





**LEOPARD FAMILY** 

# **DL-40RPM**

**Leopard RPM Meter** < 4 Digit 0.56" or 0.8" LEDs in a 1/8 DIN CASE



CE

An economically smart meter relay for RPM measurement.

### General Features

- This meter has been designed specifically for RPM measurements. Just enter the pulses per revolution and the DL-40RPM meter will calculate and display the RPM reading.
- Three ranges with resolutions of 0.1 RPM, 1 RPM and 10 RPM (99.99 X 1000 RPM max.).
- Optional isolated 16 bit analog output. User or factory scalable to 4 to 20 mA, 0 to 20 mA or 0 to 10 V across any desired digital span from one count to the full scale range of 9999.
- 24 V DC excitation is available to power external sensors.
- Auto-sensing AC/DC power supply. For voltages between 85-265 V AC / 95-370 V DC (PS1) or 15-48 V AC / 10-72 V DC (PS2).
- Standard red or optional green or super bright red 4-digit LED
- Red or green 0.8" LED large display option.
- Four annunciator LEDs provide front panel alarm status indication for up to four setpoints.
- Optional relays. Two 10 Amp Form C and two 5 Amp Form A relay, or optionally four 5 Amp Form A relays are available.

# Software Features

- Three-button programming from the front panel (UP, DOWN and PROGRAM buttons).
- Three front panel selectable ranges.
- Front panel selectable four-level brightness control of digital display, and setpoint LEDs.
- · Four programmable setpoints.
- · Relay activation can be selected to occur above (HI) or below (LO) each setpoint.
- · Hysteresis setting for all four setpoints. Delay on make and delay on break for SP1 and SP2.
- Peak and Valley. View and Reset.

# Input Module Compatibility

There is 1 Plug-in Modular Input Signal Conditioner, IF05, for this specialized RPM only member of the Leopard Family.



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Specification	S					
Input Specs:	Depends on Input Signal Conditioner					
A/D Converter:						
Accuracy:	•					
	100 ppm/°C (Typical)					
Warm up time:						
_	5 conversions per second (Typical)					
Display:	4 digit 0.56" Red LED display (std),					
	0.56" or 0.8" Red, Green or Super Bright					
	Red (optn). Range to 9999 counts.					
Polarity:						
Decimal Selection:	Automatic by selection of resolution					
Positive Overrange:Top segments of digital display flash						
Relay Output:	Two 5 Amp Form A relays and two 10					
	Amp Form C, or 5 Amp form A relays.					
Analog Output:	Isolated 16 bit user scalable mA or V					
AIC (mA out)	4-20 mA @ 0 to $500\Omega$ max loop resistance					
AIV (volts out)	0-10 V DC @ 500 $\Omega$ or higher resistance					
	AC/DC Auto sensing wide range supply					
PS1 (std)	85-265 VAC / 95-370 VDC @ 2.5W max 3.5W					
_	15-48 VAC / 10-72 VDC @ 2.5W max 3.5W					
Operating Temp.:						
Storage Temp:						
	95% (non condensing)					
Case Dimensions:						
	(3.78"x1.89")					
	Depth behind bezel: 117 mm (4.61")					
	Plus 11.8 mm (0.47") for Right-angled					
	connectors, or plus 20 mm (0.79") for					
	Straight-thru connector.					
Weight:	6.5 oz., 8.5 oz when packed					

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Case Dimensions         .10           Component Layout         8-9           Connector Pinouts         7-8           Controls and Indicators         .2           Digital Span Selection for           Analog Range Output         .5           Functional Diagram         .7	General Features	Ordering Information         .12           Pin Descriptions         .8           Pulses Per Revolution, Range         & Brightness Selection         .4           Setpoint Setting & Relay Configuration Mode         .6           Software Features         .1           Software Logic Tree         .3	Specifications					

### Controls and Indicators





# **Front Panel Buttons**

# **Program Button**

The P button is used to move from one program step to the next. When pressed at the same time as the button, it initiates the **calibration mode**. When pressed at the same time as the button, it initiates the **setpoint setting mode**.

# **Up Button**

When in the operational display, pressing the 1 button alone allows you to view, but not change, the setting of setpoint 1.

When in the **calibration mode** or the **setpoint setting mode** the **b** button is used to increase the value of the displayed parameter.

### Down Button

When in the operational display, pressing the 
■ button alone allows you to view, but not change, the setting of **setpoint 2**.

When in the **calibration mode** or the **setpoint setting mode** the **!** button is used to decrease the value of the displayed parameter.

# Glossary of Programming Symbols

To explain software programming procedures, logic diagrams are used to visually assist in following the programming steps. The following symbols are used throughout the logic diagrams to represent the buttons and indicators on the meter:



### **Explanation**



This symbol represents the OPERATIONAL DISPLAY.



This is the PROGRAM button.



This is the UP ARROW button.



This is the DOWN ARROW button.



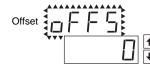
When a button is shown, press and release it to go onto the next step in the direction indicated by the arrow. When two or more buttons are shown, each with an arrow, this indicates that there is a number of programming choices.



When two buttons are shown side by side and enclosed by a dotted line, they must be pressed at the same time then released to go onto the next programming step.



If the display is shown with XXXX, it means the value displayed will be the previously set value. When a number is shown, it indicates the initial factory default setting or a specific "example number".



When two displays are shown together with bursts, this indicates that the display is toggling (flashing) between the name of the function and the value.

[ScLE] [9999] Text or numbers shown between square brackets in a procedure indicate the programming code name of the function or the value displayed on the meter display.

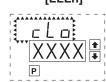


When the ● and ● buttons are shown together, the display value can be increased by pressing and releasing the ● button or decreased by pressing and releasing the ● button.

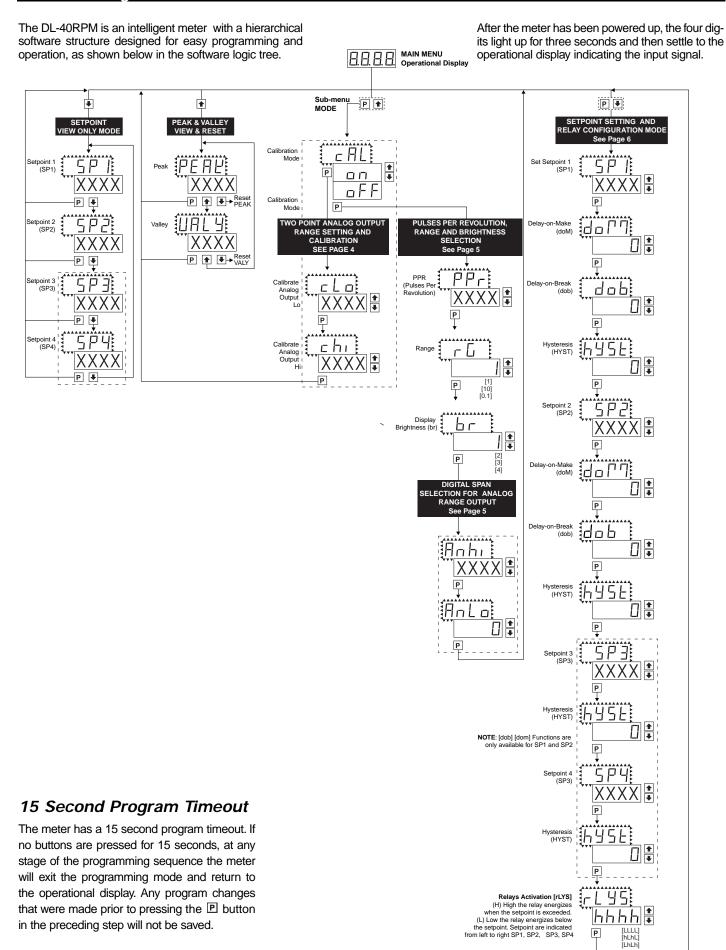


When the ♠ and ▶ buttons are shown with two displays, either display can be selected by pressing and releasing the ♠ or ▶ buttons.





A dotted box indicates these functions are omitted or bypassed when the related hardware is not present.



# Two Point Analog Output Range Setting and Calibration

#### STEP A Enter the Calibration Mode

1) Press the P and buttons at the same time. Display toggles between [cAL] and [oFF] if the Analog Output option is installed.

**Note**: If at this point the display skips directly to toggle between [PPr] and the previous Pulses per revolution setting (STEP E) then the software is detecting that the optional analog output hardware is NOT installed.

### STEP B Enter the [oUT] Analog Output Calibration Mode

- 1) Press the 

  or 

  button. Display changes from [oFF] to [on].
- Press the P button. Display toggles between [cLo] and an internal scale factor

### STEP C Calibrate the [cLo] Low Analog Output

- 1) Select the voltage or current output header position on the output module. (See Component Layout on page 9).
- Press the 
   button. Display toggles between [chi] and an internal scale factor.

### STEP D Calibrate the [chi] High Analog Output

- Using the and buttons, adjust the analog output to the desired high value as shown on the multimeter display. chi may be adjusted to any value from 17 mA to 21 mA (mA output selected) or from 8 V to 10.3 V (volt output selected)
- 2) Press the D button. The display exits the calibration mode and returns to the operational display.

**Note**: Having established the Low and High range of the analog output, the digital span can now be selected which will set the two display points between which the analog output will occur. (See STEP I and STEP J on Page 5).

# Pulses Per Revolution, Range and Brightness Selection

# STEP E Enter the Range Selection Mode Through the Sub Menu [cAL] [oFF]

- 2) Press the D button. Display toggles between [PPr] and the previous pulses per revolution setting.

### STEP F Enter the Pulses per revolution (PPR)

- Using the 

   and 
   buttons, enter the number of pulses per revolution.

   Any number between 1 and 9999 may be entered.
- 2) Press the P button. Display toggles between [rG] and the previous range setting.

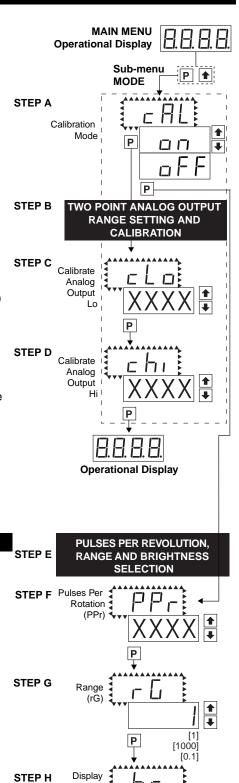
#### STEP G Select the Range

- 1) Using the and buttons, select the required range. There are three ranges with resolutions of 0.1 (max. 999.9 RPM), 1 (max. 9999 RPM) and 10 RPM (max. 99.99 X 1000 RPM).
- 2) Press the P button. Display toggles between [br] and the previous brightness setting.

### STEP H Set the Display Brightness

- Press the D button. Display brightness changes to new setting and display toggles between [Anhi] and the previous [Anhi] setting, if the Analog Output Option is installed.

Note: If the Analog Output option is not installed then the displays returns to the operational display.



Brightness

(br)

Р

**DIGITAL SPAN** 

SELECTION FOR ANALOG

RANGE OUTPUT

SEE PAGE 5

[2] [3]

# Digital Span Selection for Analog Range Output

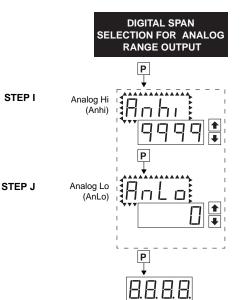
# STEP I Set the Display Corresponding to the Analog High Output

- 1) Using the **1** and **1** buttons, adjust the display to the desired value at which the selected analog high output will occur.
- 2) Press the P button. Display toggles between [AnLo] and previous [AnLo] setting.

# STEP J Set the Display Corresponding to the Analog Low Output

- 1) Using the **1** and **1** buttons, adjust the display to the value at which the selected analog low output range will occur.
- 2) Press the P button. The display exits the calibration mode and returns to the operational display.

**Note**: Any two points from 0 to 9999 can be selected for which the specified analog output occurs. The display values for analog high and analog low can be reversed for reversed 20-4 mA output. The difference between the two display points can be as small as two counts however small spans cause the 16 bit D to A to increment in staircase steps.



# Setpoint Setting and Relay Configuration Mode

The following programming steps are required to enter the setpoint values and configure the relay functions in a meter with four relays using four setpoints. Generally if less than four relays are installed the software auto detects missing relays and deletes reference to them from the menu. In some cases setpoints without relays are operational for display only purposes.

### STEP A Enter the Setpoint Mode

Press the 

and 

buttons at the same time.
 Display toggles between [SP1] and the previous [SP1] setting.

### STEP B Set Setpoint 1 (SP1)

- 1) Using the 1 and 1 buttons, adjust the display to the desired SP1 value.
- 2) Press the D button. Display toggles between [doM] and the previous [doM] setting.

### STEP C Set the SP1 Delay-on-Make (doM) Delay Time Setting

- 1) Using the 1 and 1 buttons, adjust the display to the desired [doM] value (0 to 9999 seconds). The reading must continuously remain in an alarm condition until this delay time has elapsed before the relay will make contact (energize).
- 2) Press the D button. Display toggles between [dob] and the previous [dob] setting.

### STEP D Set the SP1 Delay-on-Break (dob) Delay Time Setting

- Using the 
   • and buttons, adjust the display to the desired [dob] value (0 to 9999 seconds). The reading must continuously remain in an non-alarm condition until this delay time has elapsed before the relay will break contact (de-energize).
- 2) Press the P button. Display toggles between [hYSt] and the previous [hYSt] setting.

### STEP E Set the Hysteresis Setting for Setpoint 1

- 1) Using the **1** and **1** buttons, adjust the display to the desired hysteresis [hYSt] value.
- 2) Press the 🖻 button. Display toggles between [SP2] and the previous [SP2] setting. **NOTE**: Half of the Hysteresis value selected is applied above and below the setpoint.

NOTE: Steps F, G, H and J have functionally the same procedure as steps B, C, D, and E shown above.

### STEP F Set Setpoint 2 (SP2)

- STEP G Set the SP2 Delay-on-Make (doM) Delay Time Setting
- STEP H Set the SP2 Delay-on-Break (dob) Delay Time Setting

### STEP I Set the Hysteresis Setting for Setpoint 2

- 1) Using the **1** and **1** buttons, adjust the display to the desired hysteresis [hYSt] value.
- 2) Press the D button. Display toggles between [SP3] and the previous [SP4] setting.

### STEP J Set Setpoint 3 (SP3) (No [doM] or [dob])

- 1) Using the **1** and **1** buttons, adjust the display to the desired SP3 value.
- 2) Press the P button. Display toggles between [hYSt] and the previous [hYSt] setting.

### STEP K Set the Hysteresis Setting for Setpoint 3

- 1) Using the **1** and **1** buttons, adjust the display to the desired hysteresis [hYSt] value.
- 2) Press the P button. Display toggles between [SP4] and the previous [SP4] setting.

### STEP L Set Setpoint 4 (SP4) (No [doM] or [dob])

- 1) Using the 1 and 1 buttons, adjust the display to the desired SP4 value.
- 2) Press the P button. Display toggles between [hYSt] and 0.

### STEP M Set the Hysteresis Setting for Setpoint 4

- 1) Using the **1** and **1** buttons, adjust the display to the desired hysteresis [hYSt] value.
- 2) Press the P button. Display toggles between [rLYS] and the previous relay setting.

### STEP N Set Relay Activation mode [rLYS]

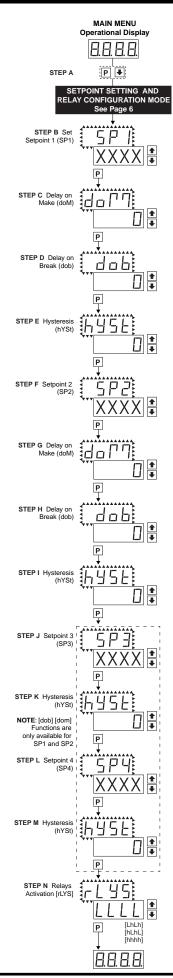
- (h) High the relay energizes when the setpoint is exceeded. (L) Low the relay energizes below the setpoint. The setpoint is indicated from left to right SP1, SP2, SP3, SP4.
- 1) Using the **1** and **1** buttons, adjust the reading on the display to the desired relay settings: [LLLL], [LhLh], [Lhhh].

If only 2 relays installed [Lh] [hL] [hh] [LL].

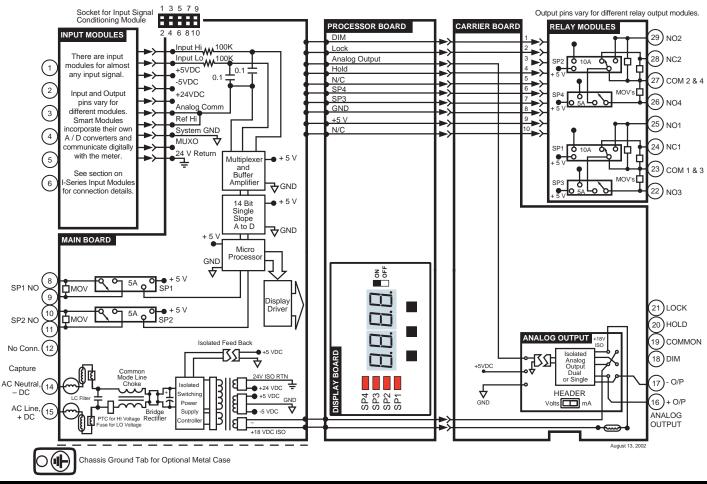
2) Press the P button.

The meter exits the setpoint mode and returns to the operational display.

The Setpoint Relay programming mode is now complete.



# Functional Diagram



# Connector Pinouts

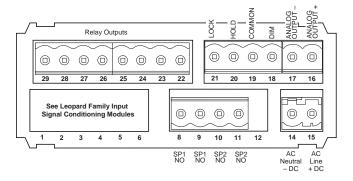
# Pinout Diagram

The Rear View of the Meter diagram shows the meter with the relay configuration: dual 10 Amp Form C and dual 5 Amp Form A relays. An analog output module is also shown as installed.

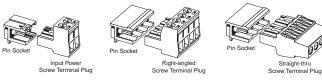
The DL-40RPM uses plug-in type screw terminal connectors for all input and output connections. The power supply connections (pins 14 and 15) have a unique plug and socket outline to prevent cross connection. The main board and input signal conditioner use rightangled connectors as standard. The output module uses straightthru connectors as standard.



WARNING: AC and DC input signals and power supply voltages can be hazardous. Do Not connect live wires to screw terminal plugs, and do not insert, remove or handle screw terminal plugs with live wires connected.



Auto-sensing AC/DC power supply. For voltages between 85-265 V AC / 95-370 V DC (PS1) or 18-48 V AC / 10-72 V DC (PS2). Standard plug-in screw terminal connectors provided by Texmate:



# Input Signal – Pins 1 to 6

Pins 1 to 6 are reserved for the input signal conditioner. See the data sheet for the selected input signal conditioner.

### Pins 8 to 12 - Relay Output Pins

Note: If relays for setpoints 1 & 2 are installed on the main board, and a relay output module is used that also has relays in the setpoints 1 & 2 positions, the duplicate relays will operate in unison.

**SP1 NO.** Normally Open 5 Amp Form A. Pin 8 Pin 9

SP2 NO. SP2 NO. Normally Open 5 Amp Form A. Pin 10 Pin 11

Pin 12 NO CONNECTION.

# Pins 14 and 15 – AC/DC Power Input Auto-sensing AC/DC power supply. For voltages between

85-265 V AC/95-370 V DC (PS1) or 18-48 V AC/10-72 V DC (PS2). Pin 14 AC/DC Neutral. Neutral power supply line.

Pin 15 AC/DC line. Live power supply line.

# **Optional Carrier Board Output Pins**

Pins 16 and 17 - Analog Output

Pins 16 and 17 are the analog output pins on the optional output module. Their pin definitions are:

Pin 16 Positive (+) analog output. Negative (-) analog output. **Pin 17** 

# **Connector Pinouts continued**

# Pins 18 to 21 - Rear Panel Function Pins

**Pins 18 to 21** provide functions that can be implemented with an external switch. Their pin definitions are:

- **Pin 18 DIM.** By connecting the display dim (DIM) pin to the COMMON pin, the display brightness setting is halved.
- Pin 19 COMMON. To activate the LOCK or DIM functions from the rear of the meter, the respective pins have to be connected to the COMMON pin. This pin is connected to the internal power supply ground.
- internal power supply ground.

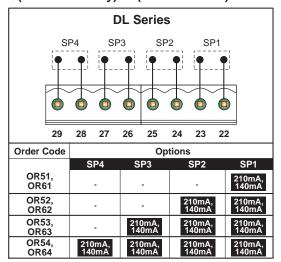
  Pin 20 HOLD. By connecting the HOLD pin to the COMMON pin, the displayed reading is frozen, however, A/D conversions continue. When the HOLD pin is disconnected from the COMMON pin, the correct reading is displayed.
- pin, the correct reading is displayed.

  Pin 21

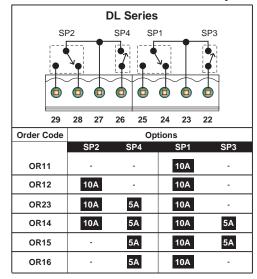
  LOCK. By connecting the LOCK pin to the COMMON pin, the meter's programmed parameters can be viewed but not changed.

# Pins 22 to 29 - Output Module Pins

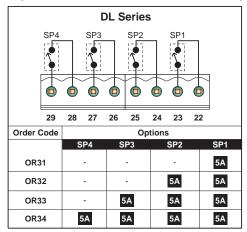
Relay Modules with 4 Independent 400V (210mA DC only) or (140mA AC/DC) SSRs



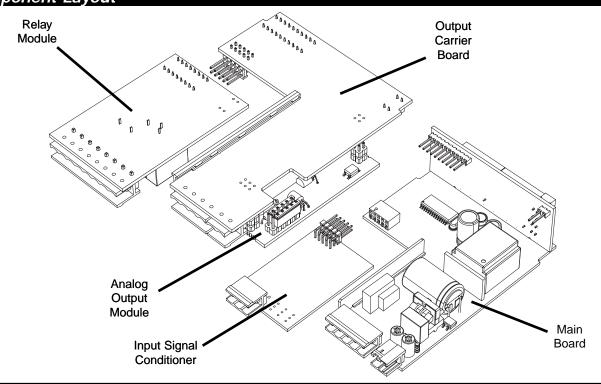
### Relay Modules with 2 Non-Isolated 5A Form A Relays, and 2 Non-Isolated 10A Form C Relays



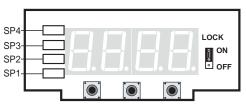
### Relay Modules with 4 Isolated 5A Form A Relays



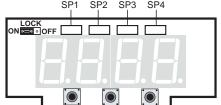
# Component Layout



# **Display Board - Front View**

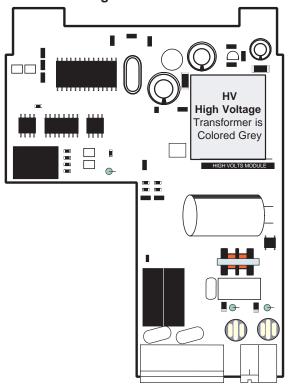


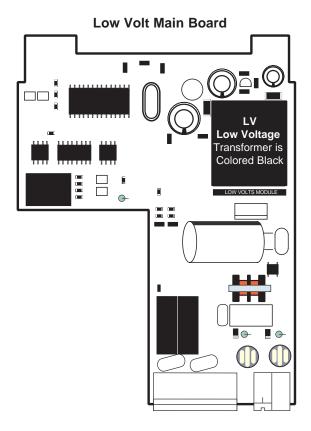
0.56" LED Display Board - Front View



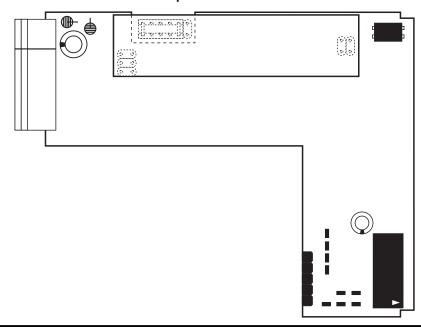
0.8" LED Display Board - Front View



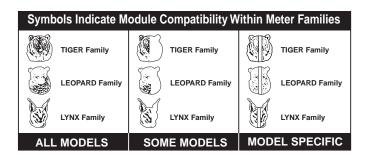




# **Output Module Carrier Board**

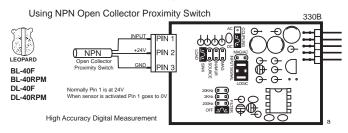


# I-Series Input Signal Conditioning Modules



Unless otherwise specified Texmate will ship all modules pre-calibrated with factory preselected ranges and/or scalings as shown in **BOLD** type. Other pre-calibrated standard ranges or custom ranges may be ordered. Factory installed custom scaling and other custom options are also available (see Ordering Information, Special Options on last page).

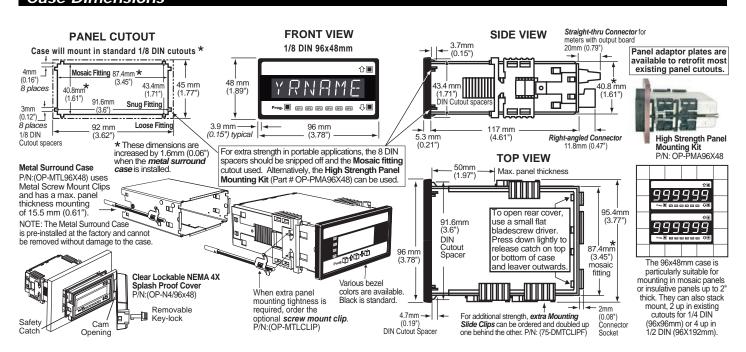
# IF05: Universal Frequency / RPM





WARNING: AC and DC input signals and power supply voltages can be hazardous. Do Not insert, remove or handle modules with live wires connected to any terminal plugs.

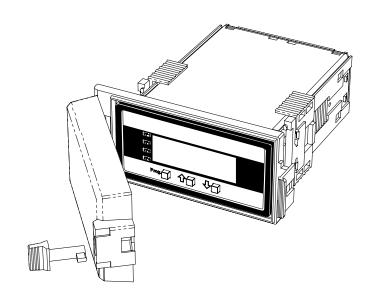
## Case Dimensions



# Lens Cover OP-N4X/96X48

The lens cover is designed to be dust and water proof to NEMA-4 standards. The lens cover consists of a base and cover with a cam hinge and key-lock locking device.

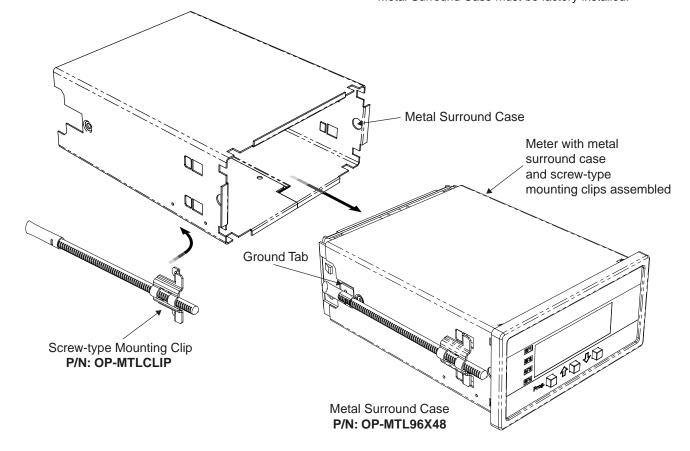
An O-ring, or neoprene gasket forms a seal between the base and the panel. The cam hinge prevents the cover from closing when opened until pushed closed. The cover has a tapered recess that, when closed, forms a capillary seal with a tapered ridge on the base. Turning the key-lock tightens the cover to the base, ensuring seal integrity. A safety catch keeps the cover closed even when the key is turned to the open position and removed. The keyhole can also be used to attach a safety seal clip, preventing unauthorized opening.



# Metal Surround Case OP-MTL96X48

The meter's plastic case is made from fire retardant polycarbonate. A metal surround case can be ordered to enhance the meter's fire retardant capabilities and also provide shielding against electromagnetic interference (EMI). The metal case slides over the polycarbonate case and is held firmly in place by spring-type non-return clips. Once the metal case has been fitted to the polycarbonate case it cannot be removed. With the metal case in place, the meter's plastic ratchet-type mounting clips can no longer be used. A pair of screw-type mounting clips are inserted into holes on the side of the metal case and used to mount the meter in the panel. A ground tab on the metal case provides a ground connection between the meter's main board and the metal case.

\* Metal Surround Case must be factory installed.



#### Ordering Information **BASIC MODEL#** DISPLAY **POWER SUPPLY INPUT MODULES ANALOG OUTPUT\* RELAY OUTPUT\* OPTIONS / ACCESSORIES** DL-40RPM OA

Add to the basic model number the order code suffix for each standard option required. The last suffix is to indicate how many different special options and or accessories that you may require to be included with this product. \*Except when when R1 or R2 relay output is selected, a meter ordered with an analog output or a relay output module requires an Output Module Carrier Board which should be automatically included with the order, with an additional charge. (See special Options and Accessories section)

Ordering Example: DL-40RPM-DR-PS1-IA01-AIC-R1-OA2, the 2 OA's are, CR-CHANGE and a OP-N4X/96X48

### **▶ BASIC MODEL NUMBER**

DL-40RPM . . 96x48mm, Leopard, 4 Digit, RPM Meter

### Standard Options for this Model Number

Order Code Suffix

Description

#### **▶ DISPLAY**

DR ... Red LED, 0.56 inch high

.Super-bright Red LED, 0.56 inch high DR .Green LED, 0.56 inch high DG . . . . Large Green LED, 0.8 inch high

LR . . . . Large Red LED, 0.8 inch high

### **▶ POWER SUPPLY**

PS1 . .85 - 265VAC / 95 - 370VDC PS2 . . . . 15 - 48VAC / 10 - 72VDC

### ▶ INPUT MODULES (Partial List. See www.texmate.com)

Unless otherwise specified Texmate will ship all modules precalibrated with factory preselected ranges and/or scalings as shown in BOLD type

IF05 . . . Universal Frequency/RPM

#### **► ANALOG OUTPUT**

AIC . . . . Isolated 16 Bit Current Output, 0-20mA and 4-20mA, pls. specify

AIV . . . . Isolated 16 Bit Voltage Output, 0-10VDC

### ▶ RELAY OUTPUT

Note: R1 and R2 are located on the main board, and are generally used when only two Form A Relays or less are required and an Analogy Output is not required.

.Single 5A Form A Relay . . . . Dual 5A Form A Relays

### **▶ RELAY OUTPUT MODULES**

Note: If a meter is ordered with a Relay Output Module, but without Analog Output, an Output Module Carrier Board should be automatically added to the order.

OR11 . . One 10 Amp Form C Relay, Isolated

OR15 . . One 10 Amp Form C and Two 5 Amps Form A Relays

. .One 10 Amp Form C and One 5 Amp Form A Relays
. .Two 10 Amp Form C Relays, Isolated OR16

OR12

OR14 .Two 10 Amp Form C and Two 5 Amps Form A Relays

.Two 10 Amp Form C and One 5 Amp Form A Relay, Isolated OR23

OR31 . . One 5 Amp Form A Relay, Isolated OR32

.Two 5 Amp Form A Relays, Isolated OR33

.Three 5 Amp Form A Relays, Isolated

. .Four 5 Amp Form A Relays, Isolated OR34

### Solid State Relay (SSR) Output Modules DC Only

. .One 400V DC Solid State Relay (SSR) 210mA . .Two 400V DC Solid State Relays (SSR) 210mA

**OR52** 

. Three 400V DC Solid State Relays (SSR) 210mA OR53

. .Four 400V DC Solid State Relays (SSR) 210mA OR54

### Solid State Relay (SSR) Output Modules AC/DC

. .One 400V AC/DC Solid State Relay (SSR) 140mA . .Two 400V AC/DC Solid State Relays (SSR) 140mA

OR62

OR63 . .Three 400V AC/DC Solid State Relays (SSR) 140mA

.. Four 400V AC/DC Solid State Relays (SSR) 140mA OR64

#### Special Options and Accessories (OA's)

Part Number Description

### ▶ SPECIAL OPTIONS (Specify Inputs or Outputs & Req. Reading) **Output Module Carrier Board**

\*One carrier board must be ordered with any meter that includes any one or more of the following options: Analog Output and/or Relay Output Modules.

.Output Module Carrier Board, DL series SA-DL/ŎM-CB

CR-CHANGE Range Change from Standard Range shown in **BOLD** type

Custom display scaling within standard ranges CS-3/3.5/4 COA-3/3.5/4 Custom scaling of analog output for digital meters & bargraphs

CCL-SETUP NRC to set-up Custom Configuration file and issue serial #

CCL-INSTL . Installation of custom configuration, specify serial #CCL-

NRC to set-up custom selectable range CSR-SETUP

CSR-INSTL . .Factory installation - custom configuration, specify serial # CSR-CSS-SETUP NRC to set-up custom special scaling

CSS-34/INSTL ... .Installation - for 3.5 and 4.0 meters, specify serial # CSS-

COR-SETUP ..... .NRC to set-up Relays in non-standard locations COR-INSTL . . . . . . Installation - Relays in non-standard locations , specify serial # COR-

### ▶ ACCESSORIES (Specify Serial # for Custom Artwork Installation)

75-DBB79648F .Black Bezel for 96x48mm Case

75-DMTCLIPF

Side Slide Brackets (2 pc) - extra set, extra strength "Touch" Green LED Faceplate, NEMA 4, Factory install 76-DL40G-N4

76-DL40LG-N4 "Touch" Large Green LED Faceplate, NEMA 4, Factory install

"Touch" Large Red LED Faceplate, NEMA 4, Factory install 76-DL40LR-N4

"Touch" Red LED Faceplate, NEMA 4, Factory install 76-DL40R-N4.

ART-FS-S/D/C .NRC for artwork & set-up Faceplate/Desc/Co.Logo

ART-FS-S/D . .NRC for artwork & set-up Faceplate/Desc ART-FS-001 . . . . . Install Custom Faceplate per meter - 1 color

**OP-MTLCLIP** 

Screw Mounting Clips (2 pc) - to screw tighten slide brackets
.Metal Surround Case, includes screw mounting clips OP-MTL96X48

OP-N4X/96X48 . . . . . 96x48mm clear lockable front cover—NEMA 4X, splash proof

Prices subject to change without notice.

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