



Actuator Group

# TDBRO-40 101 Segment Bargraph with 4 Digit 0.32" LED in a 9/64 DIN CASE

Smart Tricolor or mono-color digital bargraph with four fully programmable set points for monitoring, measurement, and control applications



## General Features

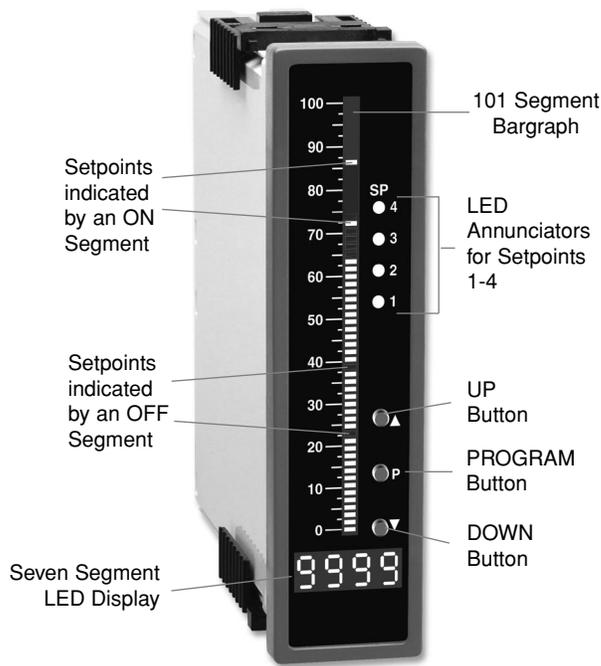
- Optional isolated 16 bit analog output. User or factory scalable to 4 to 20 mA, 0 to 20 mA or 0 to 10 V across any desired digital span from  $\pm$  one count to the full scale range of -1999 to 9999 (12000 counts).
- A Programmable Tricolor (Red-Green-Orange) or mono color (red or green), 101 segment high brightness bargraph. Vertical or optional horizontal format.
- Red 4-digit LED display with a range of -1999 to 9999 (12000 counts). Optional green digital display.
- Front panel LED annunciators provide indication of setpoint status.
- Two 10 Amp Form C, and two 5 Amp Form A relays available
- 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).
- 24 V DC excitation is available to power external 4/20mA transmitters and 5 or 10 V DC excitation is available for resistance bridge type sensors.
- Provision to connect an external programming lockout switch.
- Provision for external DIM switch to reduce the brightest display setting by 50%.
- Optional NEMA-4 front cover.
- Automatic intelligent averaging, smooths noisy signals while providing a fast display response to real level changes.

## Software Features

- Digital display and the 101 segment bargraph can be independently scaled.
- Bargraph center zero function.
- Four programmable setpoints.
- Adjustable delay-on-make and delay-on-break time for setpoints 1 and 2.
- Relay activation can be selected to occur above (HI) or below (LO) each setpoint.
- Digital display blanking.
- Decimal point setting.
- Four-level brightness control of bargraph, digital display, and setpoint LEDs.

## Specifications

- Input Specs:** .....Depends on Input signal conditioner
- A/D Converter:** .....14 bit single slope
- Accuracy:** ..... $\pm(0.05\%$  of reading + 2 counts)
- Temp. Coeff.:** .....100 ppm/ $^{\circ}$ C (Typical)
- Warm up time:** .....2 minutes
- Conversion Rate:**.....10 conversions per second (Typical)
- Digital Display:**.....**4 digit 0.31" LED red (std)**, green (optn)  
Range -1999 to 9999 counts.
- Bargraph Display:** ....**101 segment 4" red vertical (std)**,  
green or tricolor (optn), horizontal (optn)
- Polarity:** .....Assumed positive. Displays - negative
- Decimal Selection:**.....Front panel button selectable, X•X•X•X•
- Positive Overrange:**..Bargraph and top segments of digital display flash.
- Negative Overrange:** First segment of bargraph and bottom segments of digital display flash.
- Relay Output:** .....Two 5 Amp Form A relays and Two 10 Amp Form C relays.
- Analog Output:** .....Isolated 16 bit user scalable mA or V  
OIC (mA out) .....4-20 mA @ 0 to 500 $\Omega$  max loop resistance  
OIV (volts out) .....0-10 V DC @ 500  $\Omega$  or higher resistance
- Power Supply:** .....AC/DC Auto sensing wide range supply  
PS1 (std) .....**85-265 VAC / 95-370 VDC @ 2.5W max 4.2W**  
PS2 .....15-48 VAC / 10-72 VDC @ 2.5W max 4.2W
- Operating Temp.:** .....0 to 60 $^{\circ}$ C
- Storage Temp:** .....-20 $^{\circ}$ C to 70 $^{\circ}$ C
- Relative Humidity:** ....95% (non condensing)
- Case Dimensions:** ....9/64 DIN (Bezel 36Wx144Hmm)  
Depth behind bezel (5.83") 148mm  
Plus (0.7") 18mm for connectors
- Weight:** .....9.5 oz., 12 oz when packed



## 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 **↑** button allows you to view the setting of **setpoint 1**.

When setting a displayed parameter during programming, the **↑** button is used to increase the value of the displayed parameter.

### Down Button

When in the operational display, pressing the **↓** button allows you to view the setting of **setpoint 2**.

When setting a displayed parameter during programming, the **↓** button is used to decrease the value of the displayed parameter.

## Front Panel LED Display

### Annunciator LEDs

The annunciator LEDs indicate the alarm status. They are labeled from bottom to top: SP1, SP2, SP3, SP4.

### Digital LED Displays

The digital LED displays are used to display the meter input signal readings. They also display the programming settings during programming.

### Setpoint Indication

The position of setpoints on the bargraph display are indicated by an ON or OFF segment dependent on the bargraph display being above or below the setpoint.

## Programming Conventions

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 TDBRO-40 meter:

Symbol	Explanation
	This symbol represents the OPERATIONAL DISPLAY.
	This is the PROGRAM button.
	This is the UP button.
	This is the DOWN 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.

**XXXX**

If an X appears through a digit, it means that any number displayed in that digit is not relevant to the function being explained.

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.

[Span]  
[10000]

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.

[LHLH]

[HLHL]

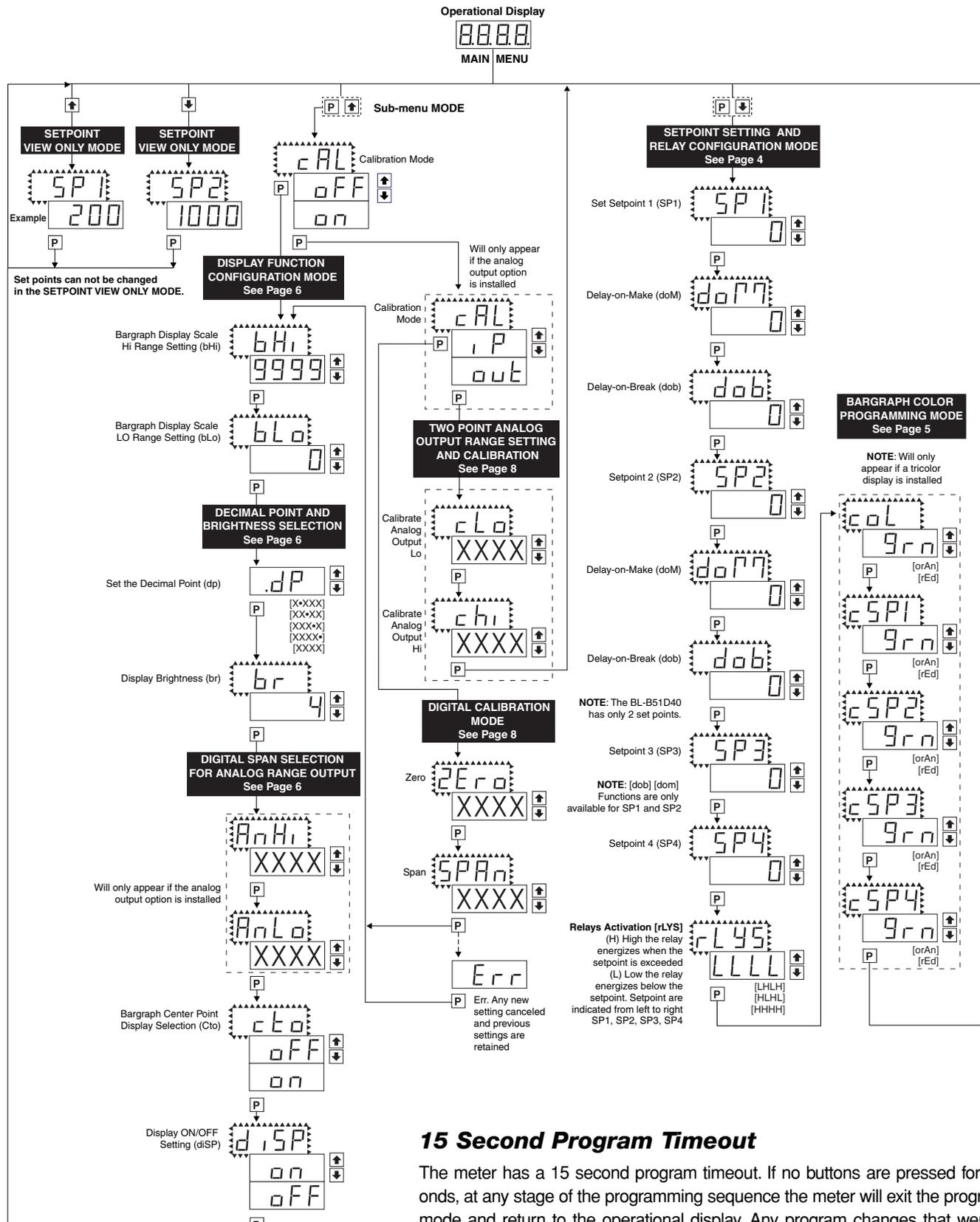
[LLLL]

When there are more than two display selections they are shown in brackets below the first display and are also selectable by pressing and releasing the **↑** or **↓** buttons.

The TDBRO-40 is an intelligent bargraph meter with a hierarchical software structure designed for easy programming and operation, as shown below in the software logic tree.

## Software Version Number Display

Whenever power is applied to the TDBRO-40 Bargraph, all segments of the bargraph and digital display light up for 3 seconds. The version number of the software is displayed for 2 seconds on the digital readout and then the meter reverts to the operational display and indicates the input signal.



## 15 Second Program Timeout

The meter has a 15 second program timeout. If no buttons are pressed for 15 seconds, at any stage of the programming sequence the meter will exit the programming mode and return to the operational display. Any program changes that were made prior to pressing the [P] button in the preceding step will not be saved.

# 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

- 1) Press the **[P]** and **[↑]** buttons at the same time. Display toggles between [SP1] and the previous SP1 setting.

## STEP B Set Setpoint 1 (SP1)

- 1) Using the **[↑]** and **[↓]** buttons, adjust the display to the desired SP1 value.
- 2) Press the **[P]** 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 **[↑]** and **[↓]** 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 **[P]** button. Display toggles between [dob] and the previous [dob] setting.

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

- 1) Using the **[↑]** and **[↓]** buttons, adjust the display to the desired [dob] value (0 to 9999 seconds). The reading must continuously remain in a 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 [SP2] and the previous SP2 setting.

## STEP E Set Setpoint 2 (SP2)

- 1) Using the **[↑]** and **[↓]** buttons, adjust the display to the desired SP2 value.
- 2) Press the **[P]** button. Display toggles between [doM] and the previous [doM] setting.

## STEP F Set the SP2 Delay-on-Make (doM) Delay Time Setting

- 1) Using the **[↑]** and **[↓]** 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 **[P]** button. Display toggles between [dob] and the previous [dob] setting.

## STEP G Set the SP2 Delay-on-Break (dob) Delay Time Setting

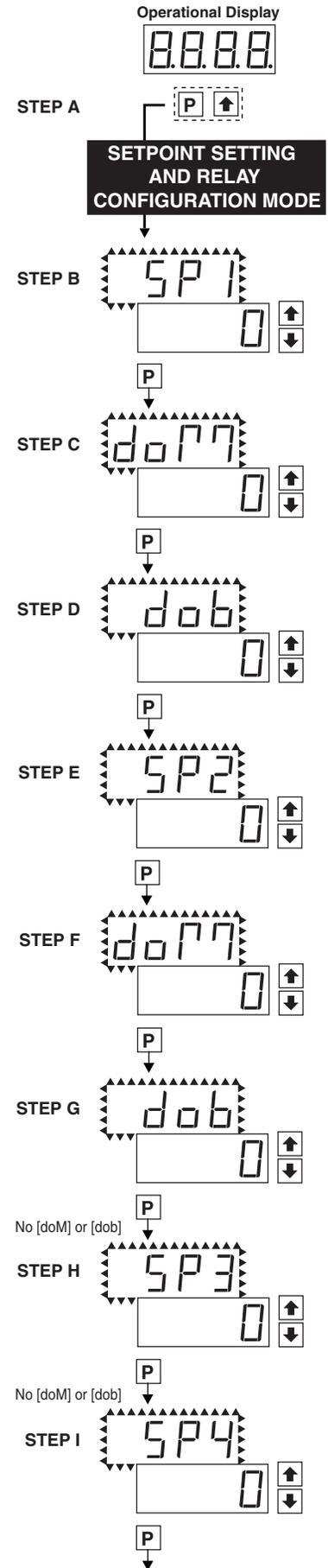
- 1) Using the **[↑]** and **[↓]** buttons, adjust the display to the desired [dob] value (0 to 9999 seconds). The reading must continuously remain in a non-alarm condition until this delay time has elapsed before the relay will break contact (de-energize).
- 2) Press the **[P]** button. Display toggles between [SP3] and the previous SP3 setting.

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

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

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

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



Please Continue On Next Page.

## Setpoint Setting and Relay Configuration Mode Continued

### STEP J 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.

- Using the and buttons, adjust the reading on the display to the desired relay settings: [LLLL], [LHLH], [LLHH], [HHHH].
- Press the button.

If a mono-color red or green display is installed then the Setpoint Relay Programming Mode is now complete and the meter returns to the operational display.

If a tricolor bargraph display is installed then the Bargraph Color Programming Mode will be entered and display toggles between [COL] and the previous setting. Color selection menu will be displayed.

### Bargraph Color Programming Mode

For safety, the tri-color bargraph is designed like a traffic light, to display either red, orange or green, but only one color at a time. The color to be displayed is selected in two ways.

**First** (Step K) is to select the color to be displayed, when the bar is “below\*”, whichever set point is set to the lowest position.

**Second** (Steps L, M, N, and O) is to select the color to be displayed when the bar is above each specific set point, regardless of the order or position to which the set points are set.

However, if two or more setpoints with differently specified colors are positioned at the same set point value, the color specified for the set point with the highest identifying number will be displayed. When set points are set to the same value, the SP4 color overrides the SP3 color, the SP3 color overrides the SP2 color, and the SP2 color overrides the SP1 color.

### STEP K Select Bargraph Color when the bar is BELOW\* the Setpoint that is set to the lowest position

- Using the and buttons, select the desired bargraph color [grn], [oran] or [red]
- Press the button. Display toggles between [CSP1] and the previous color setting.

### STEP L Select Bargraph Color when the bar is ABOVE\* SP1 Setpoint

- Using the and buttons, select the desired bar graph color [grn], [oran] or [red]
- Press the button. Display toggles between [CSP2] and the previous color setting.

### STEP M Select Bargraph Color when the bar is ABOVE\* SP2 Setpoint

- Using the and buttons, select the desired bargraph color [grn], [oran] or [red]
- Press the button. Display toggles between [CSP3] and the previous color setting.

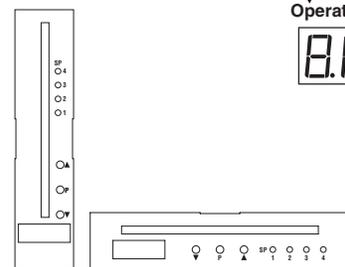
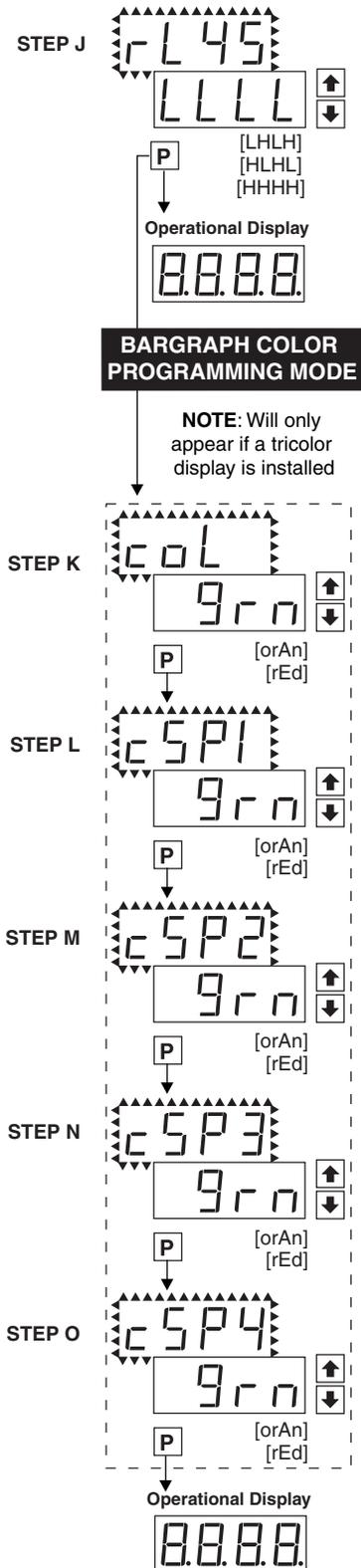
### STEP N Select Bargraph Color when the bar is ABOVE\* SP3 Setpoint

- Using the and buttons, select the desired bargraph color [grn], [oran] or [red]
- Press the button. Display toggles between [CSP4] and the previous color setting.

### STEP O Select Bargraph Color when the bar is ABOVE\* SP4 Setpoint

- Using the and buttons, select the desired bargraph color [grn], [oran] or [red]
- Press the button. The meter exits the setpoint mode and returns to the operational display.

The Bargraph Color programming mode is now complete.



\*Note: For horizontal display formats BELOW\* should be read as, “to the left” and ABOVE\* should be read as, “to the right”.

## Display/Bargraph Function Configuration Mode

### STEP A Enter the Calibration Sub Menu Mode

- 1) Press the **[P]** and **[↑]** buttons at the same time. Display toggles between [CAL] and [oFF]. (See Bargraph display scale range setup on page 7)
- 2) Press the **[P]** button. Display toggles between [bHi] and the previous setting.

### STEP B Set the Bargraph Display Scale Range (See example page 7)

- 1) Using the **[↑]** and **[↓]** buttons, adjust the display to the desired high parameter reading, e.g. 6000 counts.
- 2) Press the **[P]** button. Display toggles between [bLo] and the previous setting.
- 3) Using the **[↑]** and **[↓]** buttons, adjust the display to the desired low parameter reading, e.g. 4000 counts.
- 4) Press the **[P]** button. Display changes from [oFF] to [dP].

## Decimal Point and Brightness Selection

### STEP C Set the Decimal Point

- 1) Using the **[↑]** and **[↓]** buttons, adjust the display to the desired decimal point setting.
- 2) Press the **[P]** button. Display toggles between [br] and the previous brightness setting.

### STEP D Set the Bargraph and Digital Display Brightness

- 1) Using the **[↑]** and **[↓]** buttons, adjust the display to the desired brightness setting (4 is the brightest setting).
- 2) Press the **[P]** button. Display toggles between [AnHi] and the previous [AnHi] setting.

**Note:** If at this point, the display skips directly to STEP G and toggles between [Cto] and [oFF], the software is detecting that the optional analog output hardware is NOT installed.

## Digital Span Selection for Analog Range Output

### STEP E Setting the Digital Reading for Analog High Output

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

### STEP F Setting the Digital Reading for Analog Low Output

- 1) Using the **[↑]** and **[↓]** buttons, adjust the display to the desired digital value at which the analog low output will occur.
- 2) Press the **[P]** button. The display toggles between [Cto] and [oFF].

**Note:** Any two digital scale points from -1999 to 9999 can be selected. The digital scale points for analog high and analog low can be reversed for reversed 20-4 mA output. The span of the digital scale can be as small as two counts however small spans cause the 16 bit D to A to increment in stair case steps.

### STEP G Bargraph Center Point Mode Selection (See example on next page)

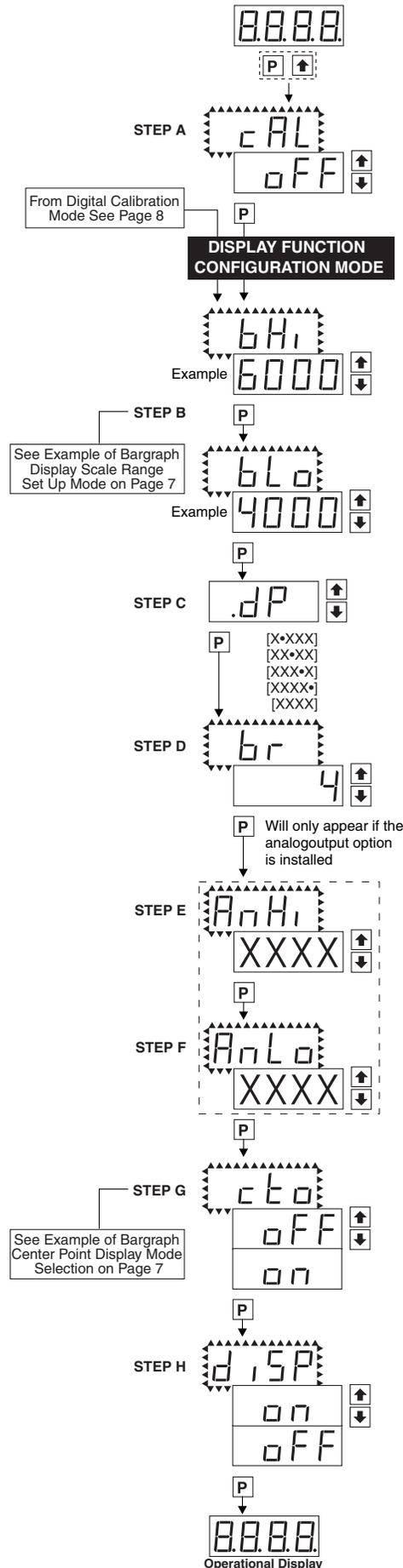
- 1) To select bargraph center point mode, press the **[↑]** or **[↓]** button. Display changes from [oFF] to [on].
- 2) Press the **[P]** button. Display toggles between [diSP] and [on] or [oFF].

### STEP H Digital Display ON/OFF Selection

- 1) To set the display to [oFF], press the **[↑]** or **[↓]** button. Display toggles between [diSP] and [oFF].
- 2) Press the **[P]** button. The display exits the calibration mode and returns to the operational display. Only the bargraph display is on and the digital display is off.

If the digital display is selected to be off, pressing any button to make programming changes or to view setpoints activates the digital display. When the procedure is complete, the digital display will then automatically switch off.

**The Display/Bargraph settings are now complete.**



## (Step B pg.6)

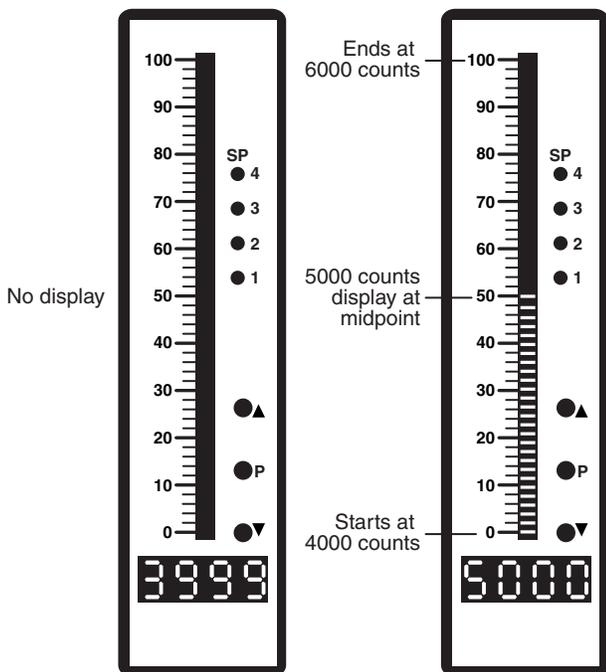
The bargraph display range can be independently scaled to display any portion of the digital reading up to a maximum full scale bargraph display of 100 counts. This provides an enhanced visual bargraph indication for those applications where the normal operating range is less than the full scale input range of the digital display.

This feature is set when the meter display toggles between [bHi] and [0000] to set the high parameter, and between [bLo] and [0000] to set the low parameter.

For Example:

If the full scale range of the meter has been set from 0-10000 counts, but the normal operating range of the input signal is 4000-6000 counts. The bargraph high parameter [bHi] can be set to 6000 and the bargraph low parameter [bLo] can be set to 4000.

This means that although the meter digitally displays all signals between 0-10000 counts, the bargraph display only begins to function at 4000 counts and reaches full scale indication at 6000 counts. Higher counts cause the bargraph display to indicate an overrange by flashing.



**Bargraph Display Scale Range Setting Example**

**Input Signal of 3999 counts**  
Bargraph does not light up

**Input Signal of 5000 counts**  
Bargraph lights up from 4000 to 5000 counts

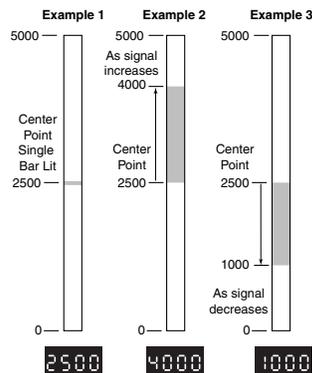
## Bargraph Center Point Display Mode Selection (Step G pg.6)

When the bargraph center point mode is enabled, the center segment of the bargraph becomes the midpoint of the bargraph full scale range. Depending on the size of the input signal, the bargraph lights up from the center segment (2500 counts in the example below) up to the position of a signal higher than 2500 counts, or from the center segment down to the position of a signal lower than 2500 counts.

## Example of Setting the Center Point Bargraph Mode

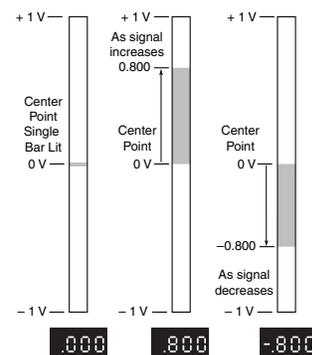
If the meter's full scale range is 5000 counts, the midpoint is 2500 counts. If a signal of 2500 counts is applied only one segment at the 2500 count mark will light up. If a signal of 4000 counts is applied the segments between the center segment (2500 counts) and the 4000 count mark light up.

If a signal of 1000 counts is applied, the segments between the center segment (2500 counts) and the 1000 count mark will light up.



## Measuring Bipolar Signals

The TDBRO-40 may also be calibrated to display bipolar signals like  $\pm 1$  V,  $\pm 10$  V or  $-1$  to  $+5$  V. When the bargraph is calibrated for symmetrical signals and the center point display mode is selected, it functions as a center zero meter.



## Two Point Digital Calibration Mode

### SEE PAGE 8

This mode enables the meter to be calibrated by applying a high input signal, entering the desired reading for that signal, then applying a zero or low input signal, and then entering the desired 0 or low reading. The meter then automatically calculates and programs in the requisite scale factor, within the following parameters.

1. Positive and negative signals may be applied, but the difference between the high and the low signal inputs must be at least 1000 counts or Err will be indicated.
2. Positive and Negative values for the desired reading can be entered, but the scale factor created can not exceed the Digital Display Span capability of the meter which is 12,000 counts between  $-1999$  to  $9999$ .
3. The internal Signal Span is limited to 3 V DC between  $-1$  V DC to  $+2$  V DC. Any outputs from an Input Signal Conditioning module that exceed these limits will cause the meter to indicate overrange regardless of the Digital Display Span scaled.

**Note:** Most input signal conditioners have provisions for analog calibration and scaling. If the meter is set to read zero with a zero input (shorted input), and to read 1000 with a 1.000 V input, any pre-calibrated signal conditioner with an output that does not exceed  $-1$  V to  $+2$  V, will read correctly in the meter without any further calibration.

## Digital Calibration Mode

### STEP A Enter the Calibration Mode

- 1) Press the and buttons at the same time. Display toggles between [CAL] and [oFF].
- 2) Press the or button. Display changes from [oFF] to [on].
- 3) Press the button. Display toggles between [CAL] and [out].

**Note:** If at this point, the display skips directly to STEP C and toggles between [SPAn] and the previous [SPAn] setting, the software is detecting that the optional analog output hardware is NOT installed.

### STEP B Select Two Point Digital Calibration of Input Signal

- 1) Press the or button to select CAL [iP] for input signal calibration.
- 2) Press the button. Display toggles between [ZEro] and the previous zero setting.

### STEP C Set the Meter's Low Input Signal Reading on the Digital Display

- 1) Apply a zero or low signal to the meter. (Positive or negative values are allowed)
- 2) Using the and buttons, adjust the meter display to the desired reading for the applied low input signal.
- 3) Press the button. Display toggles between [SPAn] and the previous span setting

### STEP D Set the Meter's High Input Signal Reading on the Digital Display

- 1) Apply a high input signal to the meter.
- 2) Using the and buttons, adjust the digital display to the desired reading for the applied high input signal.
- 3) Press the button.

**The Digital Calibration Procedure is now complete.**

If the digital calibration was successfully completed, the menu branches to the Display Function Configuration Mode, (see page 6) and the display flashes [bH1] and the previous setting.

### ERROR Indicates Unsuccessful Calibration

If the calibration was unsuccessful, the display indicates [Err], the new calibration settings just entered will not take effect and the previously stored setting will remain. The three most likely causes of an error during calibration are:

- 1) The full scale and zero signals were too similar. The full scale signal must be at least 1000 counts greater than the zero or low input signal (positive and negative values are allowed).
- 2) The scaling requirement exceeded the capability of the meter (-1999 to 9999).
- 3) No input signal present, or incorrect connections.

## Two Point Analog Output Range Setting and Calibration

### STEP A Enter the Calibration Mode

- 1) Press the and buttons at the same time. Display toggles between [CAL] and [oFF].
- 2) Press the or button. Display changes from [oFF] to [on].
- 3) Press the button. Display toggles between [CAL] and [out] input calibration.

**Note:** If at this point the display skips directly to toggle between [SPAn] and the previous [SPAn], the software is detecting that the optional analog output hardware is NOT installed.

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

- 1) Press the button. Display toggles between [CLo] and an internal scale factor.

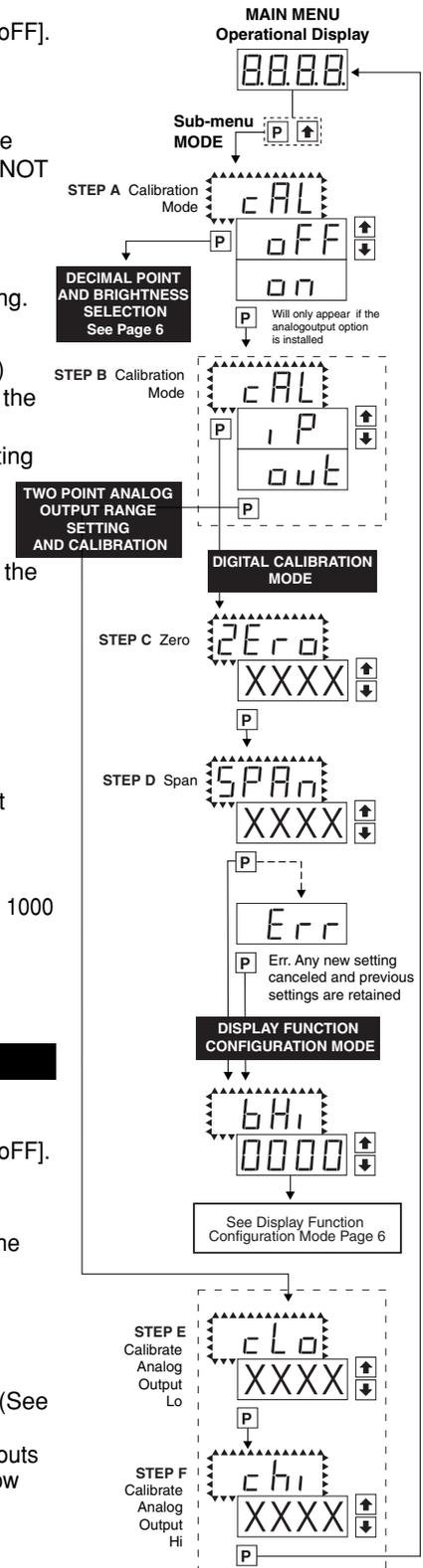
### STEP E Set or Calibrate the [CLo] Low Analog Output Range

- 1) Select the voltage or current loop output header position on the output module. (See Component Layout on page 11).
- 2) Connect a multimeter to pins 17 and 18 on the output module. (See Rear Panel Pinouts on page 10). Using the and buttons, adjust the analog output to the desired low value as shown on the multimeter display. CLo may be adjusted to any value from -0.3 mA to 17 mA (mA output selected) or from -0.6 V to 8 V (volt output selected)
- 3) Press the button. Display toggles between [Chi] and an internal scale factor.

### STEP F Set or Calibrate the [Chi] High Analog Output Range

- 1) 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 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 digital points between which the analog output will occur. (See Digital Span Selection on page 6).



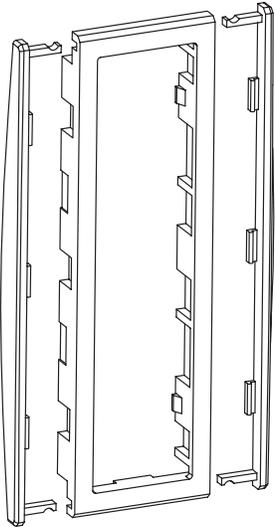
### Fits 6" Edgewise Pointer Meter Cut-Outs

The adapter snaps on the 36x144 mm (1.42"x5.69") case and enables single unit or stack mounting in an existing 6" edgewise pointer meter cut-out.

When extra panel mounting tightness is required, order the optional screw mount clip. P/N(OPMTLCLIP)

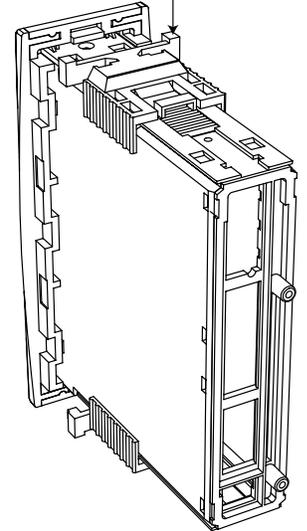
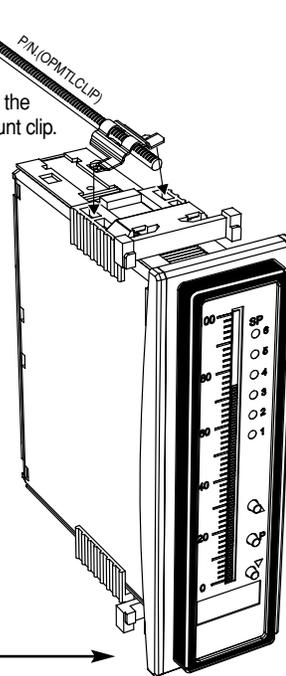
Adapter uses wide jaw mounting slide clips. P/N (75-DMC14436B)

Width: 43.7 mm to 48 mm (1.72" to 1.89")  
Height: 143.4 mm to 149 mm (5.62" to 5.88")

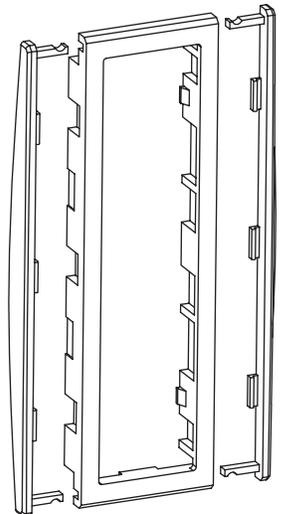
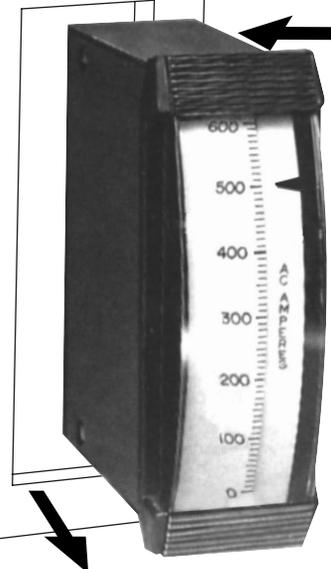
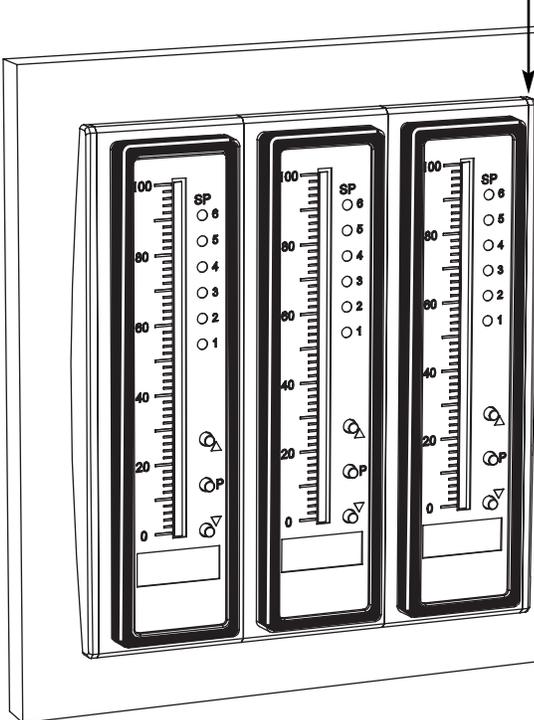
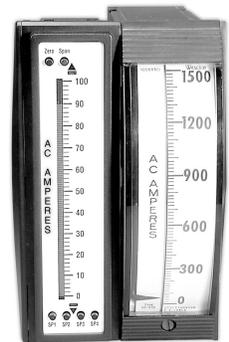


Panel Adapter  
Part #: OP-PA/144X36

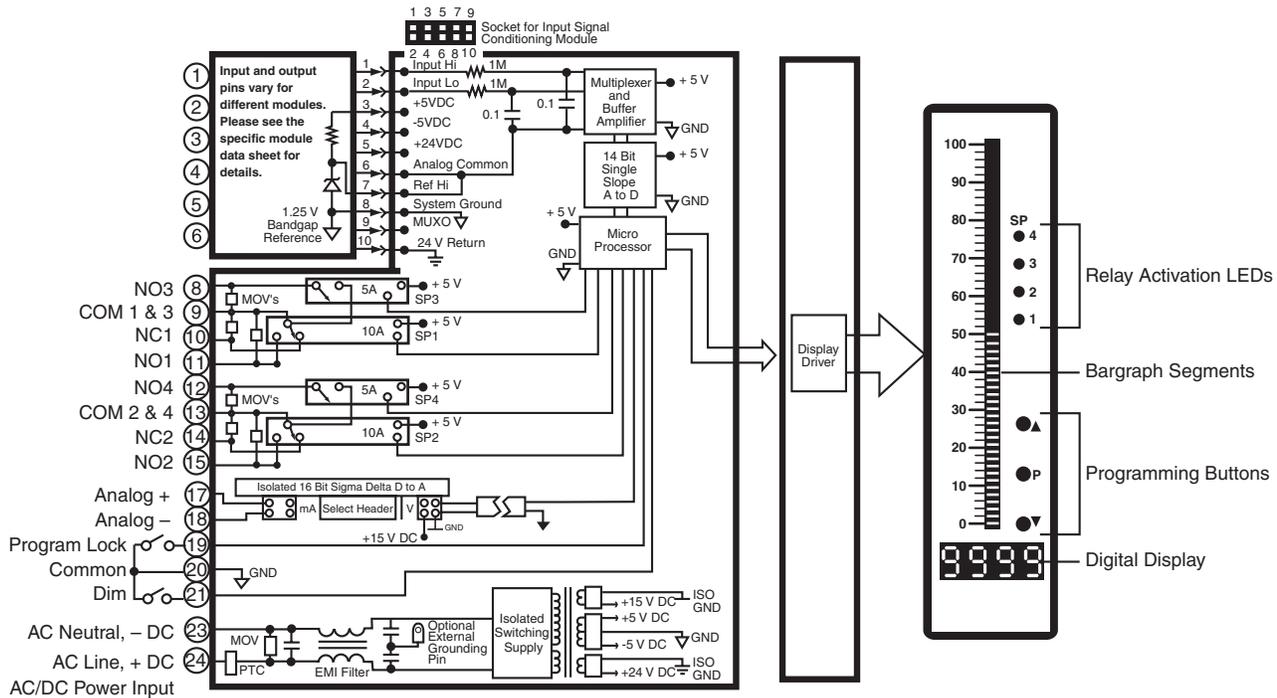
Two bezel trim strips are provided with each adapter to finish off the edge of each individually mounted meter or the edge of each stack mounted array.



Bargraphs are available with the bar either to the left or right side to match mechanical meters that have left or right sided pointers.



# Functional Diagram



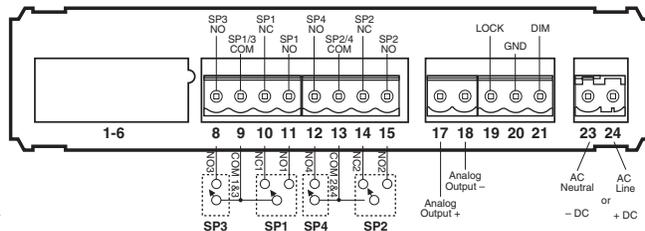
## Connector Pinouts

This meter uses plug-in type screw terminal connectors for all input and output connections. The power supply connections (pins 23 and 24) have a unique plug and socket outline to prevent cross connection. The main board uses standard right-angled connectors.

Replacement 2-, 3-, and 4-pin plug connectors are available (see Accessories on page 20).



**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.



Note: The sequence of setpoint outputs on meters shipped prior to 2002 was 1-2-3-4. The sequence is now 3-1-4-2, enabling delay on make (dom) and delay on break (dob) to be used with both Form "C" relays.

## Pin Descriptions

### 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 15 – Relay Output Pins

- Pin 8 SP3 NO. Normally Open 5 Amp Form A.
- Pin 9 SP1/3 COM. Common for SP1 and SP3.
- Pin 10 SP1 NC. Normally Closed 10 Amp Form C.
- Pin 11 SP1 NO. Normally Open 10 Amp Form C.
- Pin 12 SP4 NO. Normally Open 5 Amp Form A.
- Pin 13 SP2/4 COM. Common for SP2 and SP4.
- Pin 14 SP2 NC. Normally Closed 10 Amp Form C.
- Pin 15 SP2 NO. Normally Open 10 Amp Form C.

### Pins 17 to 21 – Rear Panel Switches

- Pin 17 ANALOG OUTPUT (+). mA (0 to 20 mA/4 to 20 mA) or V (0 to 10 V) output is header selectable.
- Pin 18 ANALOG OUTPUT (-). mA (0 to 20 mA/4 to 20 mA) or V (0 to 10 V) output is header selectable.

- Pin 19 20 mA) or V (0 to 10 V) output is header selectable. **Programming LOCK.** By connecting the LOCK pin to the COMMON pin, the meter's programmed parameters can be viewed but not changed.
- Pin 20 **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.
- Pin 21 **DIM.** By connecting the display dim (DIM) pin to the COMMON pin, the display brightness setting is halved.

### Pins 23 and 24 – 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 23 AC Neutral / -DC. Neutral power supply line.
- Pin 24 AC line / +DC. Live power supply line.

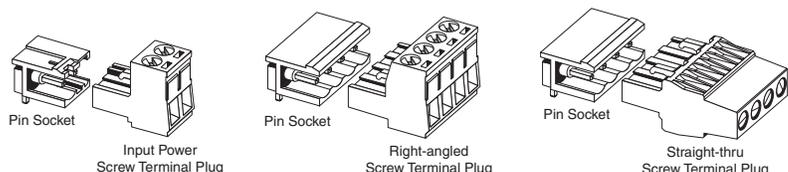
## Connectors



### WARNING

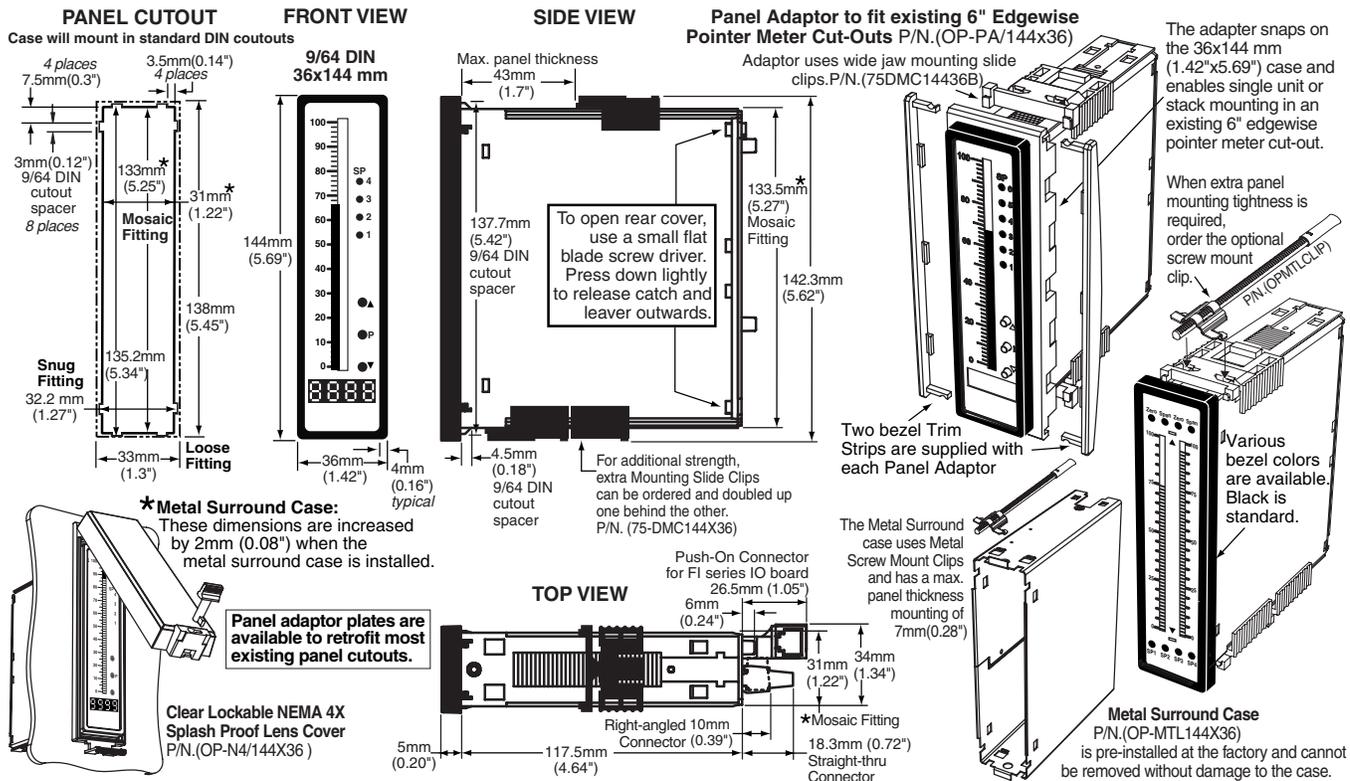
AC and DC input signals and power supply voltages can be hazardous. Do Not connect live wires to terminal blocks, and do not insert, remove or handle terminal blocks with live wires connected.

Standard plug-in screw terminal blocks provided by Numatics:

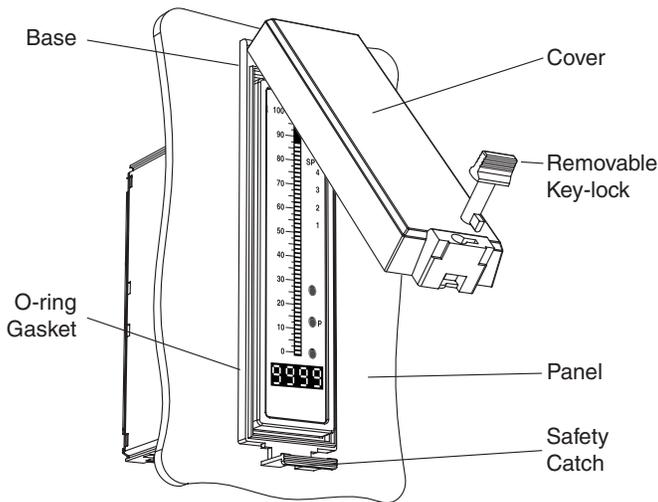




# Case Dimensions

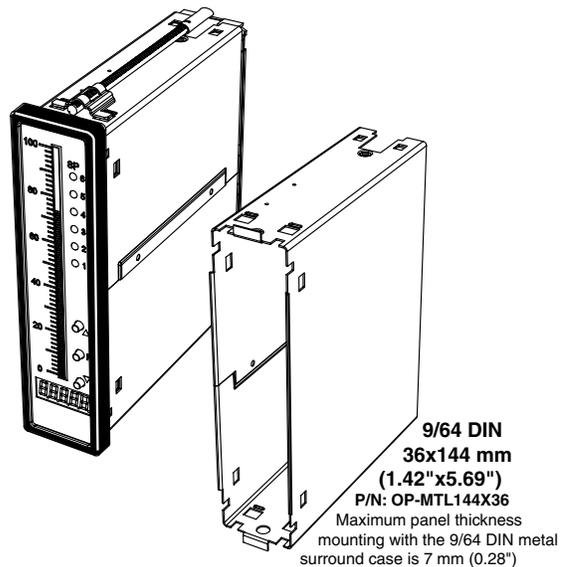


## Hinged Clear Face Plate Covers



**NEMA-4X Clear Lens Cover Part #: OP-N4/144X36**

## Metal Surround Case



### WARRANTY

The supplier warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from date of shipment. The supplier's obligations under this warranty are limited to replacement or repair, at its option, at its factory, of any of the products which shall, within the applicable period after shipment, be returned to the supplier's facility, transportation charges pre-paid, and which are, after examination, disclosed to the satisfaction of the supplier to be thus defective. The warranty shall not apply to any equipment which shall have been repaired or altered, except by the supplier, or which shall have been subjected to misuse, negligence, or accident. In no case shall the supplier's liability exceed the original purchase price. The aforementioned provisions do not extend the original warranty period of any product which has been either repaired or replaced by the supplier.

### USER'S RESPONSIBILITY

We are pleased to offer suggestions on the use of our various products either by way of printed matter or through direct contact with our sales/application engineering staff. However, since we have no control over the use of our products once they are shipped, NO WARRANTY WHETHER OF MERCHANTABILITY, FITNESS FOR PURPOSE, OR OTHERWISE is made beyond the repair, replacement, or refund of purchase price at the sole discretion of the supplier. Users shall determine the suitability of the product for the intended application before using, and the users assume all risk and liability whatsoever in connection therewith, regardless of any of our suggestions or statements as to application or construction. In no event shall the supplier's liability, in law or otherwise, be in excess of the purchase price of the product.

The supplier cannot assume responsibility for any circuitry described. No circuit patent licenses are implied. The supplier reserves the right to change circuitry, specifications, and prices without notice at any time.

### Local Distributor Address:

