickness: 0.118" max.

ML1634



Standard Case

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C						
Color	**Red / Green**		**Yellow / Green**		**Super Red / Super Green**	
Forward Voltage (VDC) typical @ 20 mA	1.9	2.2	2.1	2.2	1.85	2.2
DC Forward Current (mA)	30	25	30	25	30	25
Power Dissipation (mW) ①	105	105	105	105	75	62.5
Luminous Intensity (mcd) typical @ I_F = 20 mA DC	30	20	20	20	100	30
Dominant Wave Length (nm) typical	640	568	588	568	640	568
Viewing Angle (2 Ø $^{1/2}$) typical	60°					
Operating Temperature (°C)	-40 to +85					
Storage Temperature (°C)	-55 to +100				-40 to +85	
Lead Soldering Temperature	260°C for 5 seconds					
Notes: ① Derate linearly from 25°C at -1.2 mW/°C						

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ORDERING INFORMATION

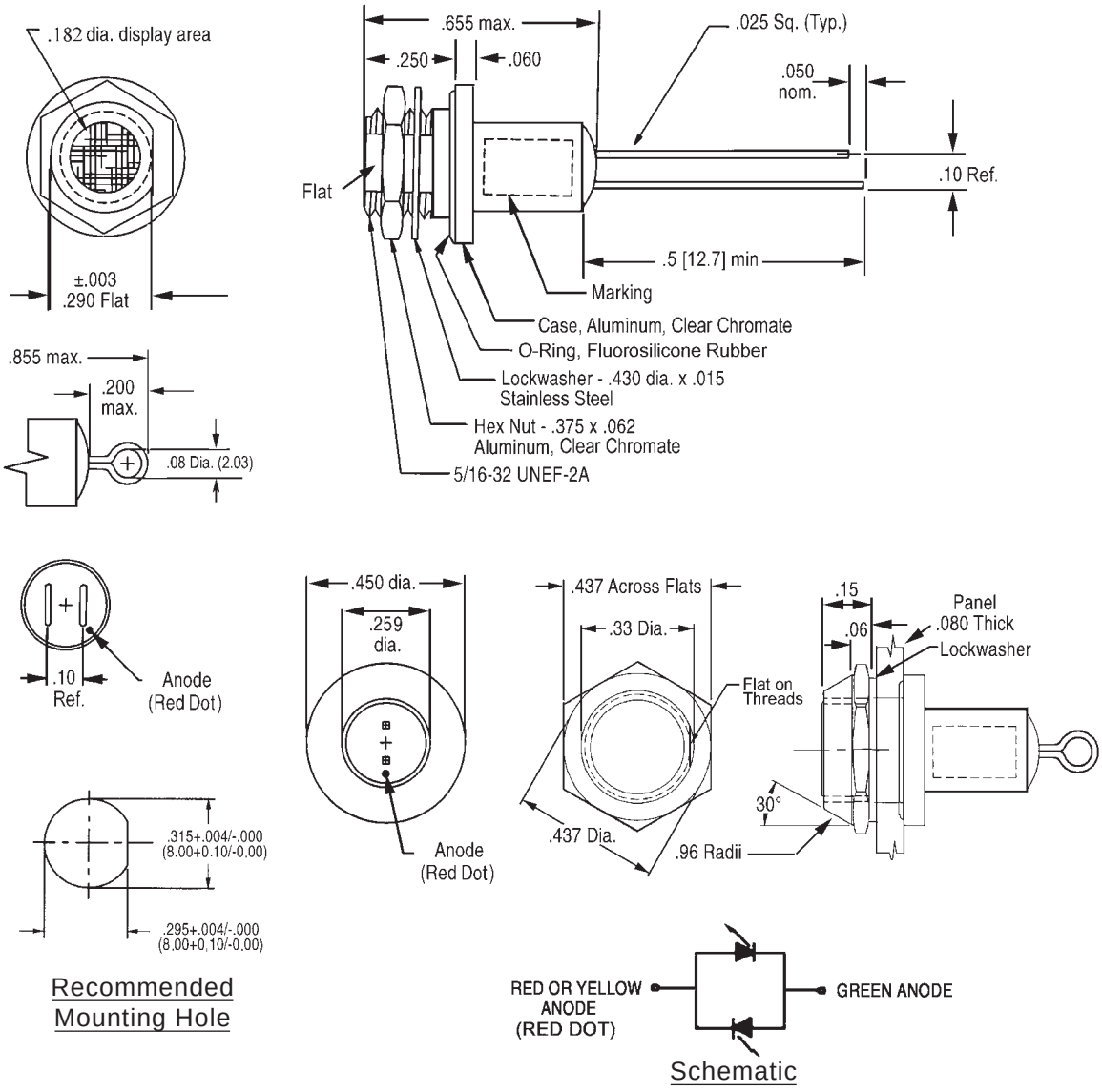
When ordering, show basic part number first, then EMI screen, LED color, lens type, and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with an EMI screen, with a red/green LED, a diffused lens, and straight terminals would be an ML1634E-R/G-D-ST.

ML1634E - R/G - D - ST - ( )

Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
ML1634	( ) None	R/G Red/Green	D Diffused	ST Straight Leads
	E Screen	Y/G Yellow/Green		LT Loop Terminals
		SR/SG Red/Green		



ML1634

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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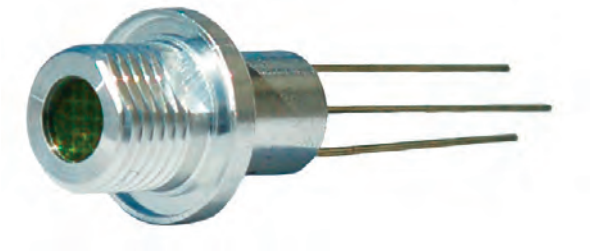
LED INDICATOR
THREE LEAD BI-COLOR REAR-MOUNT

Model ML1635

Developed for use as a status indicator, the ML1635 was designed to survive in the most severe environments. The small size and rugged package make it ideal for applications where status indication is critical to the operation of your equipment. The environmentally sealed case includes an O-ring panel seal that insures the integrity of your system. Comes complete with Fluorosilicone O-ring and mounting hardware.

ML1635E



Case with EMI Screen

FEATURES

- Multiple status indication within a single package
- Environmentally sealed
- Panel mount seal
- Colors: red/green & yellow/green
- Compact case design
- EMI screen option
- Decorative bezel

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized, standard. Clear chromate case with EMI screen option.

Mounting: Rear-mount by 5/16"-32 nut and lockwasher

O-ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C					
Color		**Red / Green**		**Yellow / Green**	
Forward Voltage (VDC) typical @ 20 mA		2.0	2.1	2.0	2.1
DC Forward Current (mA)		30	25	30	25
Reverse Voltage (VDC) @ I_R = 100 µA		5	5	5	5
Power Dissipation (mW) ①		100	105	105	105
Luminous Intensity (mcd) typical @ I_F = 20 mA DC	Diffused	200	60	150	60
Dominant Wave Length (nm) typical		630	570	588	570
Viewing Angle	Diffused	60°			
Operating Temperature (°C)		-40 to +85			
Storage Temperature (°C)		-40 to +85			
Lead Soldering Temperature		260°C for 5 seconds			

Notes: ① Derate linearly from 25°C at -1.2 mW/°C

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LED INDICATOR

THREE LEAD BI-COLOR REAR-MOUNT

ORDERING INFORMATION

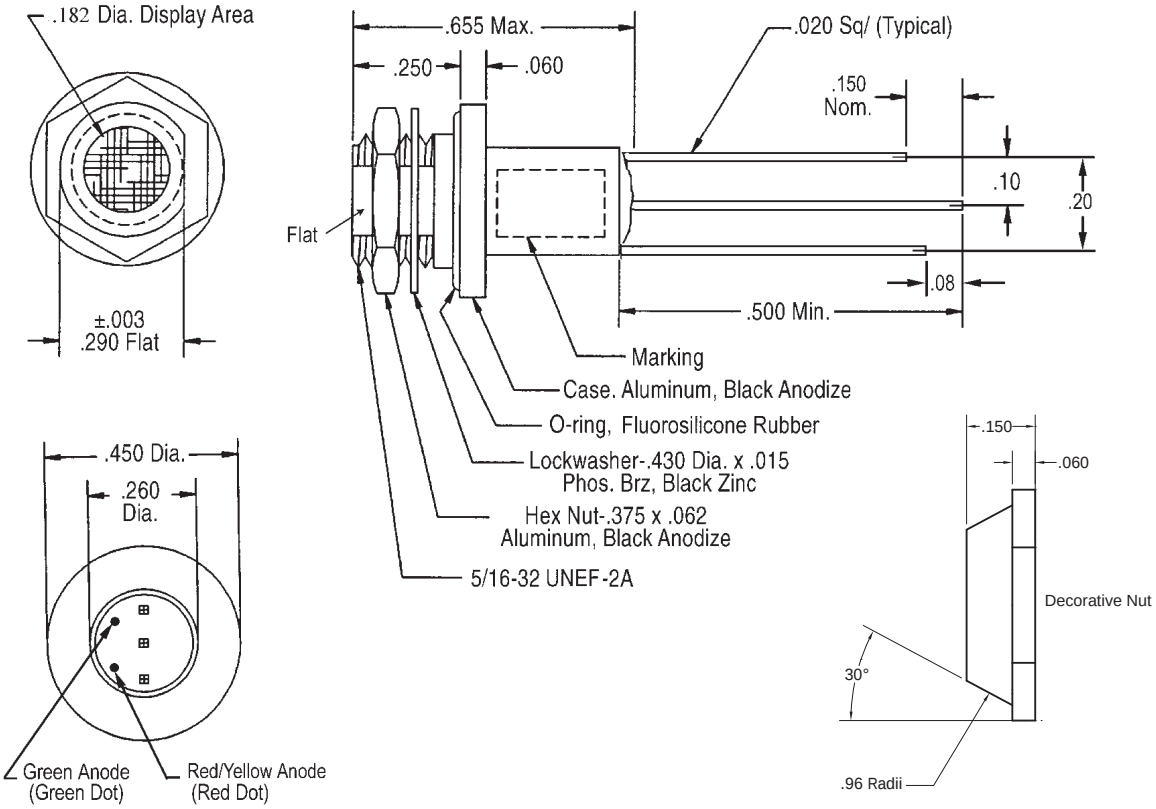
When ordering, show model number first, followed by EMI screen, then LED color, lens style, and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

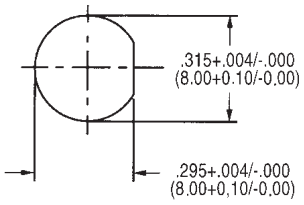
Example: Basic model with an EMI screen, with a yellow/green LED, a diffused lens, and straight leads would be ML1635E-SY/SG-D-ST.

ML1635E - SY/SG - D - ST - ( )

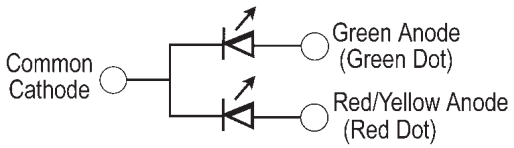
Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
ML1635	( ) None	SR/SG Red/Green	D Diffused	ST Straight Leads
	E Screen	SY/SG Yellow/Green		





Recommended Mounting Hole



Schematic

ML1635

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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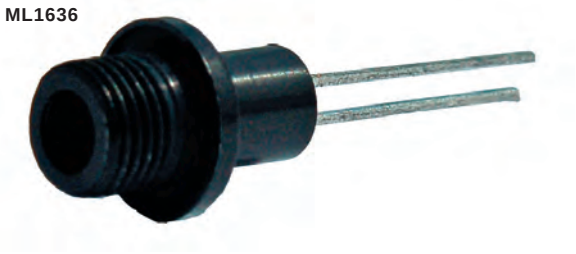
Model ML1636

Developed for use as a status indicator, the ML1636 was designed to survive in the most severe environments. The small size and rugged package make it ideal for applications where status indication is critical to the operation of your equipment. The environmentally sealed case includes an O-ring panel seal that insures the integrity of your system. Comes complete with fluorosilicone O-ring and mounting hardware.

ML1636



Standard Case

FEATURES

- Ideal for rugged environments
- Environmentally sealed
- Panel mount seal
- Colors: yellow, green & red
- Compact case design
- EMI screen option
- Decorative bezel

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized, standard. Clear chromate case with EMI screen option.

Mounting: Rear-mount by 5/16"-32 nut and lockwasher

O-ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C				
Color		**Red**	**Yellow**	**Green**
Forward Voltage (VDC) typical @ 10 mA		1.9	2.0	2.1
Peak Forward Current (mA) ①		90	60	90
DC Forward Current (mA) ②		30	30	25
Reverse Voltage (VDC) @ I_R = 100 µA		5	5	5
Power Dissipation (mW)		135	85	135
Luminous Intensity (mcd) typical @ I_F = 10 mA	Non-diffused Diffused	60 12	50 12	70 12
Dominant Wave Length (nm) typical		626	585	569
Viewing Angle	Non-diffused Diffused	35° 60°	35° 60°	24° 60°
Operating Temperature (°C)		-55 to +100	-55 to +100	-20 to +100
Storage Temperature (°C)		-55 to +100	-55 to +100	-50 to +100
Lead Soldering Temperature		260°C for 5 seconds		

Notes: ① Typical pulsing values: $t_p \leq 10$ µsec, Duty cycle = 10%
② For red and green, derate linearly from 50°C @ 0.5 mA/°C. For yellow, derate linearly from 50°C @ 0.2 mA/°C

*These characteristics reflect the baseline model. Variations may imply a difference in luminous characteristics and/or operability features. Please contact the EDI Sales Department for more information.

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ORDERING INFORMATION

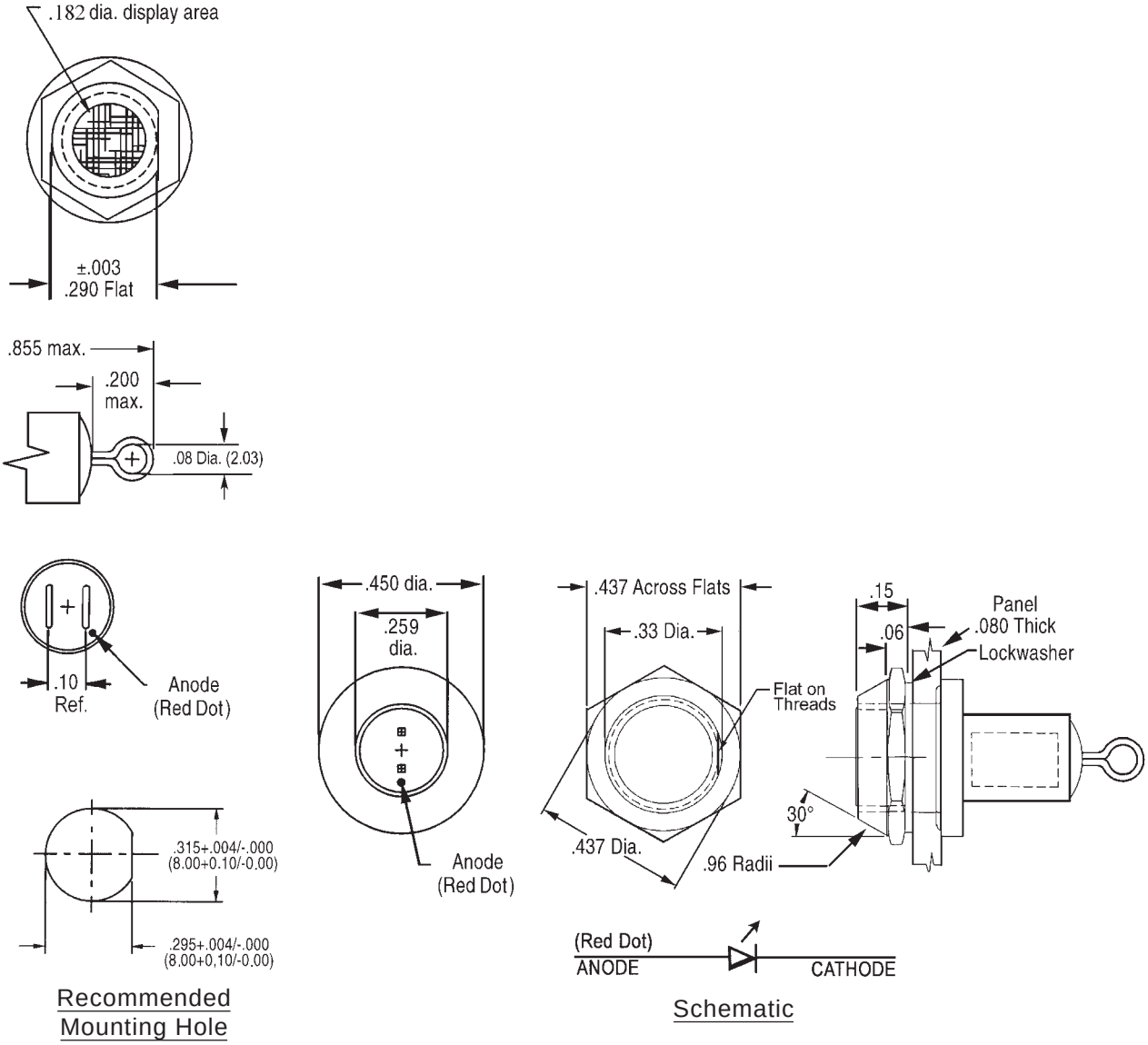
When ordering, show model number first, followed by EMI screen, then LED color, lens style and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with an EMI screen, with a yellow LED, diffused lens, and straight leads would be ML1636E-Y-D-ST.

ML1636E - Y - D - ST - ( )

Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style	Internal Resistor
ML1636	( ) None	R Red	ND Non-diffused	ST Straight Leads	() - None
	E Screen	Y Yellow	D Diffused	LT Loop Terminals	5 - 5V
		G Green			



ML1636

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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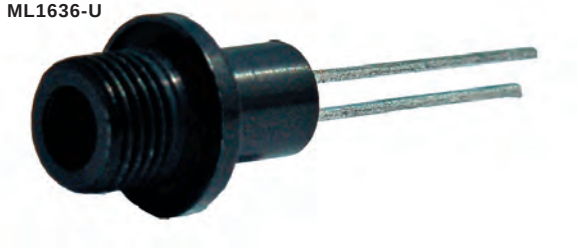
Model ML1636-U

Developed for use as a status indicator, the ML1636-U series was designed to survive in the most severe environments. The small size and rugged package make it ideal for applications where status indication is critical to the operation of your equipment. The environmentally sealed case includes an O-ring panel seal that insures the integrity of your system. Comes complete with fluorosilicone O-ring and mounting hardware.

ML1636-U



FEATURES

- Ideal for rugged environments
- Environmentally sealed
- Panel mount seal
- Compact case design
- Colors: green, red, amber, orange and red-orange
- EMI screen option
- Decorative bezel

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized, standard. Clear chromate case with EMI screen option.

Mounting: Rear-mount by 5/16"-32 nut and lockwasher

O-ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C					
Color	**Red-Orange**	**Orange**	**Amber**	**Green**	**Red**
Forward Voltage (VDC) typical @ 20 mA	1.9	2.0	2.0	3.2	1.9
DC Forward Current (mA) ①	50	50	50	30	50
Reverse Voltage (VDC) @ I_R = 100 µA	5	5	5	5	5
Junction Temperature	130°C	130°C	130°C	130°C	130°C
Luminous Intensity (mcd) typical @ I_F = 20 mA Non-diffused	600	600	600	1000	600
Dominant Wave Length (nm) typical @ I_F = 20 mA	615	605	590	526	626
Viewing Angle (2 Ø $^{1/2}$) typical	30°	30°	30°	30°	30°
Operating Temperature (°C)	-40 to +100	-40 to +100	-40 to +100	-40 to +80	-40 to +100
Storage Temperature (°C)	-40 to +100	-40 to +100	-40 to +100	-40 to +100	-40 to +100
Lead Soldering Temperature	260°C for 5 seconds				

Notes: ① Derate linearly from 50°; green @ 0.6 mA/°C; all other colors @ 0.7 mA/°C

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ORDERING INFORMATION

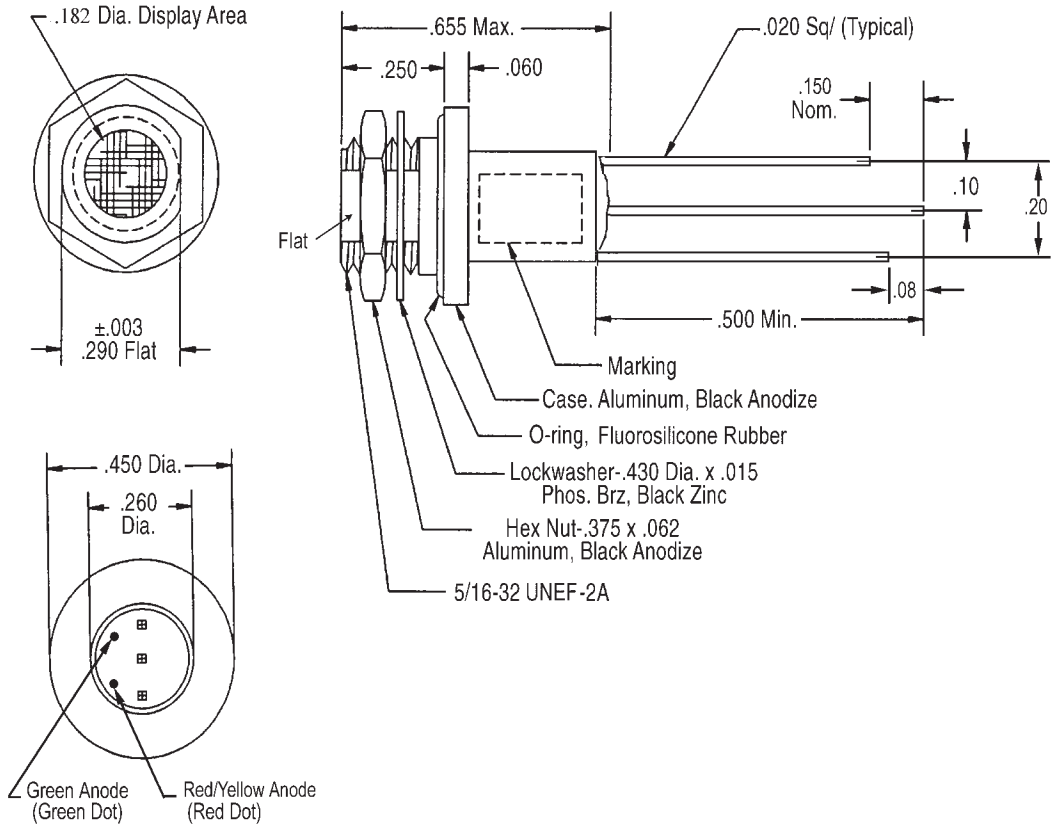
When ordering, show model number first, followed by EMI screen, then LED color, lens style and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with an EMI screen, with a red LED a non- diffused lens, and loop terminals would be ML1636E-UR-ND-LT.

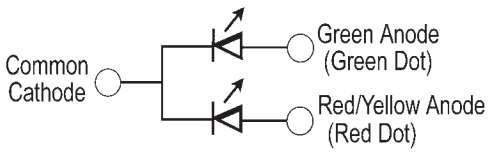
ML1636E - UR - ND - LT - ( )

Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
ML1636	( ) None	UR Red	ND Non-diffused	WL Wire Leads
	E Screen	UG Green		LT Loop Terminals
		UA Amber		ST Straight Terminals
		UO Orange		
		UP Red-Orange		



Recommended Mounting Hole



Schematic

ML1636-U

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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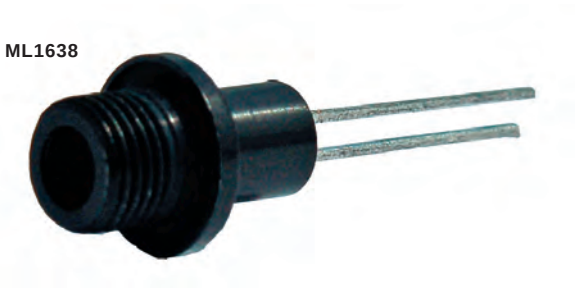
Model ML1638

The ML1638 status indicator was designed to meet the requirements of MIL-L-85762A and MIL-STD-3009. This solid-state LED indicator has an infrared blocking lens that is compatible with NVIS environments. It is a rear-mount indicator and comes complete with O-ring and mounting hardware.



Standard Case

FEATURES

- Designed to meet MIL-L-85762A and MIL-STD-3009 lighting, aircraft, interior night vision imaging system (NVIS) compatible
- Environmentally sealed
- Panel mount seal
- Colors: red, yellow & green
- Compact case design
- Decorative bezel
- Optional EMI screen

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized, standard. Clear chromate case with EMI screen option.

Mounting: Rear-mount by 5/16"-32 nut and lockwasher

O-ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C				
Color		**NVIS Red**	**NVIS Yellow**	**NVIS Green B**
Forward Voltage (VDC) typical @ 20 mA		2.0	2.0	2.1
DC Forward Current (mA) ①		50	20	50
Reverse Voltage @ I_R = 100 µA		4	5	4
Power Dissipation (mW) typical		120	85	120
Luminous Intensity (mcd) typical @ I_F = 20 mA	Non-diffused Diffused	200 100	3.0 1.8	20 10
Chromaticity per MIL-L-85762A & MIL-STD-3009		NVIS Red	NVIS Yellow	NVIS Green B
Dominant Wave Length (nm) typical		605	585	558
NVIS Radiance per MIL-L-85762A & MIL-STD-3009		NR_B 1.4 x 10^{-7} @15 fL	NR_A 1.5 x 10^{-7} @15 fL NR_B 1.4 x 10^{-7} @15 fL	NR_A 1.7 x 10^{-10} @0.1 fL NR_B 1.7 x 10^{-10} @0.1 fL
Viewing Angle (2 Ø $^{1/2}$) typical	Non-diffused Diffused	30° x 50° 50°	32° 50°	32° 50°
Operating Temperature (°C)		-40 to +100	-55 to +100	-40 to +100
Storage Temperature (°C)		-55 to +100	-55 to +100	-55 to +100

Notes: ① DC Forward Current Derating. Yellow indicators, derate linearly from 50°C at 0.2 mA per °C. Green & Red indicators, derate linearly from 50°C at 0.5 mA per °C

*These characteristics reflect the baseline model. Variations may imply a difference in luminous characteristics and/or operability features. Please contact the EDI Sales Department for more information.

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ORDERING INFORMATION

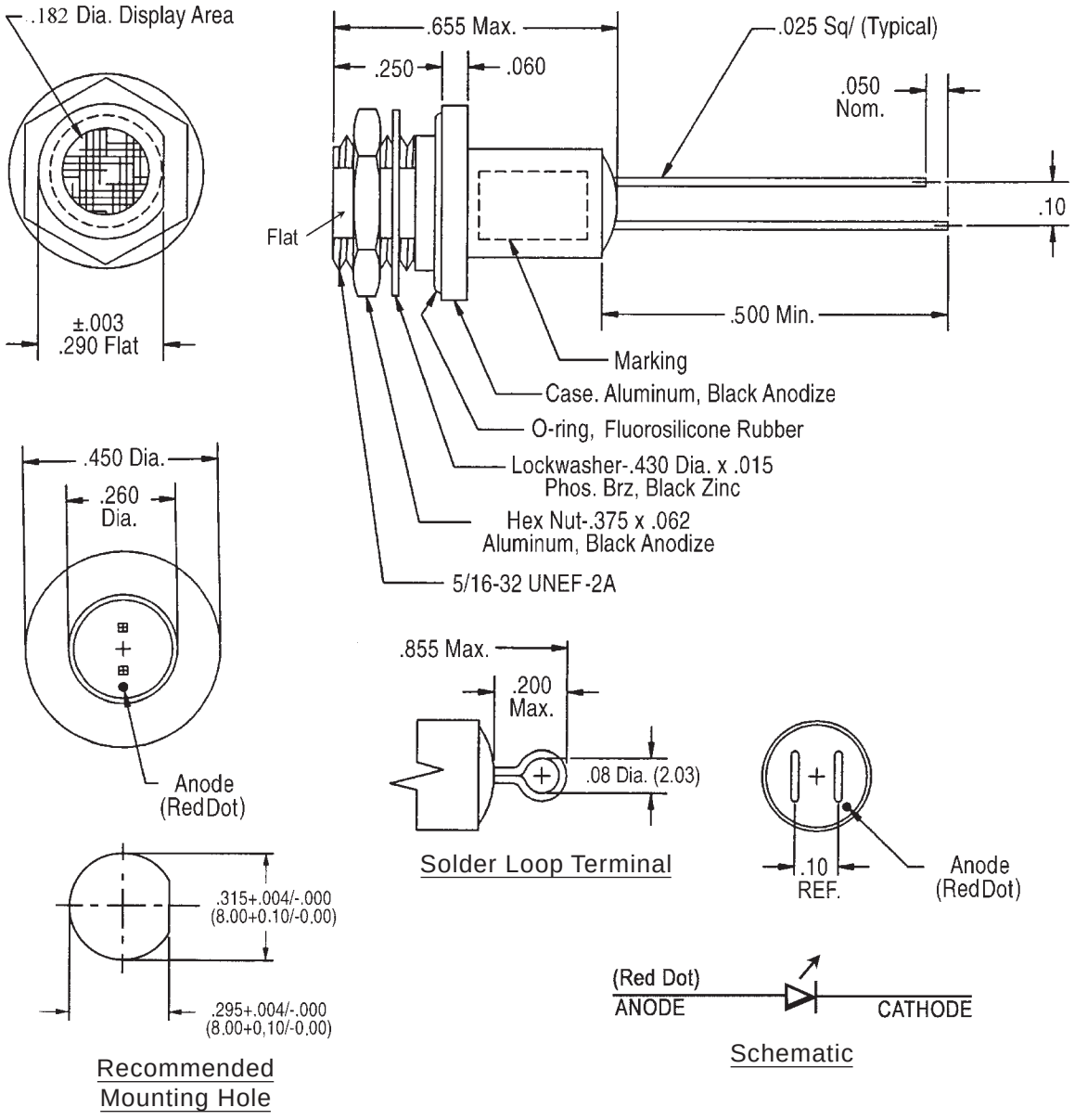
When ordering, show model number first, followed by EMI screen, then LED color, lens type, and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model, with an EMI screen, NVIS yellow LED, diffused lens, and straight leads would be ML1638E-Y-D-ST.

ML1638E - Y - D - ST - ( )

Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
ML1638	( ) None	R Red	ND Non-diffused	ST Straight Leads
	E Screen	Y Yellow	D Diffused	LT Loop Terminals
		G Green		



ML1638

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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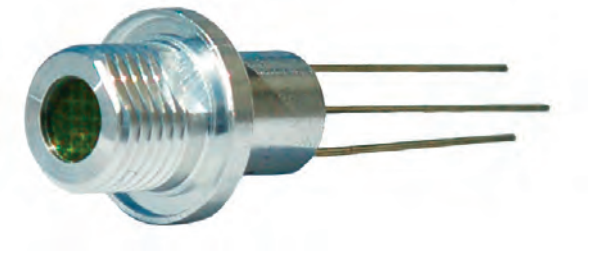
Model ML1638 Bi-Color 3-Leaded

The ML1638 Bi-Color status indicator was designed to meet the requirements of MIL-L-85762A and MIL-STD-3009. This solid-state LED indicator has an infrared blocking lens that is compatible with NVIS environments. It is a rear-mount indicator and comes complete with O-ring and mounting hardware.

ML1638E Bi-Color



Case with EMI Screen

FEATURES

- Designed to meet MIL-L-85762A and MIL-STD-3009 lighting, aircraft, interior night vision imaging system (NVIS) compatible
- Environmentally sealed
- Panel mount seal
- Colors: red/green
- Compact case design
- Decorative bezel
- Optional EMI screen

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized, standard. Clear chromate case with EMI screen option.

Mounting: Rear-mount by 5/16"-32 nut and lockwasher

O-ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C			
Color		**NVIS Red**	**NVIS Green B**
Forward Voltage (VDC) typical @ 20 mA		2.0	2.2
DC Forward Current (mA)		30	25
Reverse Voltage @ I_R = 100 µA		5	5
Power Dissipation (mW) typical ①		120	120
Luminous Intensity (mcd) typical @ I_F = 20 mA	Diffused	12	1
Chromaticity per MIL-L-85762A & MIL-STD-3009		NVIS Red	NVIS Green B
Dominant Wave Length (nm) typical		600	558
NVIS Radiance per MIL-L-85762A & MIL-STD-3009		NR_B 1.4 x 10^{-7} @15 fL	NR_A 1.7 x 10^{-10} @0.1 fL NR_B 1.7 x 10^{-10} @0.1 fL
Viewing Angle (2 Ø $^{1/2}$) typical	Diffused	60°	
Operating Temperature (°C)		-40 to +85	
Storage Temperature (°C)		-55 to +100	

Notes: ① Derate linearly from 25°C at ~1.2 mW per °C

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ORDERING INFORMATION

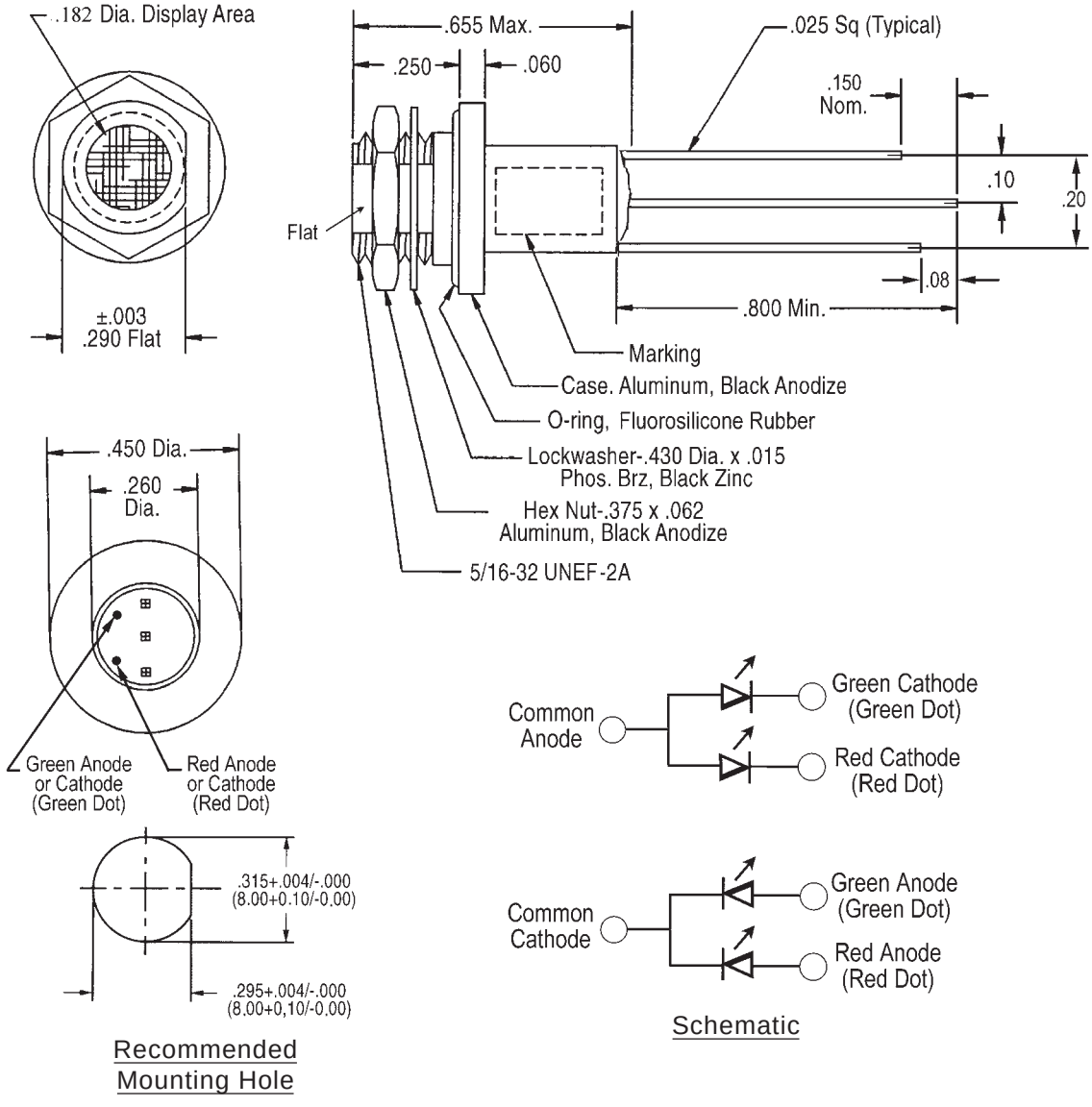
When ordering, show model number first, followed by EMI screen, LED color, common type, lens type, and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with EMI screen, NVIS Red/Green Bi-Color LED, Anode Common, diffused lens, and straight leads would be ML1638E-R/G-CA-D-ST.

ML1638E - R/G - CA - D - ST - ( )

Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Common Lead	Lens Type	Terminal Style
ML1638	( ) None	R/G Red/Green	CA Anode	D Diffused	ST Straight Leads
	E Screen		CC Cathode		LT Loop Terminals



ML1638 Bi-Color

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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ML1640 Series

Developed for use as a function indicator, this solid-state lamp with plain or filtered type lens, designed for sunlight viewing, is designed to meet the requirements of DESC drawing 85122. It is panel mountable with solderable leads and includes hardware. Available with anti-reflection lens coating.

ML1640

FEATURES

- Design meets DESC drawing 85122
- Optional EMI protection screen
- Environmentally sealed
- Colors: red, yellow & green
- Panel mount

MECHANICAL SPECIFICATIONS

Bezel: Aluminum, black anodized
Case: Aluminum, clear chromate
Mounting: Front panel by 5/16"-32 nut and lockwasher
Seal: Environmentally sealed with front panel PTFE ring seal

ENVIRONMENTAL SPECIFICATIONS

Units meet 100% screening in compliance with DESC 85122 and MIL-STD-750.

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C			
Color	**Red**	**Yellow**	**Green**
Forward Voltage (VDC) Typical I_F @ 20 mA	1.9	2.1	2.2
Peak Forward Current (mA)	90	60	90
DC Forward Current (mA)	30	20	30
Reverse Voltage (VDC) @ I_R = 100 µA	5	5	5
Power Dissipation (mW)	135 ①	85 ②	135 ①
Luminous Intensity (mcd) typical	See chart	See chart	See chart
Dominant Wave Length (nm) typical	626	585	569
Operating Temperature (°C)	-55 to +100	-55 to +100	-20 to +100
Storage Temperature (°C)	-55 to +100	-55 to +100	-55 to +100
Lead Soldering Temperature	260°C for 5 seconds		

Notes: ① Derate at 1.8 mW/°C above +25°C Ambient
② Derate at 1.6 mW/°C above +50°C Ambient

Electrodyamics Model No. ③	DESC 85122 Dash No. ④	Type of Lens	Anti-reflect. Coating	EMI Screen	Outline Figure
ML1641-X011	R01, Y01, G01	Plano Convex	No	No	1
ML1644-X011	R02, Y02, G02	Plano Convex	No	No	2
ML1644-X111	R11, Y11, G11	Plano Convex	No	Yes	2a
ML1642-X011	R03, Y03, G03	Flat 30° View. Angle	No	No	3
ML1645-X011	R05, Y05, G05	Flat 30° View. Angle	No	No	4
ML1645-X021	R07, Y07, G07	Flat 30° View. Angle	Yes	No	4
ML1645-X121	R09, Y09, G09	Flat 30° View. Angle	Yes	Yes	4a
ML1643-X011	R04, Y04, G04	Flat 100° View. Angle	No	No	3
ML1646-X011	R06, Y06, G06	Flat 100° View. Angle	No	No	4
ML1646-X021	R08, Y08, G08	Flat 100° View. Angle	Yes	No	4
ML1646-X121	R10, Y10, G10	Flat 100° View. Angle	Yes	Yes	4a

DESC 85122 Dash No. ④	Min. Luminous Intensity @ Forward Current
R01, R02, R11	15 mcd @ 10 mA
Y01, Y02, Y11	12 mcd @ 10 mA
G01, G02, G11	12 mcd @ 20 mA
R03, R05, R07, R09	10 mcd @ 20 mA
Y03, Y05, Y07, Y09	5 mcd @ 15 mA
G03, G05, G07, G09	10 mcd @ 20 mA
R04, R06, R08, R10	1.0 mcd @ 15 mA
Y04, Y06, Y08, Y10	0.5 mcd @ 15 mA
G04, G06, G08, G10	1.0 mcd @ 20 mA

Notes: ③ Substitute color X in Model No., i.e.: R=RED Y=YELLOW G=GREEN
④ Add **1A** to end of DESC P/N's

This page cleared by DoD/OSR for public release under 12-S-1675 on 04/23/2012.

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ORDERING INFORMATION

When ordering, show model number first, then LED color, EMI screen, coated lens, and the type of lead desired. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with red LED, EMI screen, uncoated lens, and straight lead would be model ML1644-R111.

ML1644 - R 1 1 1

Basic Model Number	LED Color	EMI Screen	Lens Coating	Terminal Style
ML1640	R Red	0 None	1 Uncoated	1 Straight Tin Lead
	Y Yellow	1 Screen	2 Anti-reflection Coating	2 Loop Terminals
	G Green			

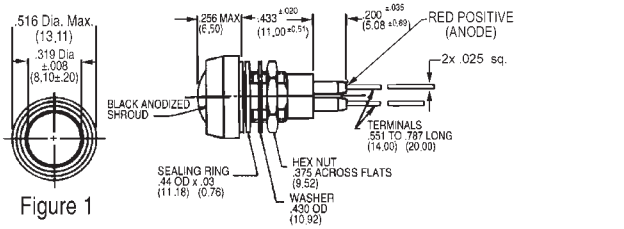


Figure 1

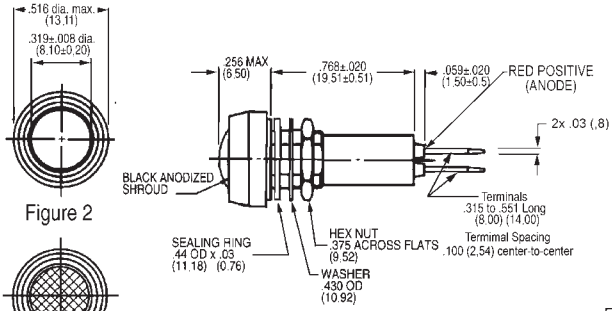
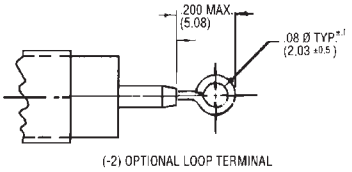


Figure 2

WITH EMI SCREEN

Figure 2a



(-2) OPTIONAL LOOP TERMINAL

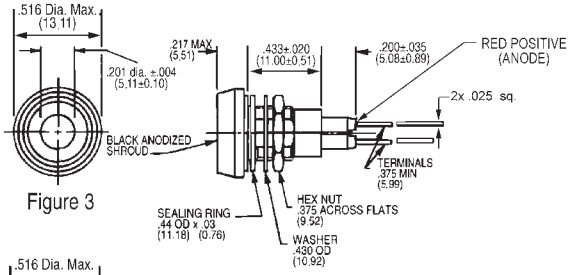
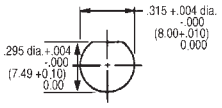


Figure 3



RECOMMENDED MOUNTING HOLE

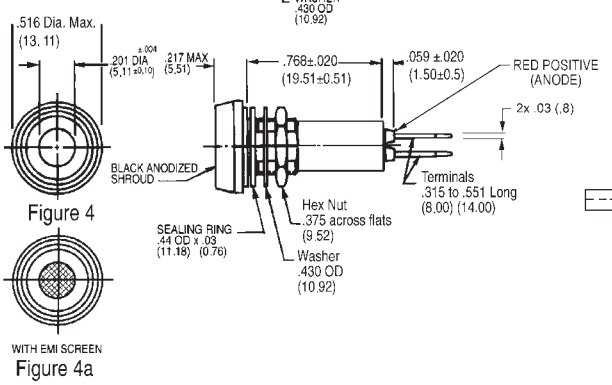
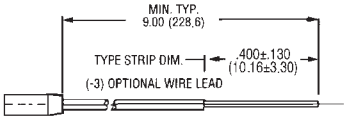
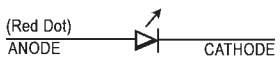


Figure 4

WITH EMI SCREEN

Figure 4a





Schematic

ML1640 Series

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

LIGHTING INDICATOR
MIL-SPEC NVIS COMPATIBLE

Model ML1662

The ML1662 status indicator was developed to meet the requirements of MIL-L-85762A and MIL-STD-3009. This solid-state lamp with infrared blocking lens is compatible with NVIS environments. It is a panel mount device with solderable leads and includes hardware.

ML1662

FEATURES

- Designed to meet MIL-L-85762A and MIL-STD-3009 lighting, aircraft, interior night vision imaging system (NVIS) compatible
- Environmentally sealed
- Optional EMI protection screen
- Colors: yellow, green & red
- Front panel mount seal

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized bezel with clear chromate body.

Mounting: Front panel by 5/16"-32 nut and lockwasher.

Seal: Environmentally sealed with front panel PTFE ring seal.

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C			
Color	**NVIS Red**	**NVIS Yellow**	**NVIS Green B**
Forward Voltage (VDC) typical @ 20 mA	2.0	2.0	2.1
DC Forward Current (mA) ①	50	20	50
Reverse Voltage @ I_R = 100 µA	4	5	4
Power Dissipation (mW)	120	85	120
Luminous Intensity (mcd) typical @ 20 mA diffused	100	1.8	10
Chromaticity per MIL-L-85762A & MIL-STD-3009	NVIS Red	NVIS Yellow	NVIS Green B
NVIS Radiance per MIL-L-85762A & MIL-STD-3009	NR_B 1.4 x 10^{-7} @15 fL	NR_A 1.5 x 10^{-7} @15 fL NR_B 1.4 x 10^{-7} @15 fL	NR_A 1.7 x 10^{-10} @0.1 fL NR_B 1.7 x 10^{-10} @0.1 fL
Dominant Wave Length (nm) typical	605	585	558
Viewing Angle (2 Ø $^{1/2}$) diffused	50°	50°	50°
Operating Temperature (°C)	-40 to +100	-55 to +100	-40 to +100
Storage Temperature (°C)	-55 to +100	-55 to +100	-55 to +100

Notes: ① DC Forward Current Derating. Yellow indicators, derate linearly from 50°C at 0.2 mA per °C. Green & Red indicators, derate linearly from 50°C at 0.5 mA per °C

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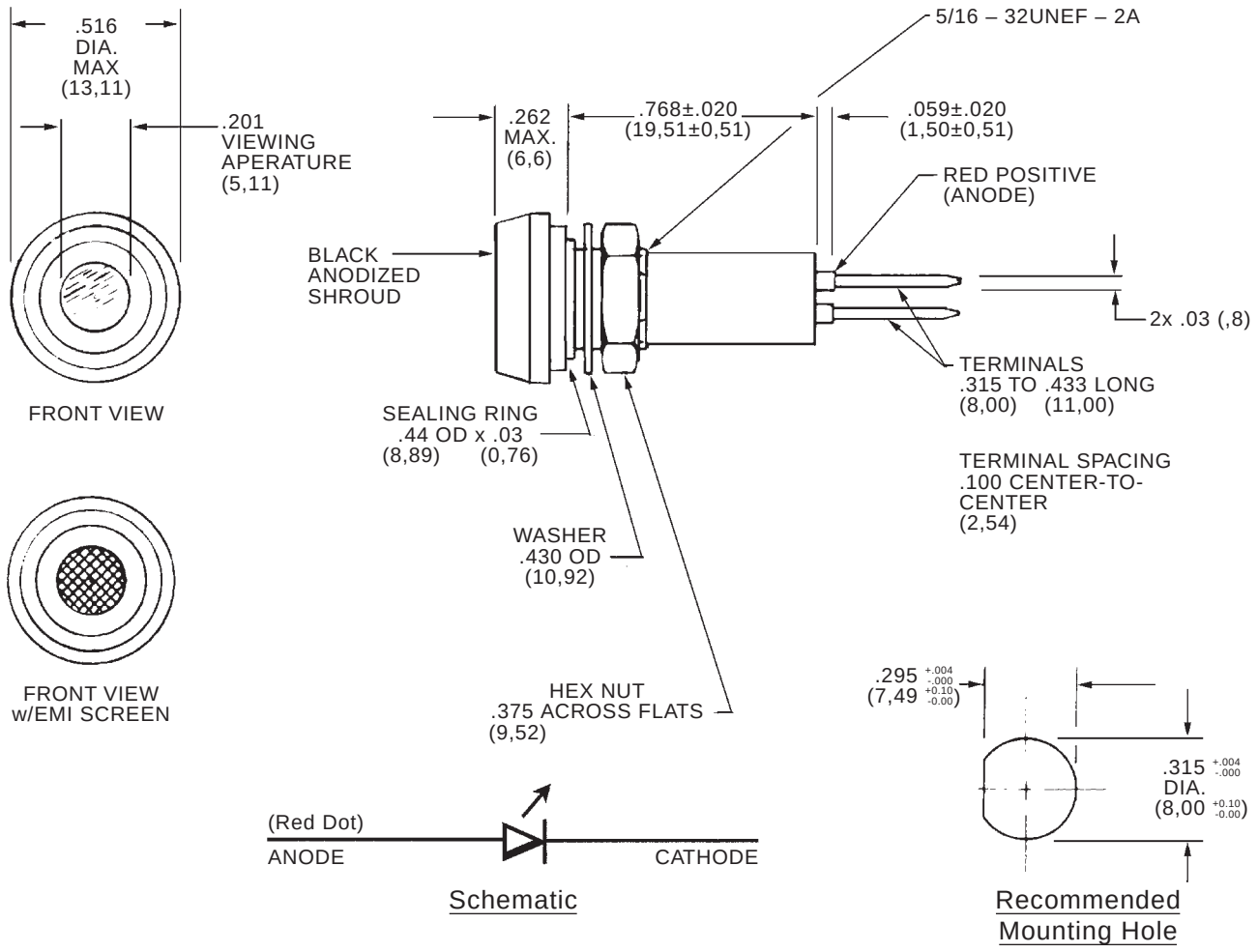
ORDERING INFORMATION

When ordering, show model number first, then LED color, EMI screen, body finish, and the terminal style desired. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with green LED, EMI screen, a clear chromate body finish, and a tin lead terminal finish would be model ML1662-G121.

ML1662 - G - 1 - 2 - 1

Basic Model Number	LED Color	EMI Screen	Body Finish Color	Terminal Style
ML1662	R Red	0 None	2 Clear Chromate	1 Straight Tin Lead
	Y Yellow	1 Screen		2 Loop Terminals
	G Green			



ML1662

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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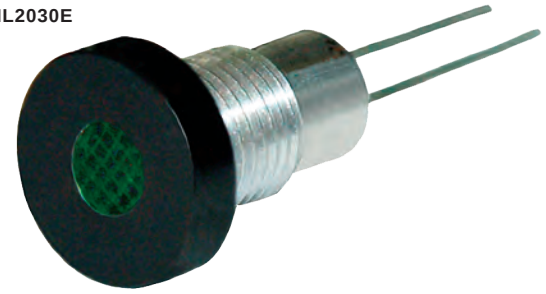
LED INDICATOR

SOLID FRONT WATERTIGHT PANEL SEAL

Model ML2030

Designed for use where a watertight panel seal is required for system performance. Can be used as a function indicator on aircraft avionics systems, test equipment, medical equipment, machine tools, and wherever severe environmental conditions are present.

ML2030E



FEATURES

- O-ring panel seal
- Dual finish case
- Low power use
- Performs in severe environments
- Rugged construction

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized front bezel with conductive clear chromate body.

Mounting: Front panel mount with 5/16"-32 nut and lock washer.

Seal: Environmentally sealed case. MIL-DTL-3661, Para. 4.6.11.1

O-ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C				
Color		**Red**	**Yellow**	**Green**
Forward Voltage (VDC)		1.9	2.0	2.1
DC Forward Current (mA DC) ①		30	20	30
Reverse Voltage (VDC) @ I_R = 100 µA		5	5	5
Power Dissipation (mW)		135	85	135
Luminous Intensity (mcd) typical @ I_F = 10 mA	Non-diffused Diffused	60 11	50 12	70 12
Dominant Wave Length (nm) typical		626	585	569
Viewing Angle (2 Ø $^{1/2}$) typical	Non-diffused Diffused	35° 60°	35° 60°	24° 60°
Operating Temperature (°C)		-55 to +100	-55 to +100	-20 to +100
Storage Temperature (°C)		-55 to +100	-55 to +100	-55 to +100
Lead Soldering Temperature		260°C for 5 seconds		

Notes: ① For red and green, derate linearly from 50°C @ 0.5 mA/°C. For yellow derate linearly from 50°C @ 0.2 mA/°C

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ORDERING INFORMATION

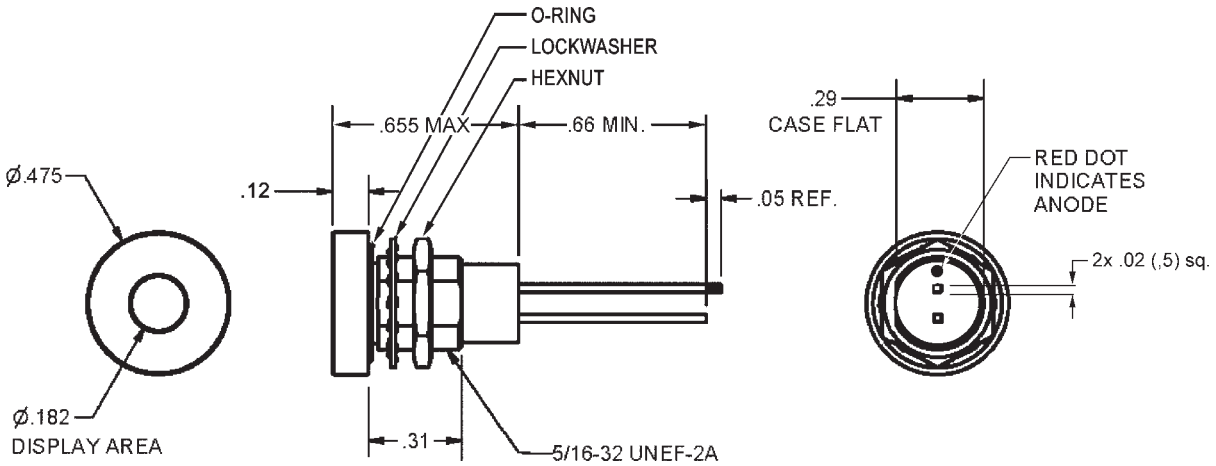
When ordering, show basic part number first, LED color, lens type, and terminal style. If this part requires customization, a special factory assigned modification number will be assigned to the end of the ordering number. Consult the factory for special configurations.

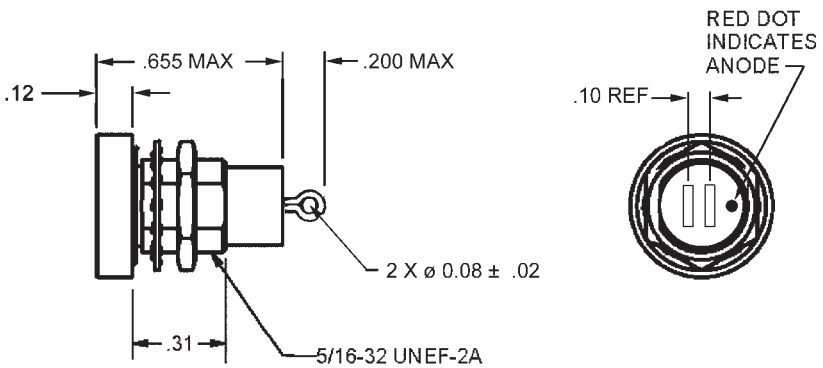
Example: Basic model with EMI screen, a red LED, a diffused lens, and looped terminals would be ML2030E-R-D-LT.

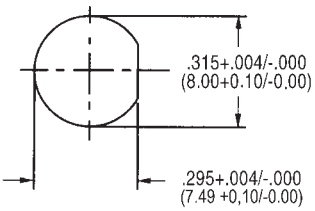
ML2030E - R - D - LT - ( )

Standard factory options are designated by "-Sxxx"

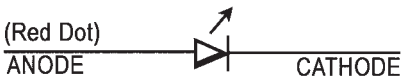
Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
ML2030		R Red	ND Non-diffused	ST Straight Leads
	E Screen	Y Yellow	D Diffused	LT Loop Terminals
		G Green		







Recommended Mounting Hole



Schematic

NOTE:
Ø .475 AND FRONT SURFACE OF FLANGE IS BLACK ANODIZED.
ALL OTHER SURFACES ARE CLEAR CHROMATE.

ML2030

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 10-12 in. lbs.

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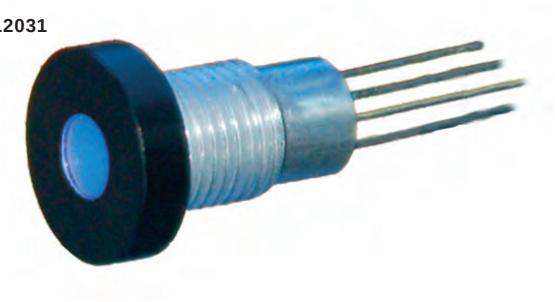
LED INDICATOR
WATERTIGHT PANEL SEAL TRI-COLOR

Model ML2031

Designed for use where a watertight panel seal is required for system performance. Can be used as a function indicator on aircraft avionics systems, test equipment, medical equipment, machine tools and wherever severe environmental conditions are present.

ML2031



FEATURES

- O-ring panel seal
- Dual-finish case
- Performs in severe environments
- Low power use
- Rugged construction
- Colors: red, green and blue
- Multiple status indication within a single package
- Wide viewing angle

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized front bezel with conductive clear chromate body

Mounting: Front panel mount with 5/16"-32 nut and lock washer

Seal: Environmentally sealed case. MIL-DTL-3661, Para. 4.6.11.1

O-Ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C			
Color	**Red**	**Green**	**Blue**
Forward Voltage (VDC) typical @ 20 mA	1.9	3.3	3.3
DC Forward Current (mA DC) ①	30	25	30
Reverse Voltage (VDC) @ I_R = 100 µA	5	5	5
Power Dissipation (mW)	75	102	120
Luminous Intensity (mcd) typical @ I_F = 20 mA DC	60	125	85
Dominant Wave Length (nm) typical	630	525	465
Viewing Angle (2 Ø $^{1/2}$) typical	130°		
Operating Temperature (°C)	-40 to +85		
Storage Temperature (°C)	-55 to +100		
Lead Soldering Temperature	260°C for 5 seconds		

Notes: ① Derate linearly from 25°C @ -0.4 mA/°C.

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LED INDICATOR

WATERTIGHT PANEL SEAL TRI-COLOR

ORDERING INFORMATION

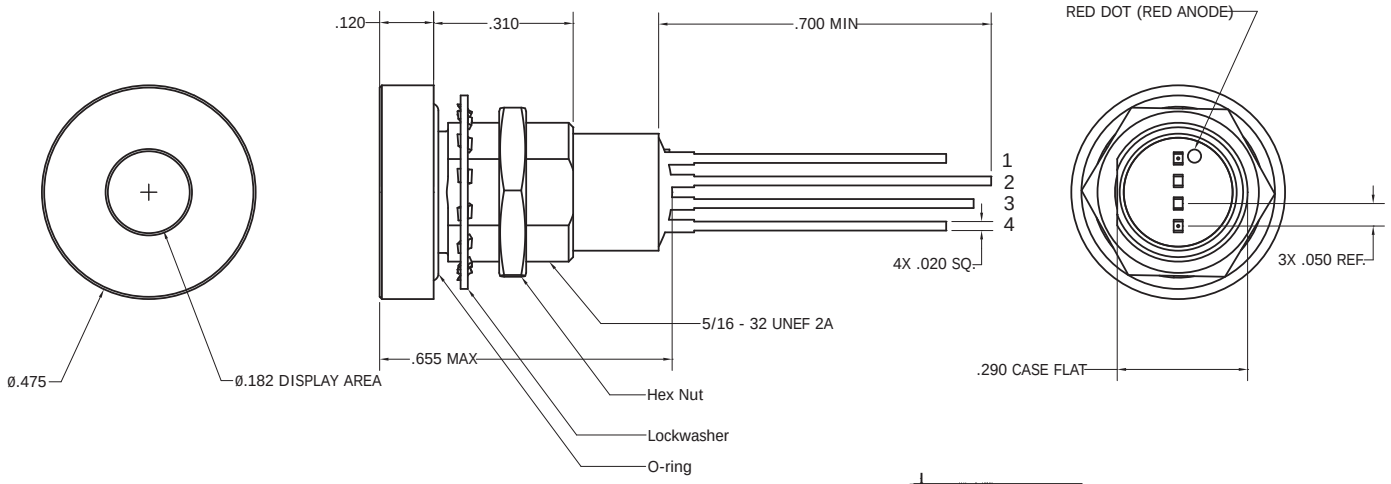
When ordering, show model number first, followed by EMI screen, then LED colors, lens style, and terminal style. If this part requires customization, a special factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

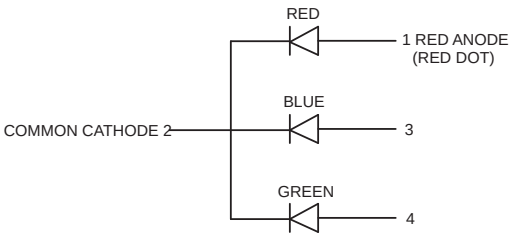
Example: Basic model with an EMI screen, red/green/blue LED, a diffused lens and straight leads would be ML2031E-RGB-D-ST.

ML2031E - RGB - D - ST - ( )

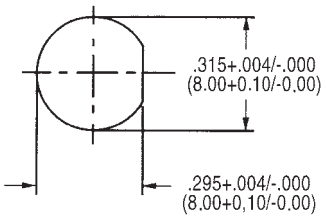
Standard factory options are designated by "-Sxxx"

Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
ML2031	( ) None	RGB Red, Green, Blue	D Diffused	ST Straight Leads
	E Screen			





Schematic



Recommended Mounting Hole

ML2031

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 10-12 in. lbs.

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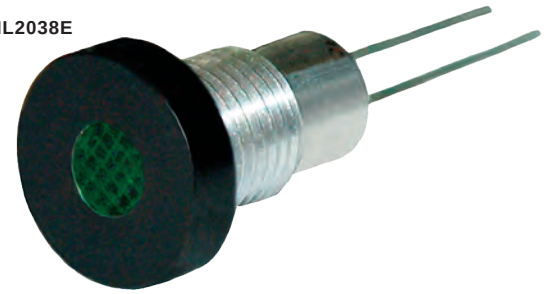
LED INDICATOR
NVIS COMPATIBLE TIGHT PANEL SEAL

Model ML2038

The ML2038E status indicator is designed to meet the requirements of MIL-L-85762A and MIL-STD-3009. This solid-state LED indicator has an infrared blocking lens that is compatible with NVIS environments. It is a rear-mount indicator and comes complete with O-ring and mounting hardware.

ML2038E



FEATURES

- Designed to meet MIL-L-85762A and MIL-STD-3009 lighting, aircraft, interior night vision imaging system (NVIS) compatible
- Performs in severe environments
- O-ring panel seal
- Dual-finish case
- Compact case design
- Rugged construction

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized, front bezel with conductive clear chromate body.

Mounting: Front Panel mount with 5/16"-32 nut and lockwasher

Seal: MIL-DTL-3661C, paragraph 4.6.11.1

O-ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C				
Color		**NVIS Red**	**NVIS Yellow**	**NVIS Green B**
Forward Voltage (VDC) typical @ 20 mA		2.0	2.0	2.1
DC Forward Current (mA) ①		50	20	50
Reverse Voltage @ I_R = 100 µA		4	5	4
Power Dissipation (mW) typical		120	85	120
Luminous Intensity (mcd) typical @ I_F = 20 mA	Non-diffused Diffused*	200 N/A	3.0 N/A	20 10
Chromaticity per MIL-L-85762A & MIL-STD-3009		NVIS Red	NVIS Yellow	NVIS Green B
Dominant Wave Length (nm) typical		605	585	558
NVIS Radiance per MIL-L-85762A & MIL-STD-3009		NR_B 1.4 x 10^{-7} @15 fL	NR_A 1.5 x 10^{-7} @15 fL NR_B 1.4 x 10^{-7} @15 fL	NR_A 1.7 x 10^{-10} @0.1 fL NR_B 1.7 x 10^{-10} @0.1 fL
Viewing Angle (2 Ø $^{1/2}$) typical	Non-diffused Diffused*	30° x 50° N/A	32° N/A	32° 50°
Operating Temperature (°C)		-40 to +100	-55 to +100	-40 to +100
Storage Temperature (°C)		-55 to +100	-55 to +100	-55 to +100

Notes: ① DC Forward Current Derating. Yellow indicators, derate linearly from 50°C at 0.2 mA per °C. Green & Red indicators, derate linearly from 50°C at 0.5 mA per °C

* Only available for NVIS Green B

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LED INDICATOR

NVIS COMPATIBLE TIGHT PANEL SEAL

ORDERING INFORMATION

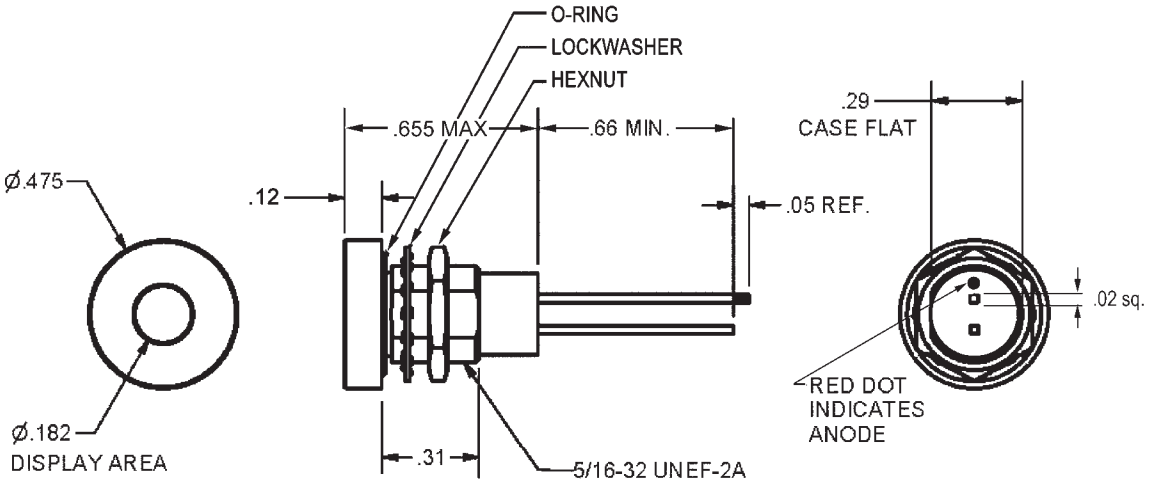
When ordering, show model number first, followed by EMI screen, then LED color, lens type, and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

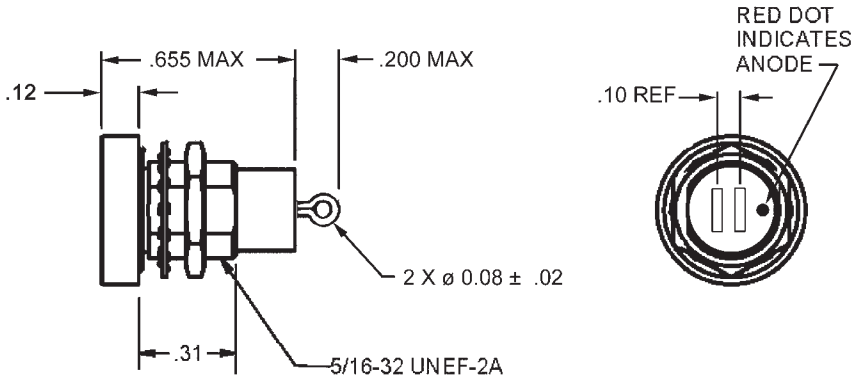
Example: Basic model, with an EMI screen, NVIS yellow LED, non-diffused lens, and straight leads would be ML2038E-Y-ND-ST.

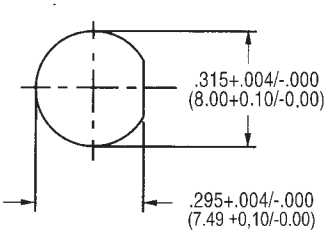
ML2038E - Y - ND - ST - ( )

Standard factory options are designated by "-Sxxx"

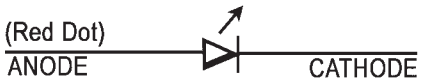
Basic Model Number	EMI Screen	LED Color	Lens Type	Terminal Style
ML2038		R Red	ND Non-diffused	ST Straight Leads
	E Screen	Y Yellow	D Diffused	LT Loop Terminals
		G Green		







Recommended Mounting Hole



Schematic

NOTE:
Ø .475 AND FRONT SURFACE OF FLANGE IS BLACK ANODIZED.
ALL OTHER SURFACES ARE CLEAR CHROMATE.

ML2038

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 10-12 in. lbs.

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Model ML4036

The ML4036 operates across a wide voltage range without the need for any external resistors. Nearly constant light intensity is maintained across the operating voltage range. The LED package is environmentally sealed and it comes complete with a fluorosilicone O-ring and mounting hardware.

ML4036

FEATURES

- Ideal for rugged environments
- Environmentally sealed
- Panel mount seal
- Colors: yellow, green & red
- Decorative bezel
- Wide operating voltage

MECHANICAL SPECIFICATIONS

Case: Aluminum, black anodized, standard.

Mounting: Rear-mount by 5/16"-32 nut and lockwasher

O-ring: Fluorosilicone rubber

ENVIRONMENTAL SPECIFICATIONS

Vibration: .06" D.A. or 20 Gs Peak, whichever is less, 10Hz to 2kHz, MIL STD 202, Method 204, Test Condition D

Shock: 100 Gs MIL STD 202, Method 213, Test Condition I

Moisture Resistance (Humidity): MIL STD 202, Method 106

Dielectric Withstanding Voltage: MIL-STD-202, Method 301, 1000VAC

Barometric Pressure (Reduced): 100,000 ft., MIL STD 202, Method 105, Test Condition D

Reliability: 3 x 10^6 hours min. MTBF @ 25°C

Salt Atmosphere (Corrosion): MIL STD 202, Method 101, Test Condition B

ELECTRO-OPTICAL CHARACTERISTIC SPECIFICATIONS

Absolute Maximum Ratings @Temp = 25°C				
Color		**Red**	**Yellow**	**Green**
Operating Voltage (VDC) min.			5.0	
Operating Voltage (VDC) max.			28	
DC Forward Current (mA)			12	
Reverse Voltage (VDC) @ I_R = 100 µA			5	
Power Dissipation (mW)			300	
Luminous Intensity (mcd) typical @ V_F = 10 VDC	Non-diffused	500	500	100
	Diffused	125	250	20
Dominant Wave Length (nm) typical		640	588	558
Viewing Angle	Non-diffused		30°	
	Diffused		60°	
Operating Temperature (°C)			-40 to +85	
Storage Temperature (°C)			-40 to +85	
Lead Soldering Temperature			260°C for 3 seconds	

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ORDERING INFORMATION

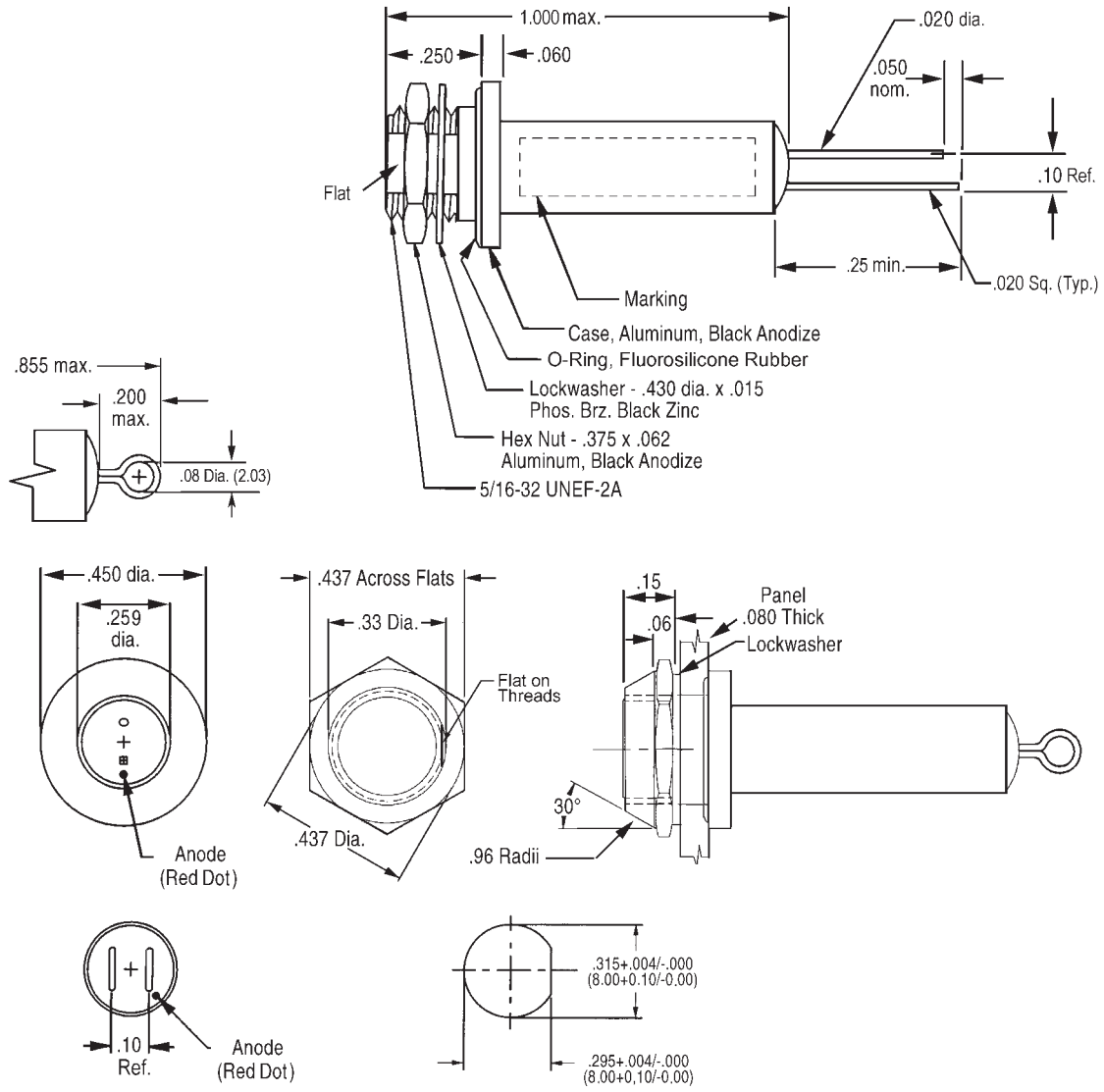
When ordering, show model number first, followed by LED color, then lens style, and terminal style. If this is a special part, a factory assigned modification number will be added at the end of the ordering number. Consult the factory for special configurations.

Example: Basic model with a yellow LED, a diffused lens, and straight leads would be ML4036-Y-D-ST.

ML4036 - Y - D - ST - ( )

Standard factory options are designated by "-Sxxx"

Basic Model Number	LED Color	Lens Type	Terminal Style
ML4036	R Red	ND Non-diffused	ST Straight Leads
	Y Yellow	D Diffused	LT Loop Terminals
	G Green		



Recommended Mounting Hole

ML4036

NOTE: Dimensions in ( ) are mm. Tolerances: Decimals: ± .010 (0.25)
Fractions: ± 1/64 Mounting Torque: 5-7 in. lbs.

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