TIGER FAMILY


- **6-digit, 0.56" (14.2 mm) Alphanumeric Display**
- **1/8 DIN Case**
- **3-button Front Panel Operation**
- **Intuitive Scrolling Text Configuration Menus**

# LVDT200

## Dual LVDT Controllers

Optimize performance and linearity. Select the correct frequency for your sensor

## Introduction

The LVDT200 Series are accurate, high performance, programmable dual channel controllers that deliver precise measurement and control for applications using LVDT (Linear Variable Differential Transformer) inputs.

The 6-digit alphanumeric LED display provides easy to follow setup prompts for all LVDT parameters using the following intuitive scrolling text configuration menus.

### *Input setup mode*

- 50 or 60 Hz supply frequency.
- Excitation frequencies:

  **50 Hz**: 1.2, 1.6, 2.4, 3.2, 4.8, 6.4, 8.0, 9.6 kHz excitation.

  **60 Hz**: 1.44, 1.92, 2.88, 3.84, 5.76, 7.68, 9.60, 11.52 kHz excitation.
- Update rates: 1, 4, 10, or 20 readings per second.
- Independent decimal point position setting for each channel display with resolution to 0.00001 of any engineering unit.

### *Calibration mode*

- Independent calibration for each channel:

  **Auto Calibration**: 2-point zero and span setting.

  **Offset Trim**: Independently trim the zero setting or enter an offset value.

  **Span Trim**: Independently trim the span setting.

### *Analog output mode*

- Zero setting.
- Full scale setting.

### *Setpoints mode*

- Four independently configured setpoints with above and below setpoint value actuation.
- **Relay**

  **Standard :** Four 4 amp relays.
- **Analog Output**

  **Standard:** Fully scalable from 0/4 to 20 mA (or reverse).

  **Options:** Single 0 to 10 V DC (or reverse) or dual 10–0–10 V DC.

## Advanced Functions

A range of built-in measurement and control functions are available with the LVDT200 Series controllers' resident operating system that can also be programmed from the front panel. These include:

- **Linearization**. Up to four 32-point flexible linearization tables or a single 125-point flexible table.
- **Serial Communications.** Optional single ASCII or Ethernet (TCP/IP) outputs.
- **Differential Measurement**. Differential measurement and cross channel maths available (A+B, A–B, AxB, A/B).

## Specifications

***General***

**Digital Display:** 14-segment alphanumeric, 0.56" (14.2 mm) LEDs.

**Display Color:** Red (standard). Green or Super-bright Red (optional).

**Display Range:** -199999 to 999999.

**Display Update Rate:** 1, 4, 10, or 20 times per second.

**Display Dimming:** 8 brightness levels. Front panel selectable.

**Scrolling Display Text Messaging:** Full alphanumeric text characters supported.

**Polarity:** Assumed positive. Displays – negative.

**Annunciators:** 6 red LEDs on front panel; one per setpoint.

**Overrange Indication:** OVER

**Underrange Indication:** UNDER

**Front Panel Controls:** PROGRAM, UP and DOWN buttons.

**Power Supplies.** Standard high voltage AC / DC power supply 85-265 V AC / 95-300 V DC, 50-400Hz, 2W nominal. or optional low voltage AC / DC power supply 14-48 V AC / 10-72 V DC.

***Environmental***

**Operating Temperature:** 0 to 50 ˚C (32 ˚F to 122 ˚F).

**Storage Temperature:** -20 ˚C to 70 ˚C (-4 ˚F to 158 ˚F).

**Relative Humidity:** 95% (non-condensing) at 40 ˚C (104 ˚F).

***Mechanical***

**Case Dimensions:** 1/8 DIN, 96x48 mm (3.78" x 1.89").

**Case Depth:** 137 mm maximum (5.39").

**Case Material:** 94V-0 UL rated self-extinguishing polycarbonate.

**Weight:** 11.5 oz (0.79 lbs), 14 oz (0.96 lbs) when packed.

***Approvals***

**UL:** E469078

***Input Module ISL1***

**Excitation Voltage:** 3 V RMS sine wave, zero DC component THD <2% (1.2 kHz).

**Excitation Frequency:** x 16 selectable frequencies available (1.2 kHz to 11.5 kHz). Crystal locked, software driven.

**Temperature Coefficient:** ± 50 ppm/ ° C of full scale (typical).

**Dual LVDT Inputs:** 30 kΩ input impedance. Synchronous demodulation of excitation carrier. >130 db rejection of excitation carrier.

**Frequency Response:** 500 Hz (–3 db) low-pass filter.

**Analog to Digital:** Dual channel ΣΔ A/D convertor approaching 19-bit resolution. Ratiometric operation relative to excitation voltage magnitude.

**Dual Output Rates:** Rapid and average response outputs. 1 Hz, 2 Hz, 10 Hz, 20 Hz averaged.

**Line Frequency Rejection:** 50 / 60 Hz noise rejection.

***Relay Output Modules***

Plug into carrier board from rear:

1. **Four Relay Module:** Available with four 5 A Form A Relays*.

   ***Form A Relay Specifications:** 5 A 240 VAC, 4 A 24 VDC. Isolation 3000 V. UL and CSA listed.
2. **Two Solid State Relay (SSR) Module:** Available with two independent (210 mA DC only) or (140 mA AC/DC) SSRs (400 V max).

## Table of Contents


Specifications . . . . . 1
Introduction . . . . . 1
Intuitive Scrolling Text Menus . . . . . 2
View Modes . . . . . 2
Configuration Menus Logic Tree . . . . . 2
Input Setup . . . . . 3
Calibration . . . . . 4
Analog Output Scaling . . . . . 5
Setpoints . . . . . 6
Calibration Mode Zero Options . . . . . 6
Analog Output Scaling and Calibration Example . . . . . 7
Input Signal Setup Procedures . . . . . 9
Connector Pinouts . . . . . 10
Installation . . . . . 12
Application Examples . . . . . 13
Notes . . . . . 14

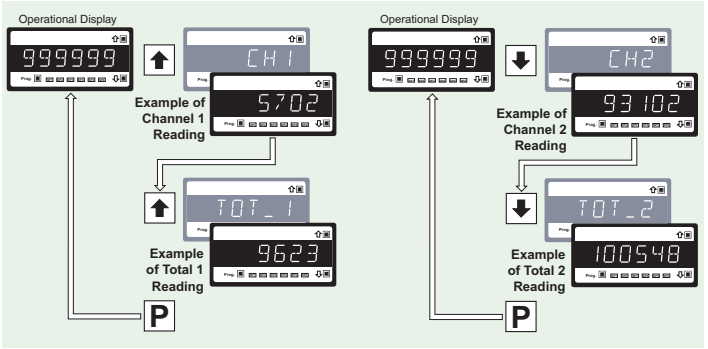

## Intuitive Scrolling Text Menus

After the controller has been powered up, the display settles and indicates the input signal calibrated value. This is known as the operational mode and is generally referred to as the throughout this document.

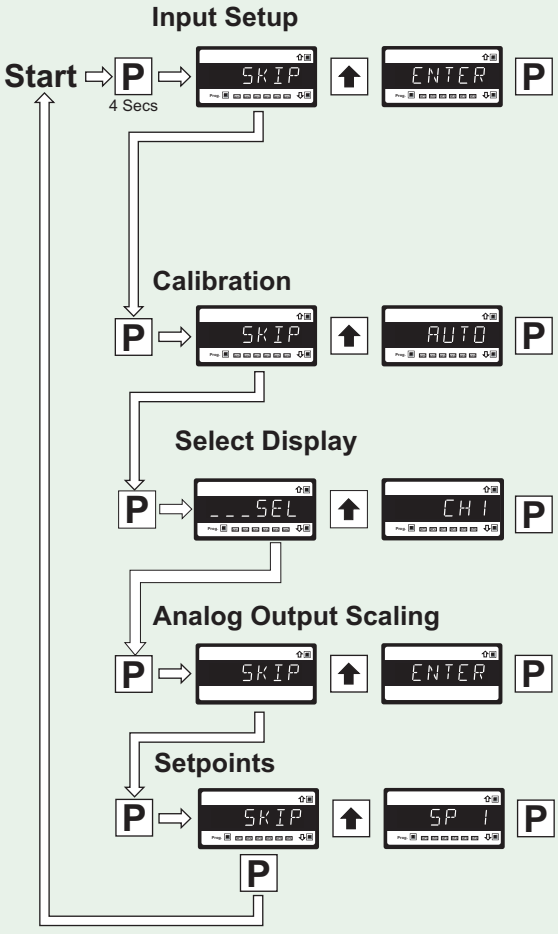
Intuitive scrolling text menus provide quick access to a range of configuration modes for easy LVDT sensor application setup. The  below describes the configuration menus.

## View Modes

The view modes allow easy viewing of the second channel reading plus total 1 and total 2 if required.




## Configuration Menus Logic Tree




**Takes you into Input Setup mode and provides selection for:**
- Supply frequency: 50 or 60 Hz.
- One of eight excitation settings for either 50 or 60 Hz.
- One of four output rates.
- Independent decimal point position for channels 1 and 2.

*See Page 3*

**Takes you into Calibration mode and provides selection for:**
- Either channel 1 or channel 2 for calibration.
- 2-point auto calibration for zero and span.
- Manual trim for zero offset.
- Manual trim for span.

*See Page 4*

**Allows you to change the displayed value:**
- Select either CH1, CH2, CH1+CH2 or CH1-CH2.

*See Page 4*

**Takes you into Analog Output Scaling mode and provides:**
A menu that allows you to set zero and full scale analog output calibration settings.

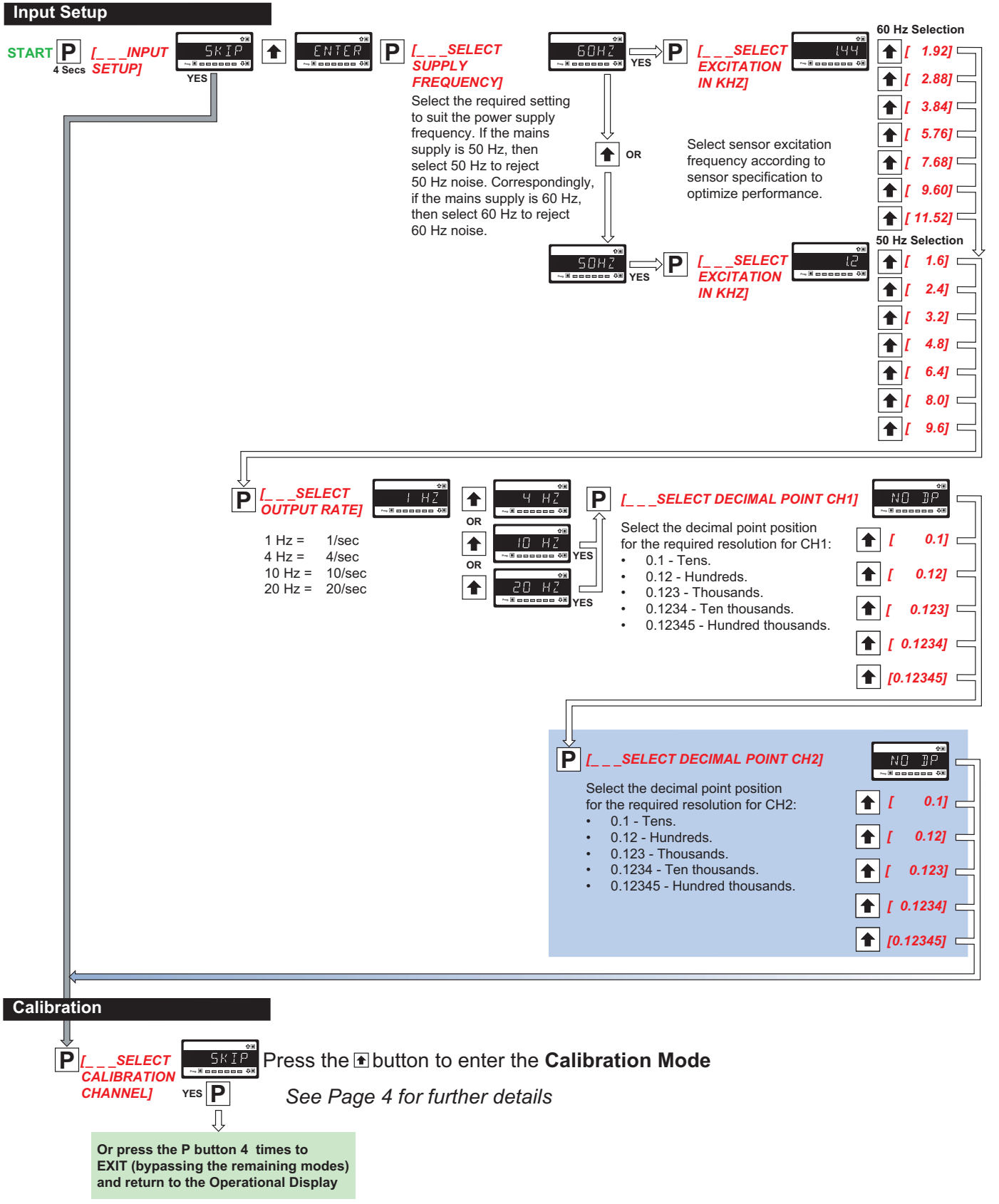
*See Page 5*

**Takes you into Setpoint mode and provides:**
- Selection of individual setpoints SP1 to SP4.
- Setting of individual setpoint source.
- Setting of individual setpoint activation value.
- Setting of individual setpoint activation ABOVE or BELOW.

*See Page 6*

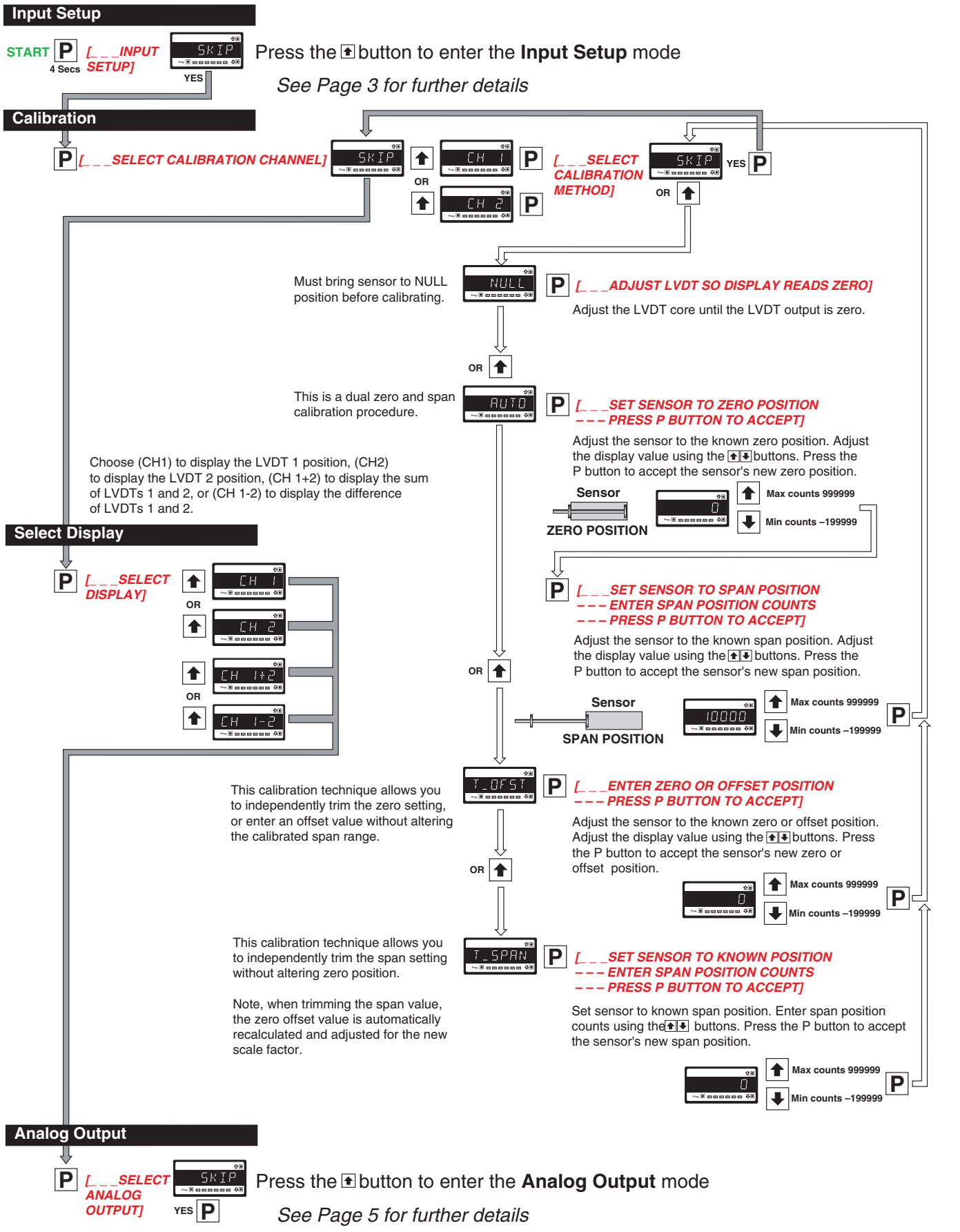
# Input Setup

The **input setup** mode allows you to configure five input setup settings in linked menus.



# Calibration

The **calibration** mode provides four individual calibration techniques.



# Analog Output Scaling

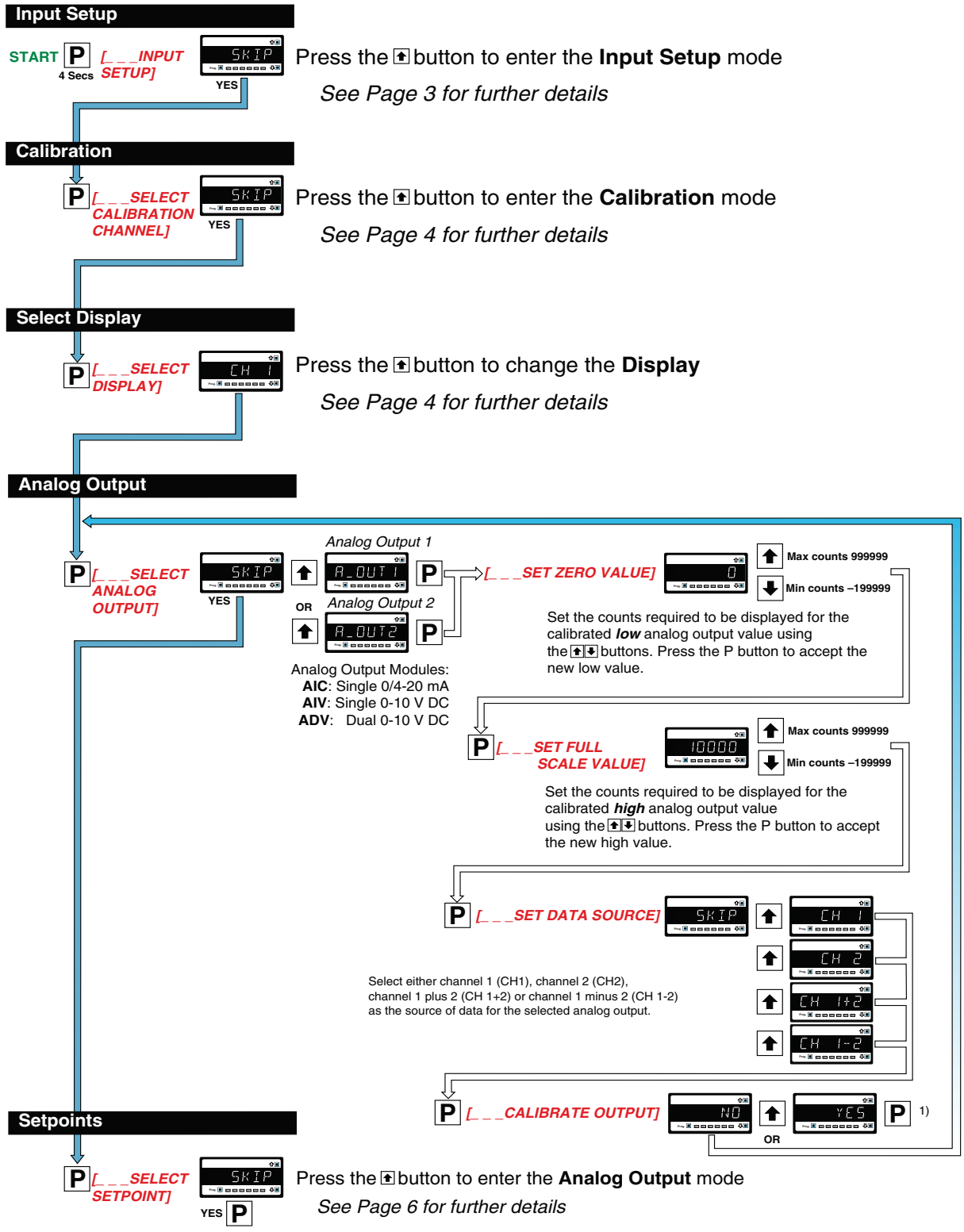
The analog output module is a standard single channel, programmable, isolated, 16-bit analog output that can be scaled to any desired span between –199999 to 999999 display counts using the .

*Optional single channel 0-10 V DC and dual channel 10–0–10 V DC analog output modules are also available.*

See **Analog Output Procedures** for an analog output scaling procedure.

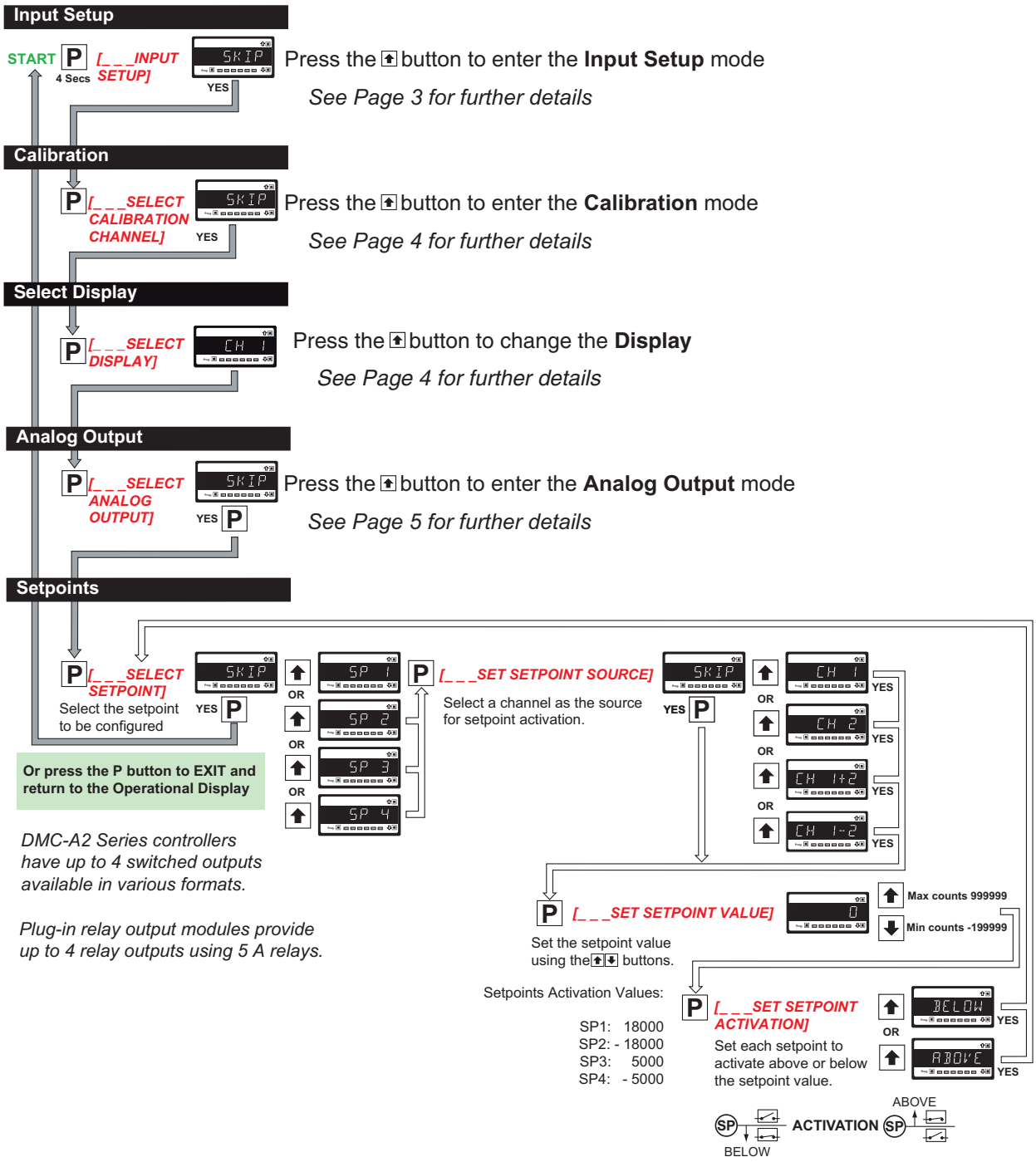
1) See **Analog Output Procedures** for an analog output signal calibration procedure.

See **Analog Output Procedures** for a current / voltage selection header positioning procedure.



## Setpoints

The **setpoint** mode provides settings for six individual setpoints.




## Calibration Mode Zero Options

***NULL***

The NULL position allows the user to adjust the LVDT core until the LVDT output is zero. The sensor must be brought to NULL position before calibrating.

The controller has been programmed with a and function that operates on the selected primary display reading only.

The function is used to zero the display. Display zero is initiated from a remote switch (not supplied) connected across the and pins at the rear of the controller (Terminal 2: Pin 4 Common, Pin 2 Hold).

The function is used to restore the true calibrated value on the display. Reset display value is initiated from a remote switch connected across the and pins at the rear of the controller (Terminal 2: Pin 4 Common, Pin 1 Lock).

The display zero value and reset display value are not retained during a power outage.

The display zero and reset display value functions are often used for cut, measure, and trim applications.

# Analog Output Scaling and Calibration Example

In this example the analog output signal is scaled over a range of 50 to 30,000 counts. The analog output is then calibrated for a 0 to 10 V DC output.

*Note:*
*In **Steps 11** to **19,** the analog output may be calibrated to other ranges such as 0-20 mA or 4-20 mA. For current output the header on the analog output module has to be moved to the CURRENT position.*

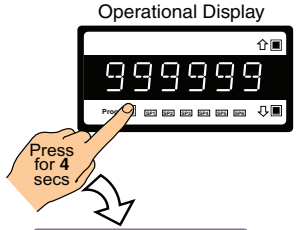
*See the drawing on Page 8 on how to change the analog output from voltage (default) to a current output.*

1) Connect a multimeter to the analog output connector at the rear of the meter (Terminal 4: Pin 3 positive, Pin 2 negative).
2) Make sure the multimeter is set to read the appropriate signal type: volts or milliamps.
3) Carry out the analog output scaling procedure to set zero and full scale settings.
4) If required, carry out the analog output calibration procedure to calibrate the milliamp (or voltage) output low and high settings.

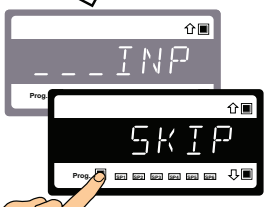
## Scaling the Analog Output Signal

START HERE

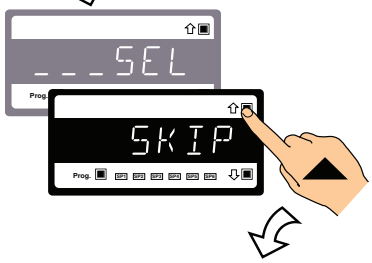
Operational Display



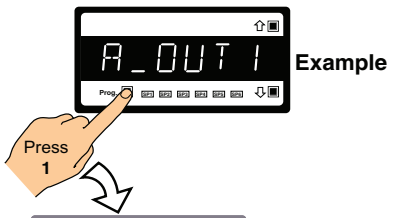

**Step 1**
Enter the Configuration Menus



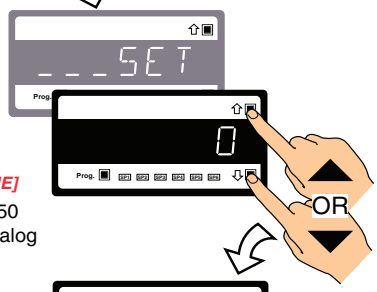

**Step 2**
Display scrolls
*[_ _ _ INPUT SETUP]*
Press the [P] button three times to skip the **Calibration** and **Display Select** modes enter the **Analog Output** mode



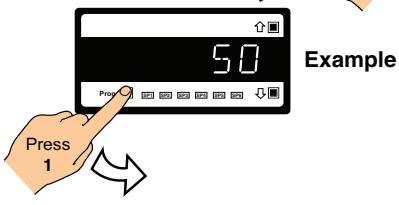

**Step 3**
Display scrolls
*[_ _ _ SELECT ANALOG OUTPUT]*
Press the [↑] button once to enter **Analog Output 1** or twice to enter **Analog Output 2**




**Step 4**
Confirm Analog Output Selection.



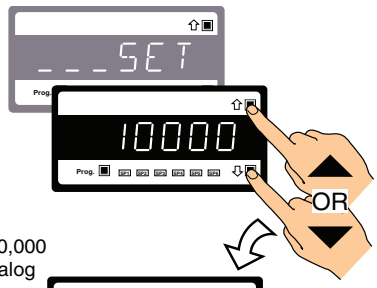

**Step 5**
Display scrolls
*[_ _ _ SET ZERO VALUE]*
Adjust the display to 50 counts for the **low** analog output scale setting



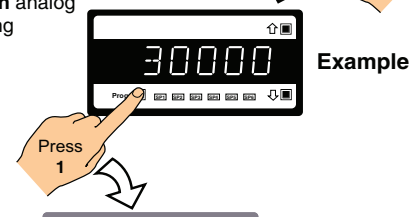

**Step 6**
Accept the new low value

To Step 7

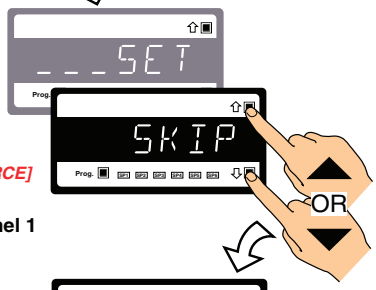
From Step 6



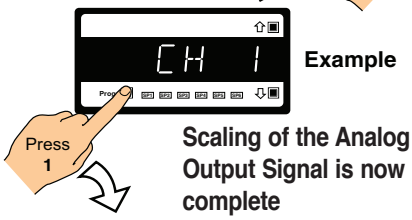

**Step 7**
Display scrolls
*[_ _ _ SET FULL SCALE VALUE]*
Adjust the display to 30,000 counts for the **high** analog output scale setting




**Step 8**
Accept the new high value

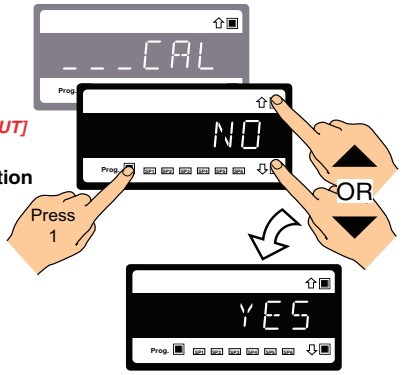



**Step 9**
Display scrolls
*[_ _ _ SET DATA SOURCE]*
Press the [↑] button once to select **Channel 1** or twice to select **Channel 2**




**Step 10**
Accept the new data source setting.

**Scaling of the Analog Output Signal is now complete**




**Step 11**
Display scrolls
*[_ _ _ CALIBRATE OUTPUT]*
Press the [P] button to skip **Output Calibration** and return to Step 3. Press the [P] button twice to return to the Operational Display

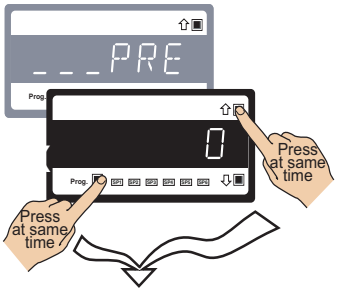
The calibration of the Analog Output is continued on page 8

From Step 16

## Step 12

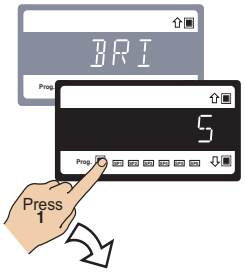
Display scrolls **[___PRESS P AND UP]**

Press P and ↑ buttons at the same time




## Step 13

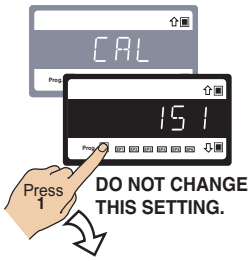
Press P to enter the Calibration menu




## Step 14

With DMC-A2 Series connected to a multimeter, DMC-A2 Series displays [CAL] [151]. This is the setting for **analog output 1** ([CAL] [152] for analog output 2).

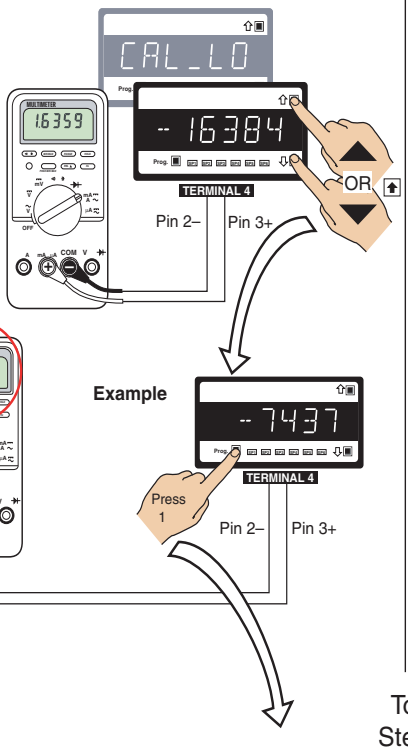
Press P to start the calibration procedure




## Step 15

Ensure the **low** analog output signal reading [CAL_LO] on the multimeter display is 0.00 V DC.

If not correct, press the ↑ or ↓ button on DMC-A2 Series until the reading on the multi meter display is correct.




## Step 16

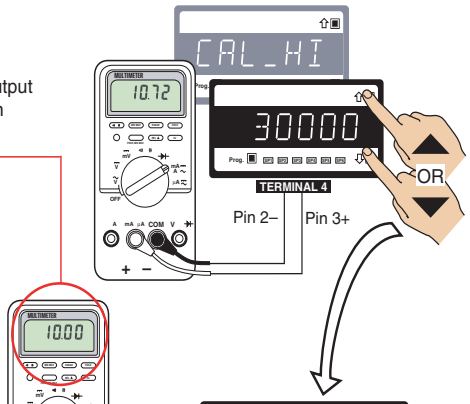
Press P to save the **low** analog output signal setting. Enter analog output **high**

To Step 17

## Step 17

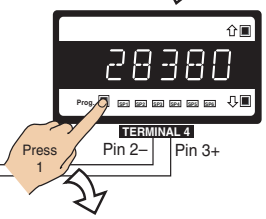
Ensure the **high** analog output signal reading [CAL_HI] on the multimeter display is 10.00 V DC.

If not 10.00 V DC, press the ↑ OR ↓ button on DMC-A2 Series until the reading on the multimeter display is correct.



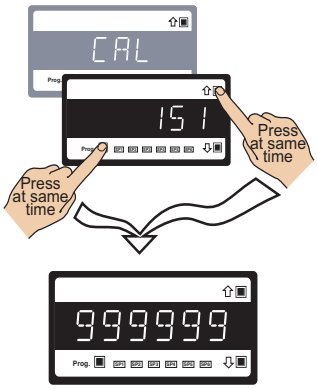

## Step 18

Press P button to leave the CAL menu



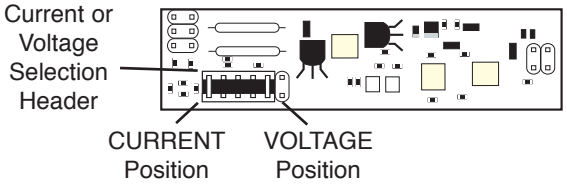

## Step 19

Press P and ↑ buttons at the same time to return to the operational display




Operational Display

### Analog Output Module PCB




Available in Single (0~4-20mA or 0-10V) or Dual (0-10V & 0-10V)

To change the analog output from voltage to current output, remove the PCB from the case.
Identify the Analog Output module which is soldered on to the top carrier board.
Move the V/I selection header on the analog output module from the voltage position (default) to the current position .

## Technical Description

This input is a smart input module designed to drive and condition the signals from two LVDT transducers. The module contains two high-speed microcontrollers and a SD 16-bit dual channel A/D convertor. It communicates with the selected controller via the I²C data bus. One of the microcontrollers generates the sine wave for the LVDT excitation frequency. These frequencies are produced as multiples of the line frequency (either 50 Hz or 60 Hz). Up to 16 frequencies are available and are selected using the controller setup. The output to the primary coil of both LVDTs is a 3 V RMS sine wave. The received LVDT signals are synchronously demodulated and filtered to remove the carrier frequency. The Σ Δ 16-bit A/D convertor has over 130 dB noise rejection at the excitation frequencies and is capable of 40 Hz averaged output on 45 samples.

Two open collector NPN transistors are available as high-speed controlled outputs. The controller setpoint SP5 controls output CONTROL 1 and SP6 and controls output CONTROL 2.

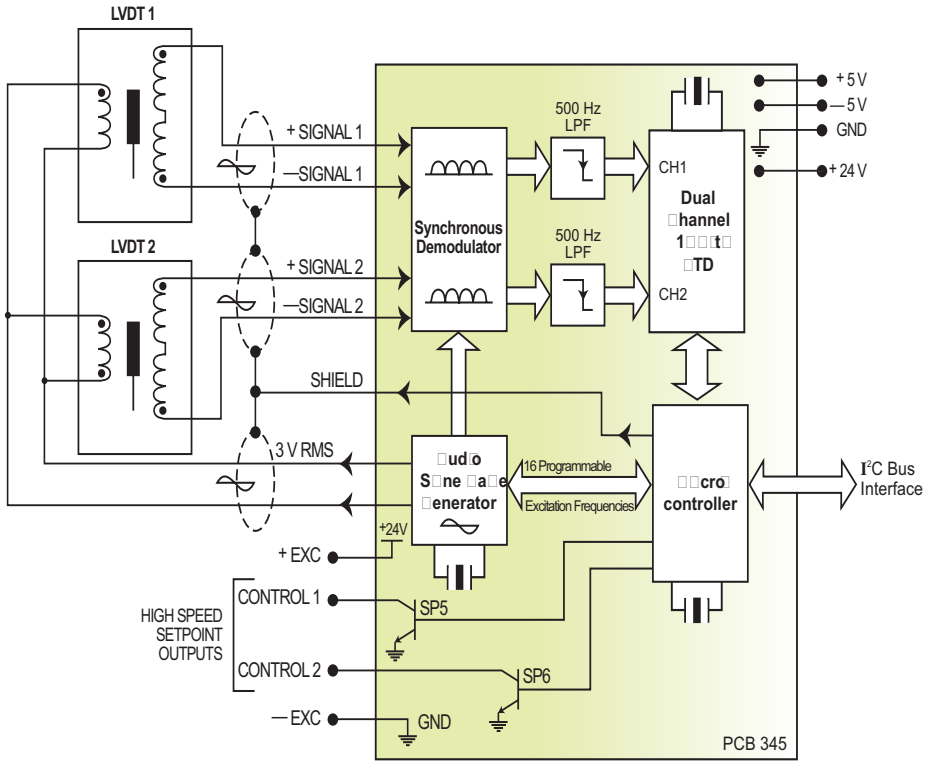
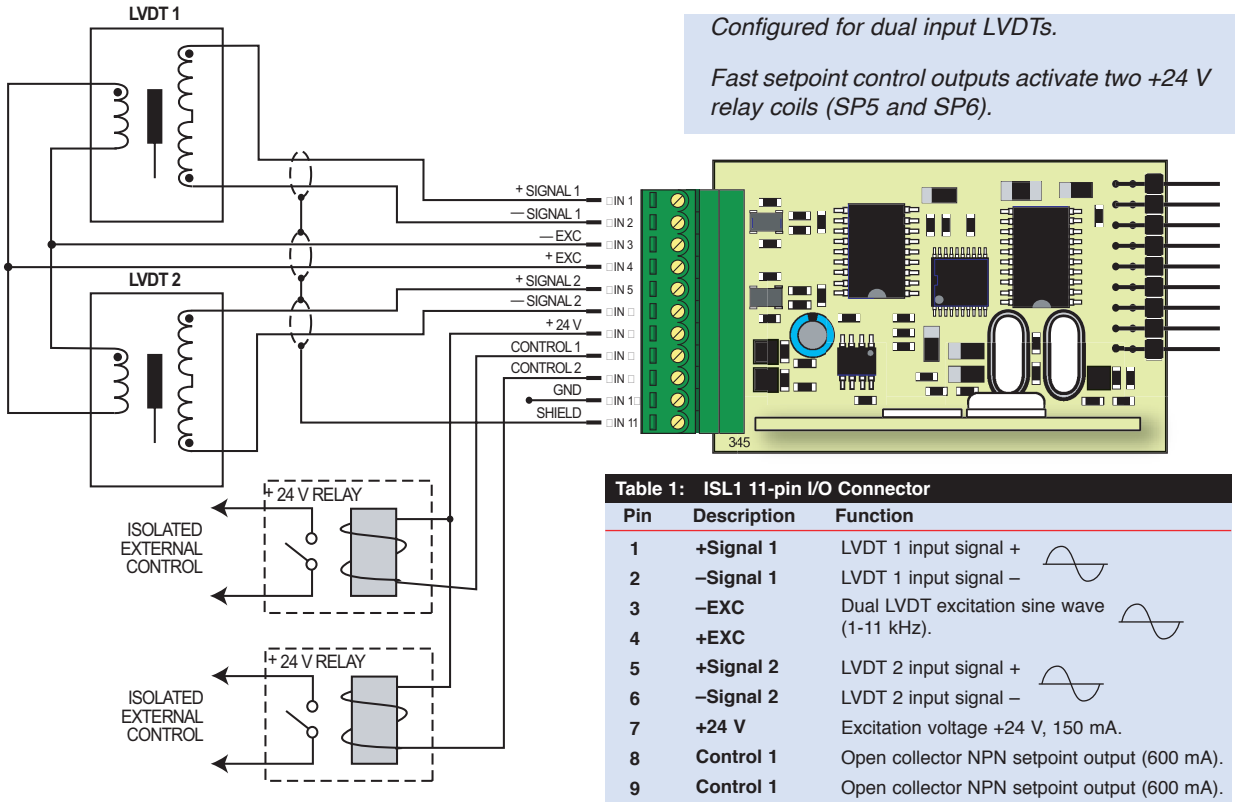



**Figure 2 – ISL1 LVDT Functional Schematic**

## Example Connection Diagram




*Configured for dual input LVDTs.*

*Fast setpoint control outputs activate two +24 V relay coils (SP5 and SP6).*

**Table 1: ISL1 11-pin I/O Connector**

| Pin | Description | Function |
|---|---|---|
| 1 | **+Signal 1** | LVDT 1 input signal + |
| 2 | **–Signal 1** | LVDT 1 input signal – |
| 3 | **–EXC** | Dual LVDT excitation sine wave (1-11 kHz). |
| 4 | **+EXC** | |
| 5 | **+Signal 2** | LVDT 2 input signal + |
| 6 | **–Signal 2** | LVDT 2 input signal – |
| 7 | **+24 V** | Excitation voltage +24 V, 150 mA. |
| 8 | **Control 1** | Open collector NPN setpoint output (600 mA). |
| 9 | **Control 1** | Open collector NPN setpoint output (600 mA). |
| 10 | **Ground** | 0 V. |
| 11 | **Shield** | Cable shield, 3 V common mode. |

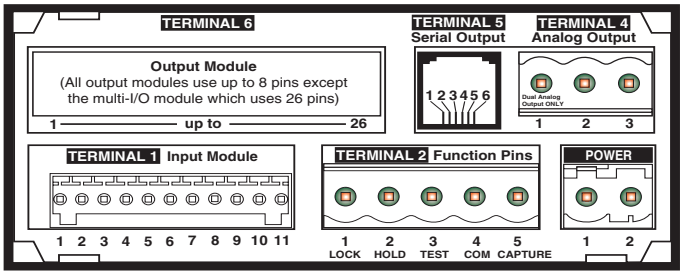
**Figure 3 – Example Connection Configured for Dual LVDT Inputs and Two Relay Outputs**

## Connector Pinouts

All external connections to the LVDT200 Series are via the following six connector terminal blocks located at the rear of the controller:

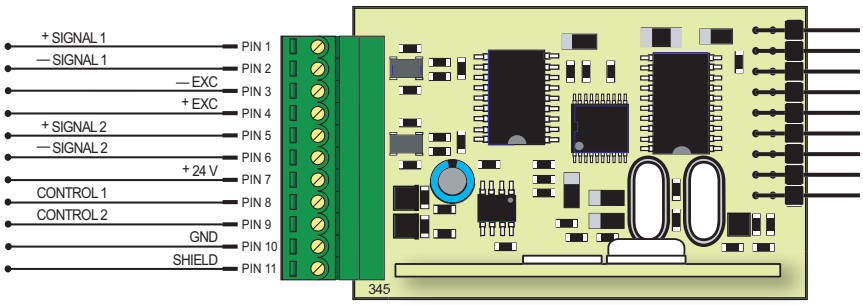
- Terminal 1: Input Signals.
- Terminal 2: Function Pins.
- Power: AC / DC Power Supply.
- Terminal 4: Analog Output.
- Terminal 5: Serial Output.
- Terminal 6: Relay Output or Multi-I/O Module.

LVDT200 Series use plug-in type screw terminal connectors for most input and output connections, an RJ-11 phone connector for the RS-232 serial output and an RJ-45 phone connector for the optional Ethernet output.




**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.**

**Figure 4 – Rear Panel Pinout Diagram**

| Connector | Pin | Name | Description |
|---|---|---|---|
| **TERMINAL 1**<br>**Input Signals**<br>Pins 1 up to 11 | 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11 | + Signal 1<br>– Signal 1<br>–Excitation<br>+Excitation<br>+ Signal 2<br>– Signal 2<br>+ 24 V<br>Control 1<br>Control 2<br>Ground<br>Shield | **Input Module ISL1**<br>  |
| **TERMINAL 2**<br>**Function Pins**<br>Pins 1 to 5 | 1 | Reset Display Value (Lock) | By connecting Pin 1 (**lock**) to Pin 4 (**common**) with a remote spring-return switch restores the display to the true calibrated value. |
| | 2 | Display Zero (Hold) | By connecting Pin 2 (**hold**) to Pin 4 (**common**) with a remote spring-return switch zeroes the display. |
| | 3 | Display Test and Reset | Pin 3 (**display test** and **reset** pin) provides a test of the controller's display and resets the microprocessor when Pin 3 is connected to Pin 4. |
| | 4 | Common | To activate the **hold**, **test and reset**, or **lock** pins from the rear of the controller, the respective pins have to be connected to the **common** pin. |
| | 5 | Manual Zero (Capture) | By connecting Pin 5 (**capture**) to Pin 4 (**common**) with a remote spring-return switch manually resets the calibrated zero.<br>**For further details on the function pins, contact Texmate.** |
| **POWER**<br>**Auto Sensing AC / DC Power Supply**<br>Pins 1 and 2 | 1<br>2 | AC Neutral / DC –<br>AC Line / DC + | The **power** connector supplies AC / DC power to the controller via a standard high voltage or optional low voltage auto-sensing power supply mounted on the main board.<br>**PS1**: Standard High Voltage option. 85-265 V AC / 95-370 V DC.<br>**PS2**: Optional Low Voltage option. 14-48 V AC / 10-72 V DC. |

| Connector | Pin | Name | Description |
|---|---|---|---|
| **TERMINAL 4**<br>**Analog Outputs**<br>Pins 1 to 3 | TERMINAL 4 connects the analog output module to external devices. A single 0~4 to 20 mA (standard) or (optional) 0 to 10 V DC or dual 10–0–10 V DC is supported on the standard, Ethernet, or DeviceNET carrier board. | | |
| | 1 | Positive (+) | Positive for Analog Output 2 (**ADV** – Dual 10–0–10 V DC modules only). |
| | 2 | Negative (–) | Negative for Analog Output 1 and 2. |
| | 3 | Positive (+) | Positive for Analog Output 1. |

**TERMINAL 5**

**Serial Outputs**

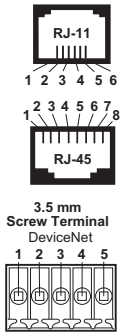
Pins 1 up to 8

TERMINAL 5 connects the serial output module to external devices.

The **standard** carrier board supports a single or dual RS-232 or RS-485 ASCII or Modbus serial card connected thru an RJ-11 socket.

**Ethernet**

The **DeviceNET** carrier board uses a 3.5 mm screw connector.




| | STANDARD CARRIER BOARD | | | | ETHERNET CARRIER BOARD | | DEVICENET CARRIER BOARD |
|---|---|---|---|---|---|---|---|
| Pin No. | RS-232 (ASCII or Modbus) RJ-11 Socket | | RS-485 (ASCII or Modbus) RJ-11 Socket | | RJ-45 Socket (10/100 Base-T) | | 3.5 mm Pitch Screw Terminal |
| | Single Output | Dual Output | Single Output | Dual Output | | | |
| **1** | Reserved for future use | RXD1 | Reserved for future use | B1 | White/Orange | TXD+ | Negative (–) 24 V |
| **2** | Isolated Ground | 0 V | Isolated Ground | 0 V | Orange | TXD– | Can – (negative) |
| **3** | +5 VDC to power external converters | 0 V1 | +5 VDC to power external converters | 0 V1 | White/Green | RXD+ | N/C |
| **4** | TXD. Transmitted Serial | TXD | A (High) | A | Blue | – | Can + (positive) |
| **5** | RXD. Received Serial | RXD | B (Low) | B | White/Blue | – | Positive (+) 24 V |
| **6** | Reserved for future use | TXD1 | Reserved for future use | A1 | Green | RXD– | Not applicable |
| **7** | Not applicable | Not applicable | Not applicable | Not applicable | White/Brown | – | Not applicable |
| **8** | Not applicable | Not applicable | Not applicable | Not applicable | Brown | – | Not applicable |

**TERMINAL 6**

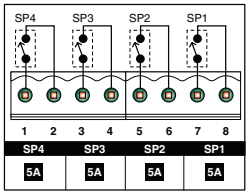
**Relay Outputs**

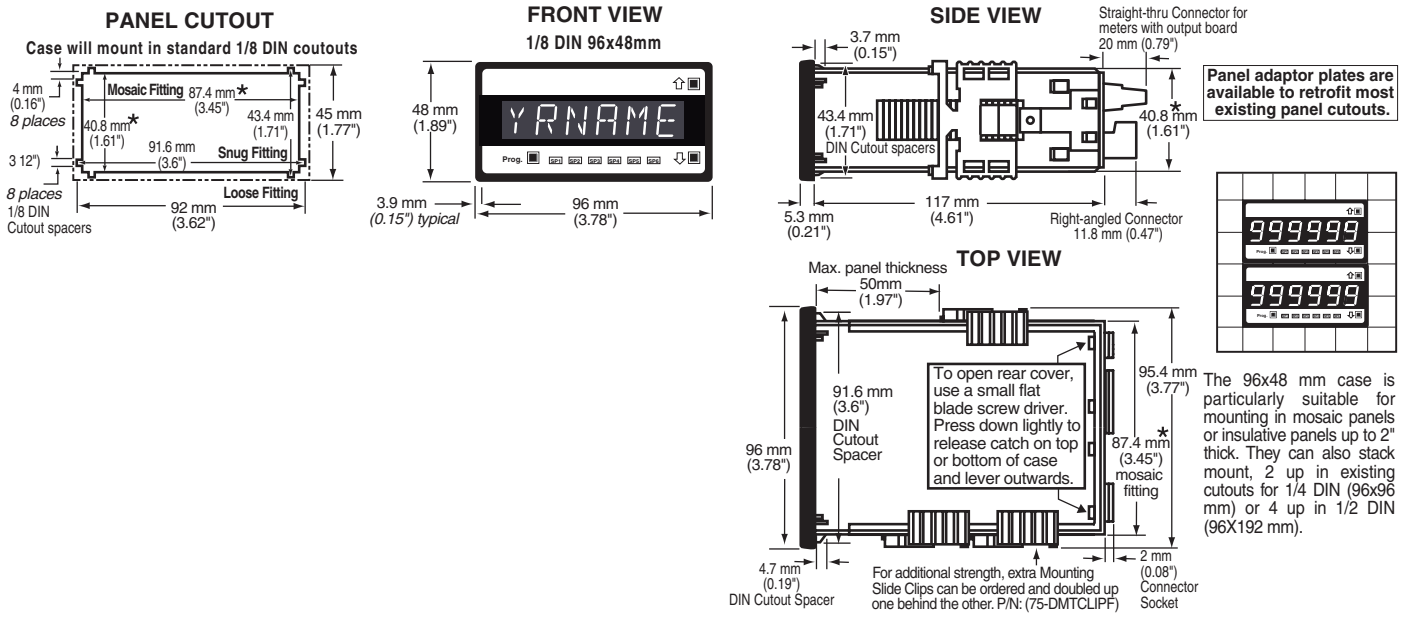
TERMINAL 6 connects electromechanical and solid state relays (SSRs) to external applications.

Depending on the number of relays, standard plug-in relay boards use up to 8 pins.

**Relay Module**

Normally Open SP4
Common SP4
Normally Open SP3
Common SP3
Normally Open SP2
Common SP2
Normally Open SP1
Common SP1






The 96x48 mm case is particularly suitable for mounting in mosaic panels or insulative panels up to 2" thick. They can also stack mount, 2 up in existing cutouts for 1/4 DIN (96x96 mm) or 4 up in 1/2 DIN (96X192 mm).

## Installation Procedure

**WARNING**

**AC and DC power supply voltages are hazardous. Make sure the power supply is isolated before connecting to the meter.**

**STEP A Prepare the Panel**

1) Cut a hole in the panel to suit the panel cutout. See panel cutout sizes above.

**STEP B Install the Meter**

1) Remove both mounting clips from the meter. ①
2) Push the meter into the panel cutout from the front of the panel. ②
3) Attach both mounting clips to the meter from the rear of the panel and push them towards the front of the panel until the meter is firmly held. ③

**STEP C Connect the Cables**

1) Connect all input and output signal cables to the connector pins (See *Connector Pinouts* for details).
2) Connect the power cables to the connector pins (See *Connector Pinouts* for details).

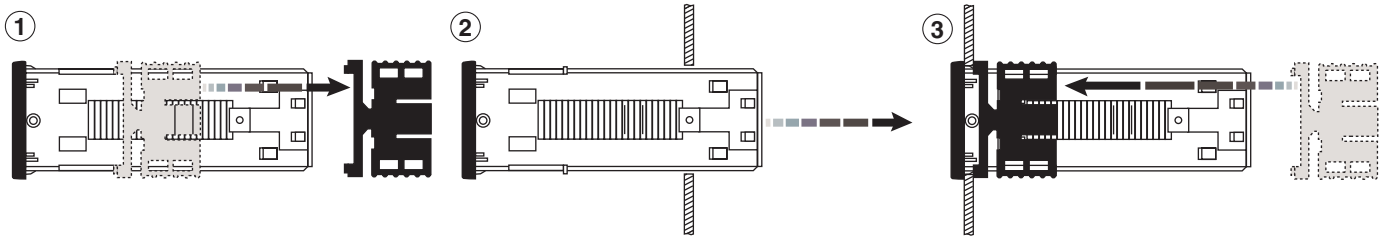



**Figure 5 – LVDT200-100 Installation Sequence**

# Application Examples

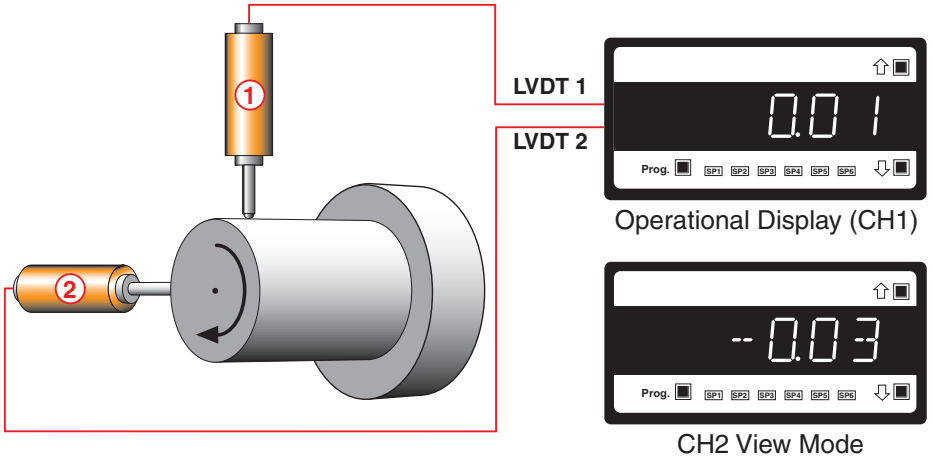
LVDT sensors can be applied in almost all engineering applications covering civil, mechanical, petrochemical, power generation, production, aerospace, defense, and much more.

They can be used on production lines to automatically gauge products for quality control and product sorting.

In the power generation and petrochemical industries they can be used, for example, as servo position feedback on actuated equipment such as valves and dampers, or for measuring turbine casing expansion.

Submersible units can be used in marine and offshore mining applications, sensors that meet military environmental standards have been applied to defense and aerospace applications.

Following are applications that show the versatility of the LVDT200 Series controller.




**ALIGNMENT TOOL**

Measured using two LVDT sensors at 90°

LVDT 1 to CH1 = Shown on Display

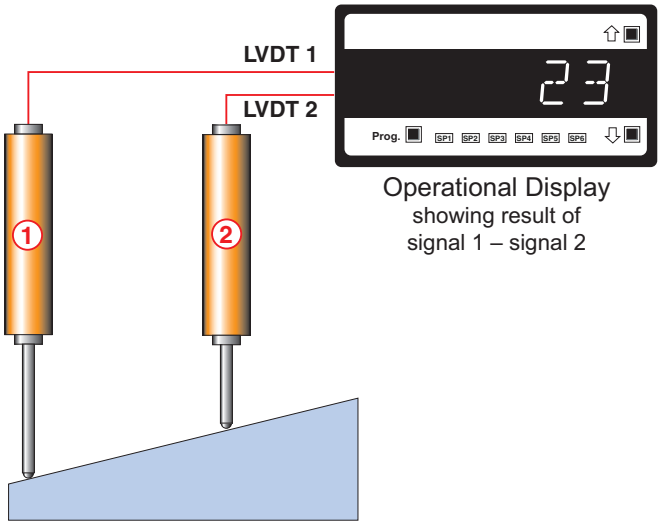
LVDT 2 to CH2 = Use View Mode to view CH2

**SLOPE INDEXING**

Measured using two parallel LVDT sensors (1 – 2)

LVDT 1 minus LVDT 2 = Displayed Result

*Note:*
*This is an advanced function and is configured in Code 1 of the main programming mode.*

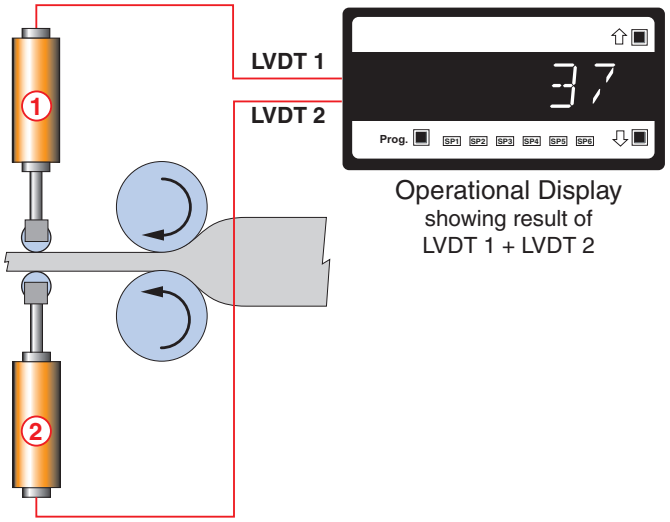



**THICKNESS MONITORING**

Measured using two opposed LVDT sensors (1 + 2)

LVDT 1 plus LVDT 2 = Displayed Result

*Note:*
*This is an advanced function and is configured in Code 1 of the main programming mode.*



**Frequency Range:**

**Excitation Frequency:**

**LVDT Output Rate in kHz:**

**Decimal Point Position:**

| | CH 1 | CH 2 |
|---|---|---|
| | | |

**Standard Display:**

**Input Signal**

| | CH 1 | CH 2 |
|---|---|---|
| Zero: | | |
| Span: | | |

**Analog Output Signal Calibration**

| | A_OUT1 | A_OUT2 |
|---|---|---|
| CAL_LO: | | |
| CAL_HI: | | |

**Scale Range**

| | | |
|---|---|---|
| Zero: | | |
| Full Scale: | | |

## Setpoints

| | Source | Value | Activation |
|---|---|---|---|
| SP1: | | | |
| SP2: | | | |
| SP3: | | | |
| SP4: | | | |

***WARRANTY***

Texmate 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. Texmate'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 Texmate's facility, transportation charges pre-paid, and which are, after examination, disclosed to the satisfaction of Texmate to be thus defective. The warranty shall not apply to any equipment which shall have been repaired or altered, except by Texmate, or which shall have been subjected to misuse, negligence, or accident. In no case shall Texmate'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 Texmate.

***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 Texmate. 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 Texmate's liability, in law or otherwise, be in excess of the purchase price of the product.

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

TEXMATE INC
450 State Place • Escondido, CA 92029
Tel: 1-760-598-9899 • USA 1-800-839-6283 • That's 1-800-TEXMATE
Fax: 1-760-598-9828 • Email: orders@texmate.com • Web: www.texmate.com

**For product details visit www.texmate.com**

**Local Distributor Address**