Associated Documents

The following documents must be read together with this supplement:

Relevant Tiger 320 Series User Manual

The operator's manual provides general information on the relevant Tiger 320 Series meter.

Tiger 320 Series Programming Code Sheet

The programming code sheet (NZ201) provides all meter programming codes including setpoint programming codes.

Registers Supplement

The Registers Supplement (NZ209) provides a detailed list of all registers available for setpoint source activation and reset functions.

Setpoint and Relays Supplement

The Setpoint and Relays Supplement (NZ201) provides detailed descriptions on all setpoint related topics.

Advanced Calibration and On Demand Mode Supplement

The Advanced Calibration and On Demand Mode Supplement (NZ203) provides detailed descriptions on all calibration related and on-demand mode topics.

This document is designed to supplement the information on the Analog Output Module described in the Tiger 320 Series User Manuals.

Contents

List of Figures

Programming Tip

This document has been written using a DI-50 7-segment, 5-digit display meter. When programming meters with other display options, some display readings may vary to the diagrams shown.

TEXMATE INC

General Notices & Tips

The range of Tiger 320 Series supplements contain three graphic symbols to aid you:

WARNING Symbol

The WARNING symbol is generic to all Tiger 320 Series documents and indicates that if the instruction is not heeded, the action may result in loss of life or serious injury.

NOTE Symbol

The NOTE symbol is generic to all Tiger 320 Series User Manual supplements and indicates important or helpful information on the topic being discussed.

PROGRAMMING TIP Symbol

The programming tip symbol is generic to all Tiger 320 Series documents and indicates useful tips when programming the instrument.

Definitions

The following definitions are relevant to all Tiger 320 Series literature:
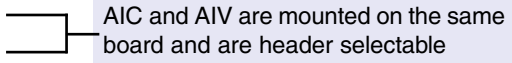
X

If an X appears in the description of a 3-digit programming code or in a configuration procedure, this means that any number displayed in that digit is not relevant to the function being explained, or more than one choice can be made.

Meter – Controller

The term meter, as used throughout this document, is a generic term for all Tiger 320 Series signal processors and controllers

Technical Description

There are three analog output options available:

- **AIC** Single 0/4 to 20 mA.
- **AIV** Single 0 to 10 V DC.

> AIC and AIV are mounted on the same board and are header selectable

- **ADV** Dual 0 to 10 V DC with common 0.

The analog output module is a programmable, isolated, 16-bit output that is scalable to any desired span within the full scale range of the controller. The single versions can be user configured for either 4-20 mA or 0-10 V DC or reverse using a selection header. The dual version can be user configured for 0-10 V DC or reverse. The selected analog output module version is mounted on the meter's output carrier board. See Figure 7.

The analog output can be programmed over:

- The full scale range of the meter and the selected input module.
- Any part within the full scale range of the selected input channel.
- Any part within the full scale range of the linearized input signal.
- The proportional band of the PID register.

The data source for the analog output can be selected from any processed meter input signal.

The span range of the analog output can be as small as 100 counts between the low and high analog output signal.

Once calibrated, the span range of the analog output can be easily changed (rescaled) without having to recalibrate the output. The low and high analog output signal values (mA or volts) follow the new span range.
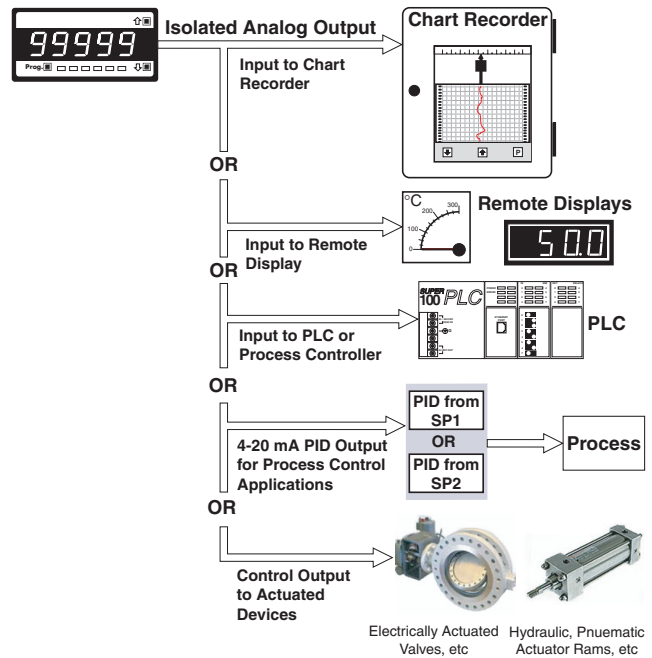

Figure 1 – Uses of Analog Output

Technical Specifications

Analog Output:	AIC or AIV: Single isolated 0/4 to 20 mA (or reverse) or isolated 0 to 10 V DC (or reverse). Header Selectable.
	ADV: Dual isolated 0 to 10 V DC (or reverse).
Accuracy:	0.02 % of full scale.
Drift:	Typical 50 ppm/°C.
Resolution:	16-bit 1/45000 counts equal to 0.4 µA on current scale, 250 µV on voltage scale.
Compliance:	500 Ω@20 mA.
Update Rate:	Typical 7 per second.

Analog Output Functions

The analog output signal can be used for the following applications (see Figure 1):

- To drive remote process control instruments.
- As an isolated 4 to 20 mA/0 to 10 V DC signal for further control processing via a PLC.
- As a 4 to 20 mA PID output for process control applications (e.g. temperature control).
- As a manual loader output to manually control the operation of actuated plant equipment such as valves, dampers, hydraulic and pneumatic cylinders and slides.

Input to PLC

The isolated analog output signal from the meter is fed into a PLC where it can be further processed.

PID Output

The analog output signal can be used in PID process control applications. The PID control data is fed through the analog output directly to a process control system.

The PID data is sourced from the PID proportional band register, register 50 for SP1 and register 51 for SP2, in the Select Source Data menu of Code 1 (See Figure 2).

Manual Loader Mode

In the manual loader mode, the meter is configured so that the display, in engineering units, accurately relates to the analog output.

The manual loader mode is used where precise and repeatable control is required from a digital display and manual control source. The front panel ⬆ and ⬇ buttons are used to control the analog output signal.

The manual loader mode can be configured to function in one of two ways:

- Directly displayed on the meter when the meter is in the operational display.

- Or as an on demand function of the meter activated by pressing the P button for 4 seconds.

Direct Display Manual Loader Mode

The meter can be configured in Code 1 to function exclusively as a manual loader using the meter's ⬆ and ⬇ buttons to adjust the analog output signal.

On Demand Manual Loader Mode

The manual loader mode can also be configured as an **on demand** function of the meter. It is activated by pressing the P button for 4 seconds after being configured in the calibration mode and Code 1.

When activated, the analog output signal is adjusted using the meter's ⬆ and ⬇ buttons.

Upper and Lower Limits

Upper and lower limits can be set for the manual loader mode. The setpoint activation values for setpoint 5 becomes the upper limit and setpoint 6 becomes the lower limit.

When either the direct display or on demand manual loader mode is programmed into the meter, the values for setpoint 5 and setpoint 6 are activated as upper and lower limits.

Meter Programming Codes

The meter's programming codes are divided into two modes (see Figure 2):

- Main Programming Mode.
- Setpoint Programming Mode.

Each mode is accessible from the operational display. The meter is in the operational display when it is displaying a processed input signal.

Main Programming Mode

The main programming mode is where the analog output is calibrated, the data source for the analog output selected, and the manual loader mode (direct display or on demand) selected.

Setpoint Programming Mode

The setpoint programming mode is where the meter is configured for 4-20 mA or 0-10 V DC PID output on setpoints SP1 and SP2 and the manual loader mode upper and lower limits on setpoints SP5 and SP6 are set (see Figure 2).
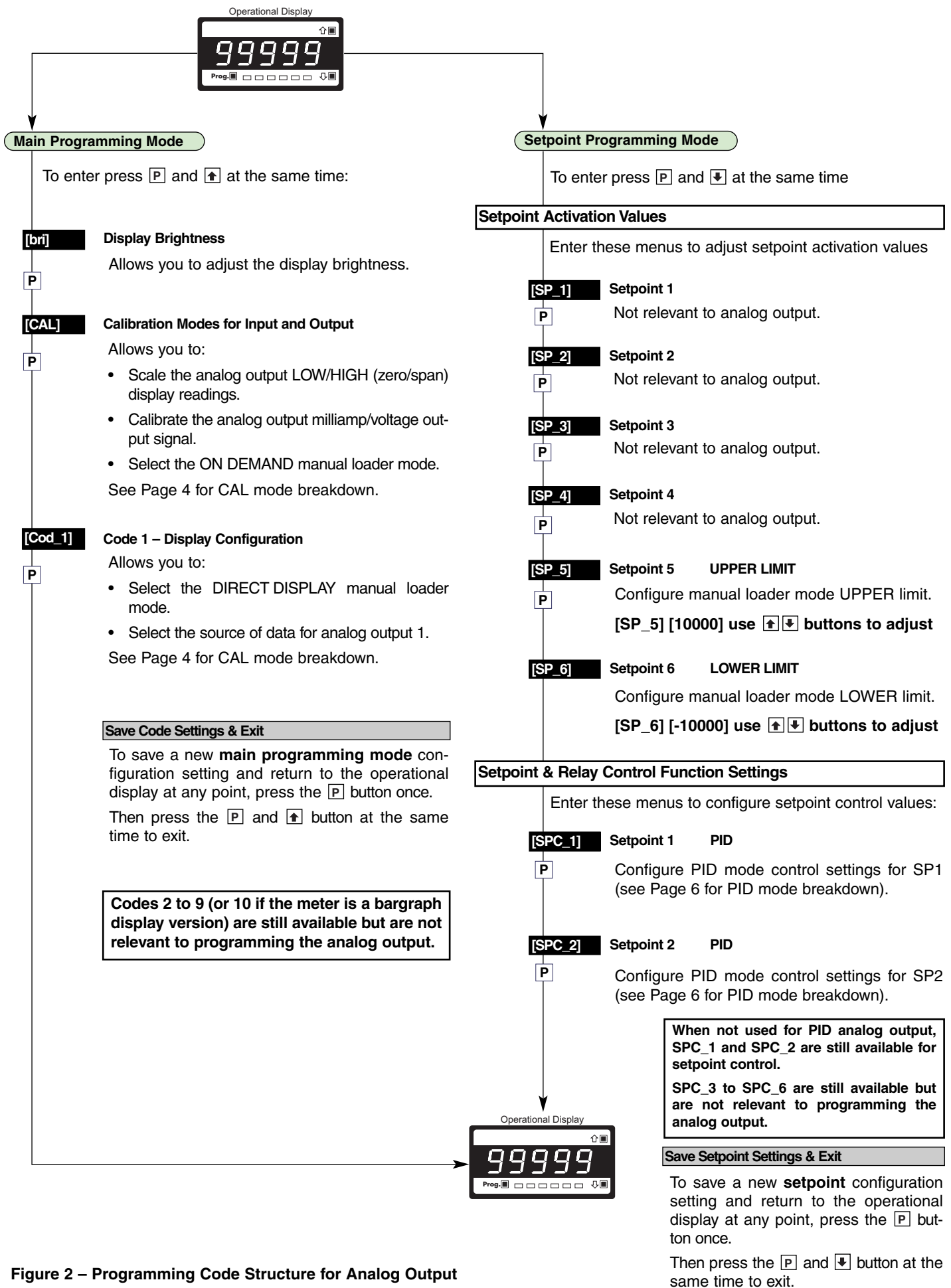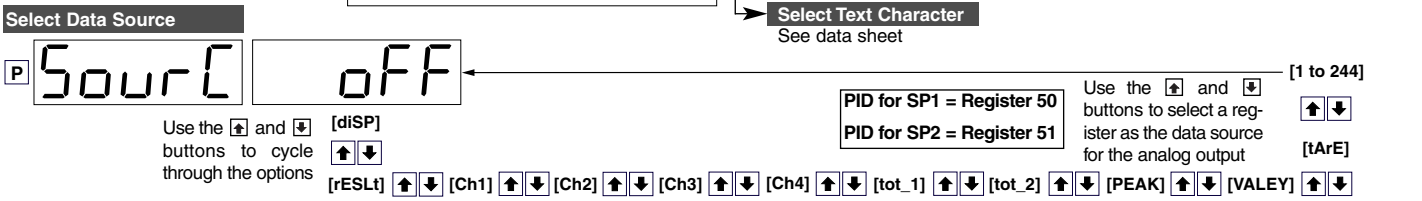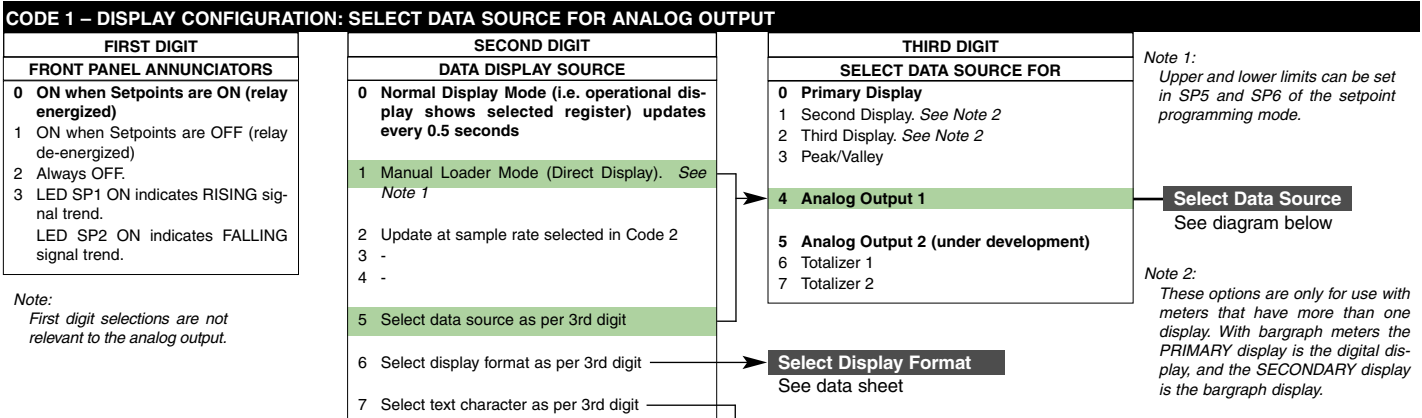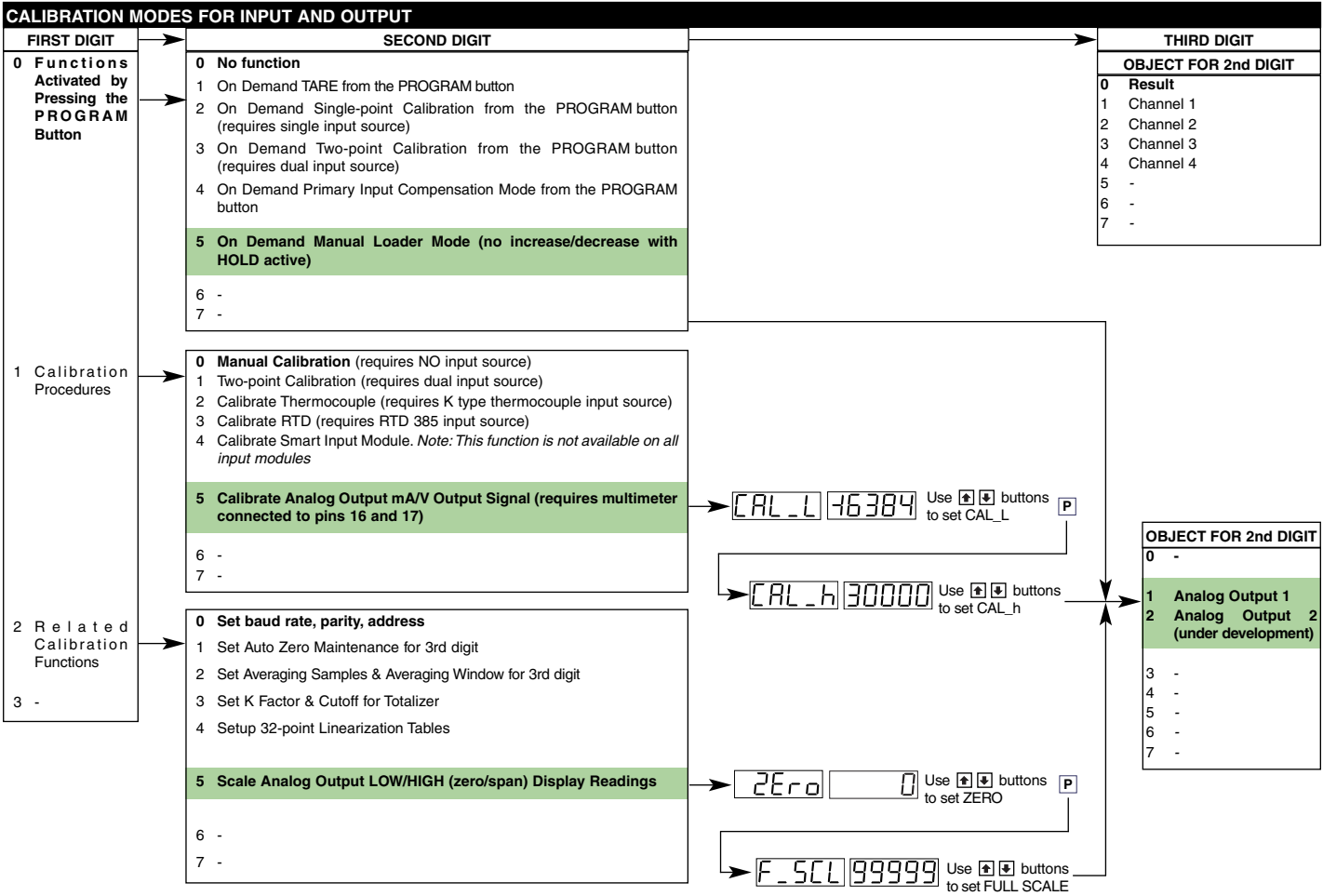
Operational Display

```
          ⬆▣
 99999
Prog.▣ ▢▢▢▢▢▢ ⬇▣
```

Main Programming Mode

To enter press [P] and [⬆] at the same time:

[bri]   **Display Brightness**

Allows you to adjust the display brightness.

[P]

[CAL]   **Calibration Modes for Input and Output**

[P]

Allows you to:

• Scale the analog output LOW/HIGH (zero/span) display readings.

• Calibrate the analog output milliamp/voltage output signal.

• Select the ON DEMAND manual loader mode.

See Page 4 for CAL mode breakdown.

[Cod_1]   **Code 1 – Display Configuration**

[P]

Allows you to:

• Select the DIRECT DISPLAY manual loader mode.

• Select the source of data for analog output 1.

See Page 4 for CAL mode breakdown.

Save Code Settings & Exit

To save a new **main programming mode** configuration setting and return to the operational display at any point, press the [P] button once.

Then press the [P] and [⬆] button at the same time to exit.

Codes 2 to 9 (or 10 if the meter is a bargraph display version) are still available but are not relevant to programming the analog output.

Setpoint Programming Mode

To enter press [P] and [⬇] at the same time

Setpoint Activation Values

Enter these menus to adjust setpoint activation values

[SP_1]   **Setpoint 1**

[P]   Not relevant to analog output.

[SP_2]   **Setpoint 2**

[P]   Not relevant to analog output.

[SP_3]   **Setpoint 3**

[P]   Not relevant to analog output.

[SP_4]   **Setpoint 4**

[P]   Not relevant to analog output.

[SP_5]   **Setpoint 5   UPPER LIMIT**

[P]   Configure manual loader mode UPPER limit.

[SP_5] [10000] use [⬆][⬇] buttons to adjust

[SP_6]   **Setpoint 6   LOWER LIMIT**

Configure manual loader mode LOWER limit.

[SP_6] [-10000] use [⬆][⬇] buttons to adjust

Setpoint & Relay Control Function Settings

Enter these menus to configure setpoint control values:

[SPC_1]   **Setpoint 1   PID**

[P]   Configure PID mode control settings for SP1 (see Page 6 for PID mode breakdown).

[SPC_2]   **Setpoint 2   PID**

[P]   Configure PID mode control settings for SP2 (see Page 6 for PID mode breakdown).

When not used for PID analog output, SPC_1 and SPC_2 are still available for setpoint control.

SPC_3 to SPC_6 are still available but are not relevant to programming the analog output.

Operational Display

```
          ⬆▣
 99999
Prog.▣ ▢▢▢▢▢▢ ⬇▣
```

Save Setpoint Settings & Exit

To save a new **setpoint** configuration setting and return to the operational display at any point, press the [P] button once.

Then press the [P] and [⬇] button at the same time to exit.

Figure 2 – Programming Code Structure for Analog Output

Analog Output Configuration Programming Codes

The analog output is scaled and calibrated in the calibration mode of the meter's main programming mode. The meter is configured for specific analog output applications in the calibration mode and Code 1 of the the meter's main programming mode.

PID control via the analog output and analog output upper and lower limits are set in the setpoint programming mode.

Pressing the P and ▲ buttons at the same time enters the **main programming mode**. To save a new configuration setting and return to the operational display, press the P button once and then press the P and ▲ buttons at the same time.
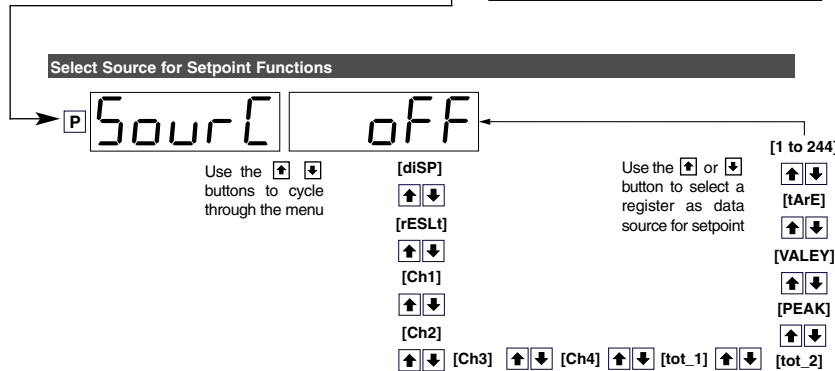
CALIBRATION MODES FOR INPUT AND OUTPUT

FIRST DIGIT	SECOND DIGIT	THIRD DIGIT
0 Functions Activated by Pressing the PROGRAM Button	**0 No function** 1 On Demand TARE from the PROGRAM button 2 On Demand Single-point Calibration from the PROGRAM button (requires single input source) 3 On Demand Two-point Calibration from the PROGRAM button (requires dual input source) 4 On Demand Primary Input Compensation Mode from the PROGRAM button **5 On Demand Manual Loader Mode (no increase/decrease with HOLD active)** 6 - 7 -	**OBJECT FOR 2nd DIGIT** **0 Result** 1 Channel 1 2 Channel 2 3 Channel 3 4 Channel 4 5 - 6 - 7 -
1 Calibration Procedures	**0 Manual Calibration** (requires NO input source) 1 Two-point Calibration (requires dual input source) 2 Calibrate Thermocouple (requires K type thermocouple input source) 3 Calibrate RTD (requires RTD 385 input source) 4 Calibrate Smart Input Module. *Note: This function is not available on all input modules* **5 Calibrate Analog Output mA/V Output Signal (requires multimeter connected to pins 16 and 17)** 6 - 7 -	
2 Related Calibration Functions 3 -	**0 Set baud rate, parity, address** 1 Set Auto Zero Maintenance for 3rd digit 2 Set Averaging Samples & Averaging Window for 3rd digit 3 Set K Factor & Cutoff for Totalizer 4 Setup 32-point Linearization Tables **5 Scale Analog Output LOW/HIGH (zero/span) Display Readings** 6 - 7 -	

`CAL_L  16384` Use ▲▼ buttons to set CAL_L P

`CAL_h  30000` Use ▲▼ buttons to set CAL_h

OBJECT FOR 2nd DIGIT
0 -
1 Analog Output 1
2 Analog Output 2 (under development)
3 -
4 -
5 -
6 -
7 -

`ZEro        0` Use ▲▼ buttons to set ZERO P

`F_SCL  99999` Use ▲▼ buttons to set FULL SCALE

CODE 1 – DISPLAY CONFIGURATION: SELECT DATA SOURCE FOR ANALOG OUTPUT

FIRST DIGIT FRONT PANEL ANNUNCIATORS	SECOND DIGIT DATA DISPLAY SOURCE	THIRD DIGIT SELECT DATA SOURCE FOR	
0 ON when Setpoints are ON (relay energized) 1 ON when Setpoints are OFF (relay de-energized) 2 Always OFF. 3 LED SP1 ON indicates RISING signal trend. LED SP2 ON indicates FALLING signal trend.	**0 Normal Display Mode (i.e. operational display shows selected register) updates every 0.5 seconds** 1 Manual Loader Mode (Direct Display). *See Note 1* 2 Update at sample rate selected in Code 2 3 - 4 - 5 Select data source as per 3rd digit 6 Select display format as per 3rd digit 7 Select text character as per 3rd digit	**0 Primary Display** 1 Second Display. *See Note 2* 2 Third Display. *See Note 2* 3 Peak/Valley **4 Analog Output 1** **5 Analog Output 2 (under development)** 6 Totalizer 1 7 Totalizer 2	*Note 1:* Upper and lower limits can be set in SP5 and SP6 of the setpoint programming mode. **Select Data Source** See diagram below *Note 2:* These options are only for use with meters that have more than one display. With bargraph meters the PRIMARY display is the digital display, and the SECONDARY display is the bargraph display.

Note:
First digit selections are not relevant to the analog output.

Select Display Format
See data sheet

Select Text Character
See data sheet

Select Data Source

P `SourC        oFF`

Use the ▲ and ▼ buttons to cycle through the options

[diSP] ▲▼

[rESLt] ▲▼ **[Ch1]** ▲▼ **[Ch2]** ▲▼ **[Ch3]** ▲▼ **[Ch4]** ▲▼ **[tot_1]** ▲▼ **[tot_2]** ▲▼ **[PEAK]** ▲▼ **[VALEY]** ▲▼

PID for SP1 = Register 50
PID for SP2 = Register 51

Use the ▲ and ▼ buttons to select a register as the data source for the analog output

[1 to 244]
▲▼

[tArE]

Page 6   Texmate Inc. Tel. (760) 598-9899 • www.texmate.com   18 December, 2003 • Analog Output Mod. (NZ200.1)

SETPOINT PROGRAMMING MODE – SETPOINT CONTROL SETTINGS FOR PID ONLY

FIRST DIGIT
Relay Energize Function

0 Energized ABOVE setpoint value.

1 Energized BELOW setpoint value.

2 Energized ABOVE setpoint value with FALLING INPUT SIGNAL INITIAL START-UP INHIBIT.

3 Energized BELOW setpoint value with RISING INPUT SIGNAL INITIAL START-UP INHIBIT.

SECOND DIGIT
SP Activation Source

0 Activate Setpoint Source from Selected Register

1 Select Source for Setpoint

Note:
[X1X] is a register selection procedure only. To finish, reset to [X0X] to activate the selection, or reset to 2-7 as required for digital input selection.

2 Digital Input – Capture Pin
3 Digital Input – D1
4 Digital Input – D2
5 Digital Input – D3
6 HOLD Pin
7 LOCK Pin

THIRD DIGIT
SP Delay & Timing Functions

0 No Latching
1 Relay Latched
2 Manual Relay Reset
3 Relay Latched with Manual Relay Reset
4 Relay Latched Off

5 Hysteresis, Deviation & PID Mode → **See Set Up PID Mode Settings below**

6 Timer Modes:
• Normal Delay.
• Repeat ON.
• Pulse ON.
• 1-Shot ON.
• Repeat OFF.
• Pulse OFF.
• 1-Shot OFF.

Note:
With PID active, all SP1 functions set in [XX6] are not functional.

7 Advanced Functions Mode:
• Reset Trigger.
• Reset Destination.
• Reset Mode.
• Reset Constant.
• Trigger Print from SP.
• Trigger Log from SP.
• Annunciator Flashing & SP Tracking.

Note:
[XX5], [XX6], and [XX7] are set up procedure settings only. To finish, reset to 0-4 as required for setpoint latching and relay reset modes.

Select Source for Setpoint Functions

[P] `SourC` `oFF`

Use the [↑] [↓] buttons to cycle through the menu

[diSP]
[↑][↓]
[rESLt]
[↑][↓]
[Ch1]
[↑][↓]
[Ch2]
[↑][↓] [Ch3] [↑][↓] [Ch4] [↑][↓] [tot_1] [↑][↓] [tot_2]

Use the [↑] or [↓] button to select a register as data source for setpoint

[1 to 244]
[↑][↓]
[tArE]
[↑][↓]
[VALEY]
[↑][↓]
[PEAK]
[↑][↓]

Set Up PID Mode Settings

Programming Tip

If you do not require any of the functions in this mode, ensure it is set to:

`ModE` `oFF`

Basic Level

Select: Mode/OFF

Intermediate or Advanced Level

Select Hysteresis, Deviation or PID Mode and adjust to required setting.

SPC_1 or SPC_2, third digit set to [XX5]

`XX5` [P] `ModE` `oFF`
[↑]
`hYSt` [P] `hYSt` `0` — Set Hysteresis from 0 to 65535 counts. Selected counts apply + and – from setpoint value
[↑]
`dEVtn` [P] `PASSb` `0` — Set Deviation from 1 to 65535 counts. Selected counts apply + and – from setpoint value
[↑]

Select Flash Setting OFF or ON

[P] `FLASh` `oFF`
[↑]
`on`

Select Tracking Setting

[P] `trACK` `oFF`
[↑]
`1`
[↑] to
`6`

OFF= Tracking Off
1 = SPX tracks SP1
2 = SPX tracks SP2
3 = SPX tracks SP3
4 = SPX tracks SP4
5 = SPX tracks SP5
6 = SPX tracks SP6

Reset SPC_X to [XX0]

`XX5` [↓] `XX0`

PID FROM SETPOINT 1 AND 2 ONLY

`Pid` [P] `SPAn` `0`
MIN 0
MAX 99999

Set the Proportional Band Value

[P] `Pb` `0.0`
MIN 0%
MAX 999.9%

Set the Integral Value

[P] `int` `0.0`
MIN 0
MAX 9999.9

Note:
If PID is selected in [XX5], the Timer Delay [XX6] and Reset and Trigger Functions [XX7] revert to [ModE][oFF] and cannot be adjusted.

Note:
The output from RELAY 1 is disabled if minimum cycle time set to 0

Set the Derivative Value

[P] `dEr` `0.0`
MIN 0
MAX 999.9

Set the Anti-reset Wind-up % PB

[P] `Ar` `0.1`
MIN 0.1%
MAX 100.0%

Set the Minimum Cycle Time

[P] `CYC_t` `0.0`
MIN 0 secs
MAX 1000.0 secs

Configure the Output to Drive Remote Instruments or Controllers

See Figure 3. The analog output is capable of driving almost any remote process instrument that displays a 4 to 20 mA or 0 to 10 V DC signal.

The analog output must be connected to the remote process instrument and configured in the following steps:

1) If AIV or AIC option installed, make sure the ANALOG OUTPUT SELECTION HEADER is correctly selected for the output signal type: volts or milliamps.

   See Selection Header Positioning for details.

2) For AIC or AIV option, connect a multimeter to pins 2 and 3 on Terminal 4. For ADV option, connect multimeter to pins 1 and 2 for Analog 2 and pins 2 and 3 for Analog 1.

3) Calibrate the analog output using the multimeter input.

   See Analog Output Calibration Procedure for details.
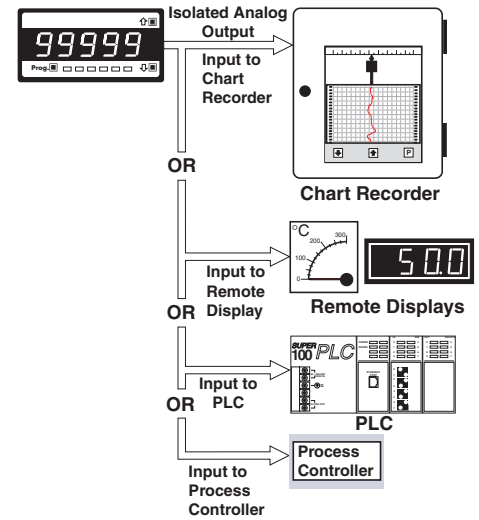
Figure 3 – Analog Output to Remote Instruments

Remote Instruments:

4) Connect the remote process instrument to Terminal 4 (see Figure 7).

5) Select the source of data for the analog output in Code 1 of the meter's main programming mode.

   See Select Data Source Procedure for details to configure the data source for the analog output to a remote instrument.

PLC:

4) Connect the PLC to Terminal 4 (see Figure 7).

5) Select the source of data for the analog output in Code 1 of the meter's main programming mode.

   See Select Data Source Procedure for details to configure the data source for the analog output to a PLC.

Configure for PID Output

The analog output signal can be used to feed PID control data from the meter to control process applications.

The analog output must be connected to the control device and configured in the following steps (see Figure 4):
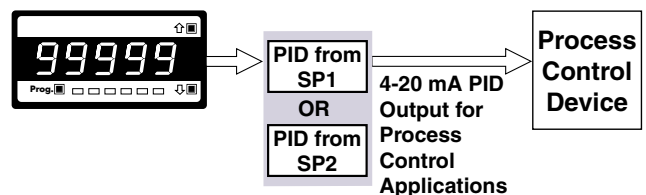
Figure 4 – PID via Analog Output

1) If AIV or AIC option installed, make sure the ANALOG OUTPUT SELECTION HEADER is correctly selected for the output signal type: volts or milliamps.

   See Selection Header Positioning for details.

2) For AIC or AIV option, connect a multimeter to pins 2 and 3 on Terminal 4. For ADV option, connect multimeter to pins 1 and 2 for Analog 2 and pins 2 and 3 for Analog 1.

3) Calibrate the analog output using the multimeter input.

   See Analog Output Calibration Procedure for details.

4) Connect the process control device to Terminal 4 (see Figure 7).

5) Enter Code 1 of the meter's main programming mode:

   a) Set Code 1 to [X54]. This selects **analog output 1**.

   b) Select register 50 (SP1 PID output value) or register 51 (SP2 PID output value) as the source of data for the analog output signal of SP1 or SP2 as required.

   See Select Data Source Procedure for details to configure the PID as the source of data for the analog output signal of SP1 or SP2.

6) Enter the setpoint programming mode and configure setpoint 1 or setpoint 2, or both for PID functions.

   See *Setpoints and Relays Supplement* for full details on the PID mode.

Direct Display Manual Loader Mode

The meter can be configured to operate exclusively as a manual loader to control equipment while in the operational display.

The analog output must be connected to the control equipment and configured in the following steps:

1) If AIV or AIC option installed, make sure the ANALOG OUTPUT SELECTION HEADER is correctly selected for the output signal type: volts or milliamps. See *Selection Header Positioning* for details.

2) For AIC or AIV option, connect a multimeter to pins 2 and 3 on Terminal 4. For ADV option, connect multimeter to pins 1 and 2 for Analog 2 and pins 2 and 3 for Analog 1.

3) Scale and calibrate the analog output using the multimeter input. See *Analog Output Calibration Procedure* for details.

4) Connect the control equipment to Terminal 4 (see Figure 7).

5) Enter Code 1 of the meter's main programming mode:

   a) Set to [X54]. Select [DiSP] as the source of data for the **analog output**.

   b) Reset Code 1 to [X50]. Select [DiSP] as the source of data for the **primary display**.

   c) Reset Code 1 to [X14]. This selects *Manual Loader Mode (Direct Display)* for **Analog Output 1**.

   See Direct Display Manual Loader Mode Procedure for details to configure the meter for direct display manual loader mode.
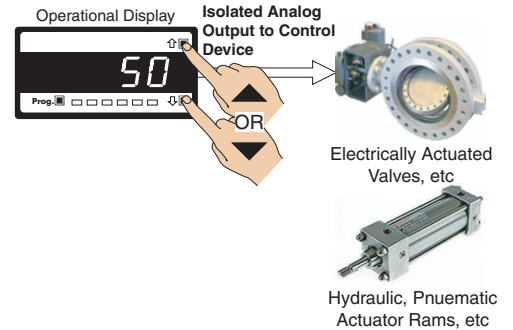
Figure 5 – Direct Display Manual Loader Mode

Return to the operational display. The meter is now configured for direct display manual loader mode. Pressing the UP or DOWN buttons increases or decreases the analog output.

On Demand Manual Loader Mode

The meter can be configured to operate on demand as a manual loader on control equipment. This leaves the meter free to perform normal control functions.

The analog output must be connected to the actuated plant equipment and configured in the following steps:

1) If AIV or AIC option installed, make sure the ANALOG OUTPUT SELECTION HEADER is correctly selected for the output signal type: volts or milliamps. See *Selection Header Positioning* for details.

2) For AIC or AIV option, connect a multimeter to pins 2 and 3 on Terminal 4. For ADV option, connect multimeter to pins 1 and 2 for Analog 2 and pins 2 and 3 for Analog 1.

3) Scale and calibrate the analog output using the multimeter input. See *Analog Output Calibration Procedure* for details.

Figure 6 – On Demand Manual Loader Mode

4) Connect the control equipment to Terminal 4 (see Figure 7).

5) Enter Code 1 of the meter's main programming mode:

   a) Set to [X54]. Select [DiSP] as the source of data for the **analog output**.

   b) Reset Code 1 to [X50]. Select a channel (CH1 to CH4) as the source of data for the **primary display**.

   c) On leaving Code 1, set to [X10]. This selects manual loader mode on the primary display.

6) Enter the calibration mode [CAL] of the meter's main programming mode and set the 2nd digit to [X5X] to select On Demand Manual Loader Mode. Select the same channel that you selected in Step 5 in the 3rd digit:

- [X51] = Analog Output 1.
- [X52] = Analog Output 2.

  See On demand Manual Loader Mode Procedure for details to configure the meter for on demand manual loader mode.

To activate the on demand manual loader mode, press the PROGRAM button for 4 to 5 secs. The meter toggles between [Ch1] and the current display counts. Pressing the UP or DOWN buttons increases or decreases the analog output.

Connector Pinouts & Component Layout

Pinout details for both single and dual analog output modules are shown in table TERMINAL 4 opposite and Figure 7 below.

In *Figure 7 – Exploded View of Meter Modular Boards*, all circuit boards are shown in an exploded assembly view of the meter without the meter case. All connector terminal numbers or names are identified. These are described in detail in the relevant Tiger user manual.

The analog output module is mounted on the component side of the output carrier board. The analog output selection header is easily repositoned by pulling the output carrier board from the meter case.

See Selection Header Positioning for further details.

TERMINAL 4	
Pin No.	Function
AIC / AIV: Single Output	
1	Not Connected
2	– Common
3	+ Analog 1
ADV: Dual Output	
1	+ Analog 2
2	– Common
3	+ Analog 1
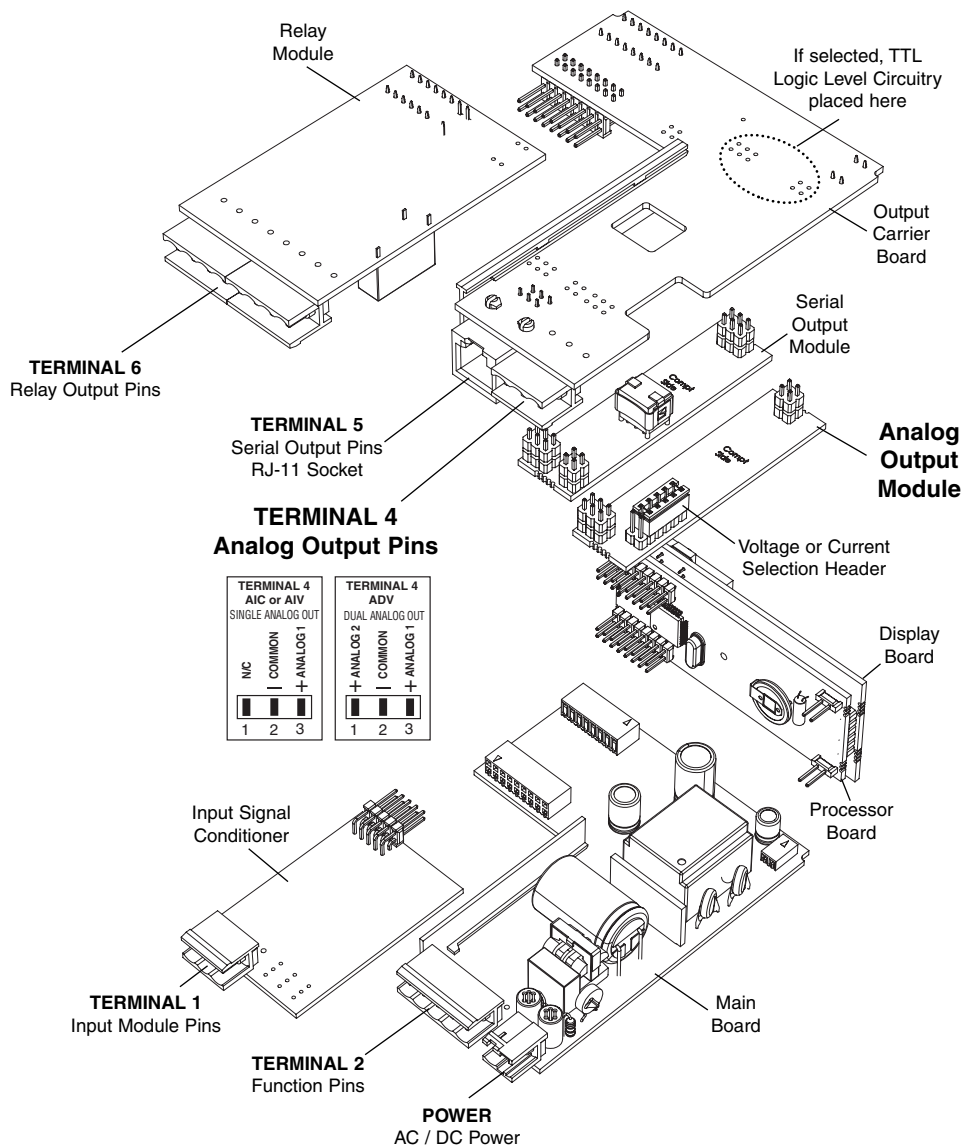
Figure 7 – Exploded View of Meter Modular Boards

Selection Header Positioning

The analog output selection header can be positioned for current (0/4 to 20 mA) or voltage (0 to 10 V DC) output. To change the header selection, the output carrier board must be removed from the meter. See Figures 8 and 9.

To reposition the analog output selection header, proceed as follows:

STEP A   **Disconnect the Power Supply and Input/Output Connectors**

WARNING

AC and DC power supply voltages are hazardous. Make sure the power supply is isolated before disconnecting from the meter.

1) Pull the AC power supply connector block from the AC power input pins.

2) Pull all other input and output connectors from their sockets.

STEP B   **Remove the Rear Cover from the Meter**

1) Using a small flat-blade screw driver, press down lightly to release the catch on the top of the case and lever outwards.

2) Repeat for the other top catch.

3) With both top catches free, pull the rear cover away from the meter.

STEP C   **Remove the Carrier Board**

1) Pull the carrier board until it is free from the meter case.

STEP D   **Select the Correct ANALOG OUTPUT SELECTION HEADER Setting**

1) If not in the correct position, pull the header from its pins and reposition it to suit the analog output signal: VOLTAGE or CURRENT.

STEP E   **Replace the Carrier Board**

1) Gently push the carrier board back into the meter case, taking care to correctly align the board with the slots on the meter case.

STEP F   **Replace the Rear Cover**

1) Place the top catches into their respective slots and swing the bottom of the rear cover towards the meter until the bottom catches slide home.

2) Press the rear cover firmly into place.

STEP G   **Reconnect the Power Supply and Input/Output Connectors**

1) Ensure the power supply is still isolated.

2) Reconnect the AC power supply connector block to the AC power input pins.

3) Reconnect the input and output connectors.

4) Remove the isolation from the power supply.

The power and input signal should be restored and the meter should be in the operational display.

TOP VIEW

To open the rear cover, use a small flat-blade screw driver. Press down lightly to release catch on top or bottom of case and lever outwards.

PART SIDE VIEW

Top Catch
Rear Cover
Bottom Catch

To replace the rear cover, place the top catches into their respective slots and swing the bottom of the rear cover towards the meter until the bottom catches slide home. Press the rear cover firmly into place.

Figure 8 – Rear Cover Removal

Output Carrier Board

Analog Output Module (located below Output Carrier Board)

Analog Output Selection Header

ANALOG OUTPUT SELECTION

CURRENT

VOLTAGE

Figure 9 – Analog Output Selection Header Placement

Analog output calibration is a two-part procedure covering scaling and calibration. The scaling settings can be changed independently of the calibration settings and vice versa.

1) See Figure 9. Make sure the ANALOG OUTPUT SELECTION HEADER on the analog output module is set in the appropriate position: VOLTAGE or CURRENT.

2) See Figure 10. Connect a multimeter to the analog output connector at the rear of the meter (pin 16-positive, pin 17-negative).

3) Make sure the multimeter is set to read the appropriate signal type: volts or milliamps.

Scaling Procedure

Scaling the analog output requires the zero [ZEro] and full scale [F_SCL] parameters to be set.

Zero is the setting at which the analog output is required to be at its calibrated **low** output. Full scale is the setting at which the analog output is required to be at its calibrated **high** output.

There are no limits to the difference between the zero and full scale settings. The difference can be anywhere between 1 count and the entire display range of the meter.

Calibration Procedure

Calibrating the analog output requires setting the [CAL_L] and [CAL_h] parameters. [CAL_L] is used to set the calibrated **low** output, and [CAL_h] is used to set the calibrated **high** output. The calibrated low and high outputs can be set anywhere between –0.3 to +21 mA for current or –0.3 V to +10.5 V for voltage.

Example

In our example procedure, we describe how to calibrate a single analog output (Analog 1) for 4 to 20 mA over a scaled range of 50 to 3000 counts. With a display of 50 counts, the analog output must be 4.00 mA. With a display of 3000 counts, the analog output must be 20.00 mA.

Steps 1 to 8 describe how to set [ZEro] and [F_SCL], and Steps 9 to 19 describe how to set [CAL_L] and [CAL_h].
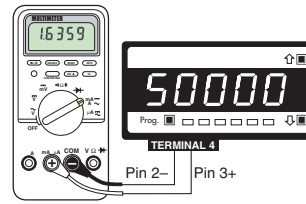
Figure 10 – Multimeter to Meter Connections

START HERE

SCALING PROCEDURE

Step 1
Enter the Brightness Mode
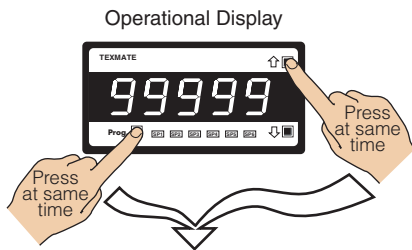
Step 2
Pass Brightness Mode and enter Calibration Mode
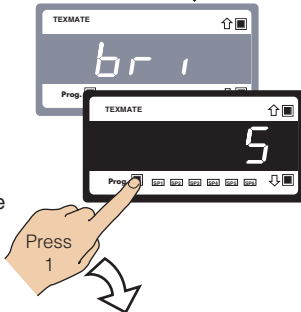
Step 3
Set CAL to [251]:
1st Digit = 2 Selects related calibration functions
2nd Digit = 5 Selects scale analog output
3rd Digit = 1 Select analog output 1 for scaling
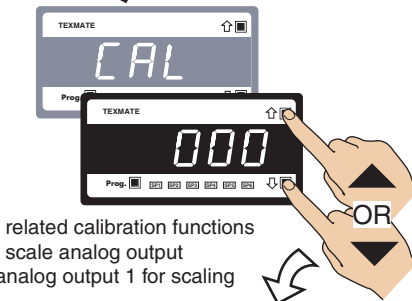
Step 4
Enter [ZEro] setting mode

0 –
1 Analog Output 1
2 Analog Output 2
3
4
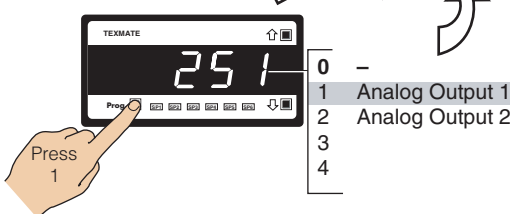
Step 5
Adjust the display to 50 counts for the low analog output signal
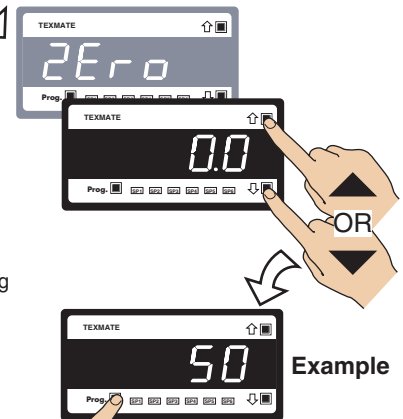
Step 6
Enter the [F_SCL] Setting mode
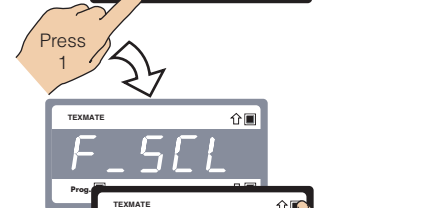
Step 7
Adjust the display to 500.0 high analog output signal counts

Note:
The scale settings may be changed at any time without having to recalibrate the analog mA/V output signal.
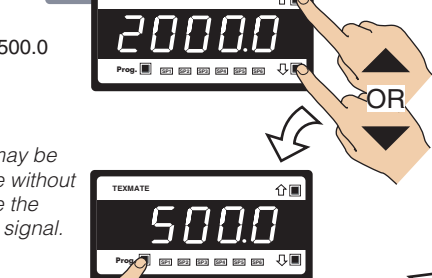
Step 8
Save scale settings (zero and full scale). To return directly to the Operational Display, proceed to Step 17.

Calibrate the Analog Output Signal continued on next page (Step 9).
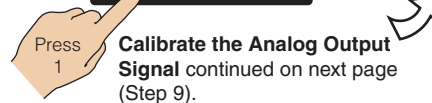
Configure Analog Output Procedure
continued from bottom of previous page

START HERE

CALIBRATION PROCEDURE

`CAL`

`251`

OR

Step 9

Set CAL to [151]:
1st Digit = 1 Selects calibration procedures
2nd Digit = 5 Selects calibrate analog output
3rd Digit = 1 Select analog output 1 for calibration

`151`

0 –
1 Analog Output 1
2 Analog Output 2
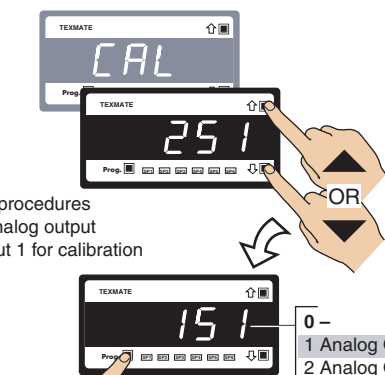
Step 10

Enter analog output LOW signal calibration mode

Press 1

`CAL_L`

`16384`

Step 11

Ensure the **low** analog output signal reading [CAL] on the multimeter display is 4.00 mA.

`16384`

TERMINAL 4
Pin 2–   Pin 3+

OR
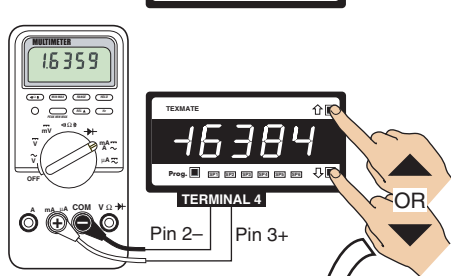
Step 12

If not correct, press the ⬆ OR ⬇ button on the Tiger meter until the reading on the multimeter display is correct.

Example

`-7437`

TERMINAL 4
Press 1   Pin 2–   Pin 3+
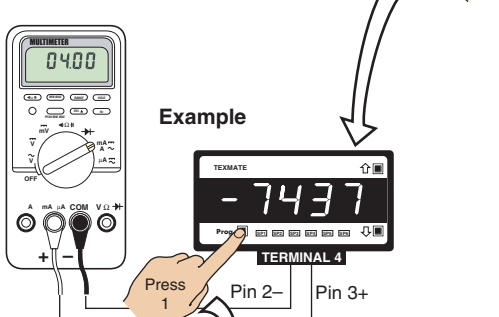
Step 13

Save the **low** analog output signal setting. Enter analog output **high** signal calibration mode

`CAL_h`

`30000`
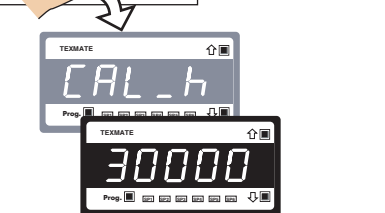
Step 14

Ensure the **high** analog output signal reading [CAL_h] on the multimeter display is 20 mA.

`30000`

TERMINAL 4
Pin 2–   Pin 3+

OR
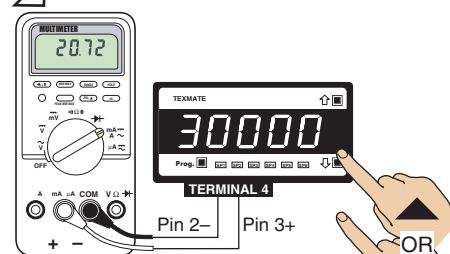
Step 15

If not 20 mA, press the ⬆ OR ⬇ button on the Tiger meter until the reading on the multimeter display is correct.

`28380`

TERMINAL 4
Press 1   Pin 2–   Pin 3+
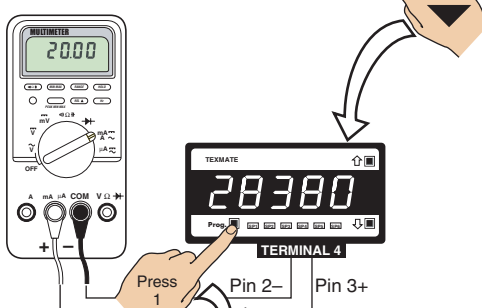
Step 16

Return to the calibration mode [CAL] menu

`CAL`

`15X`

OR

Step 17

Reset calibration mode setting to [000]

`000`

Press 1
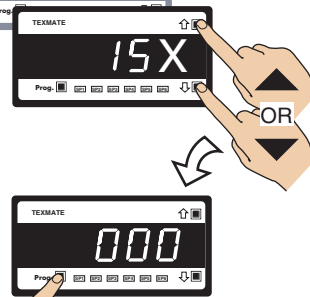
Step 18

Save calibration mode [000] setting and enter Code 1

`Cod_1`

`000`

Press at same time

Press at same time
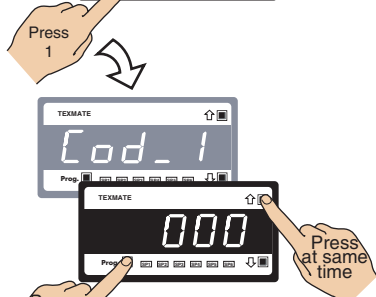
Step 19

Exit Code 1 and return to the operational display
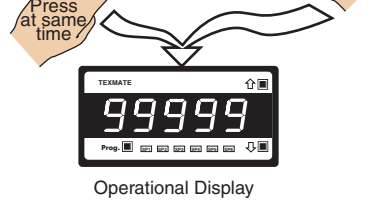
`99999`

Operational Display

To Step 14

Select Data Source Procedure

The following example procedure decribes how to select the data source for the analog output selected in third digit in Code 1.

Example Procedure:

Configure Analog Output 1 with the display [diSP] as the data source by setting Code 1 to [**X54**]. See diagram below for data source selection options.

START HERE

SELECT DATA SOURCE PROCEDURE
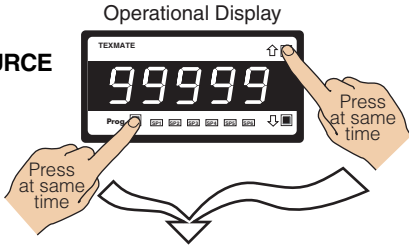
Operational Display

TEXMATE
99999

Press at same time

Press at same time

Step 1
Enter the Brightness Mode

TEXMATE
bri

TEXMATE
5

Press 2

Step 2
Pass Brightness and Calibration Modes and enter Code 1

TEXMATE
Cod_1

TEXMATE
000

Step 3
Set Code 1 to [X54]:
1st Digit = X Not relevant
2nd Digit = 5 Selects data source mode
3rd Digit = 4 Selects analog output 1

OR

TEXMATE
X54

0	Primary Display
1	Second Display
2	Third Display
3	Peak/Valley
4	Analog Output 1
5	Analog Output 2
6	Totalizer 1
7	Totalizer 2

Press 1

Step 4
Enter the Select Data Source menu.

TEXMATE
SourC

TEXMATE
oFF

OR
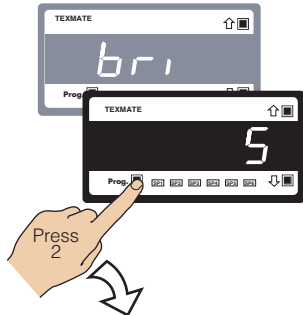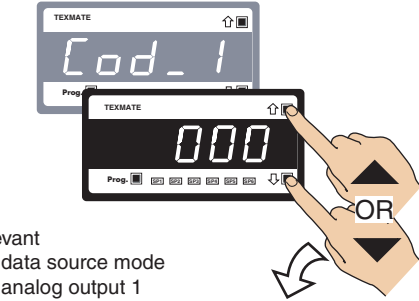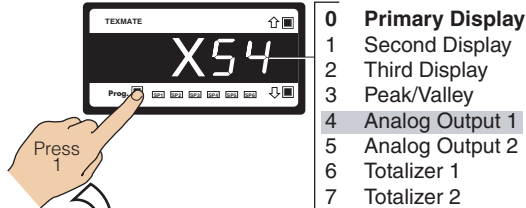
Step 5
Select [diSP] as the Data Source for Analog Output 1 from the options listed in the Select Data Source diagram below.

From Step 5

TEXMATE
diSP

Press 1

Example
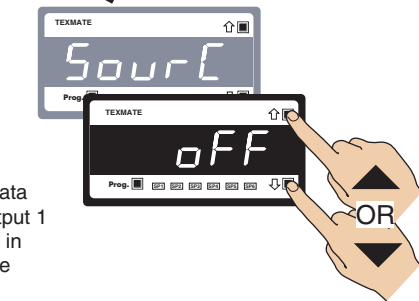
Step 6
Save the setting and re-enter Code 1

TEXMATE
Cod_1

TEXMATE
X54

OR
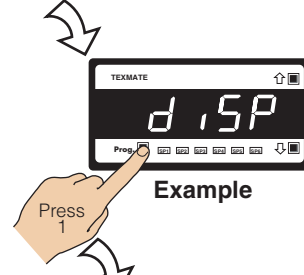
Step 7
Select [000] to leave Code 1

TEXMATE
000

Press 1

Step 8
Save the Data Source setting

TEXMATE
Cod_2

TEXMATE
000

Press at same time

Press at same time
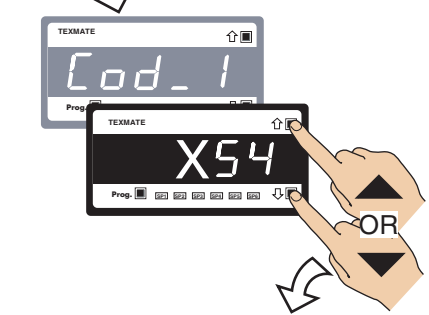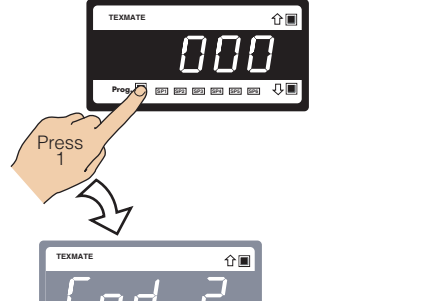
Step 9
Exit Code 2. Return to the Operational Display

TEXMATE
99999

Operational Display

Select Data Source

[P] **SourC** | **oFF**

Use the [↑] and [↓] buttons to cycle through the options

[diSP] [↑][↓]

[rESLt] [↑][↓] **[Ch1]** [↑][↓] **[Ch2]** [↑][↓] **[Ch3]** [↑][↓] **[Ch4]** [↑][↓] **[tot_1]** [↑][↓] **[tot_2]** [↑][↓] **[PEAK]** [↑][↓] **[VALEY]** [↑][↓]

PID for SP1 = Register 50
PID for SP2 = Register 51

Use the [↑] and [↓] buttons to select a register as the data source for the analog output

[1 to 244]
[↑][↓]

[tArE]

Direct Display Manual Loader Mode Setup Procedure

The following procedure decribes how to configure the meter to function as a **direct display manual loader** via the analog output in Code 1.

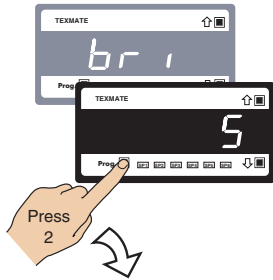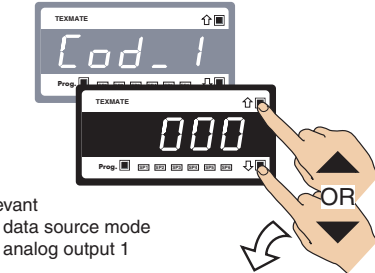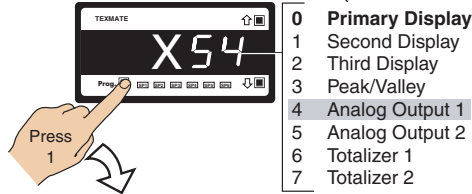*Also see Select Data Source diagram on Page 14.*

START HERE
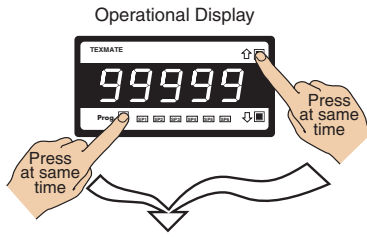
Operational Display

TEXMATE
99999

Press at same time

Press at same time

Step 1
Enter the Brightness Mode

TEXMATE
br ı

Step 2
Pass Brightness and Calibration modes and enter Code 1

TEXMATE
5

Press 2

TEXMATE
Cod_1

Step 3
Set Code 1 to [X54]
1st Digit = X Not relevant
2nd Digit = 5 Selects data source mode
3rd Digit = 4 Selects analog output 1

TEXMATE
000

OR

Step 4

TEXMATE
X54

0	**Primary Display**
1	Second Display
2	Third Display
3	Peak/Valley
4	Analog Output 1
5	Analog Output 2
6	Totalizer 1
7	Totalizer 2

Press 1

TEXMATE
SourC

TEXMATE
d ıSP

Step 5
Select [diSP] as the Data Source for Analog Output 1 from the Select Data Source menu. See Select Data Source diagram on Page 14 for options.

OR

TEXMATE
d ıSP
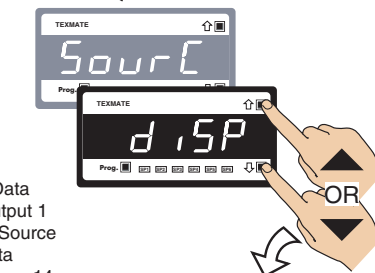
Step 6
Save the data source setting and re-enter Code 1.
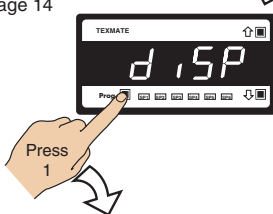
Press 1

TEXMATE
Cod_1

TEXMATE
X54

Step 7
Set Code 1 to [X50]
1st Digit = X Not relevant
2nd Digit = 5 Selects data source mode
3rd Digit = 0 Selects primary display

OR

From Step 7

TEXMATE
X50

0	**Primary Display**
1	Second Display
2	Third Display
3	Peak/Valley
4	Analog Output 1
5	Analog Output 2
6	Totalizer 1
7	Totalizer 2

Step 8
Enter the Data Source menu.

Press 1

TEXMATE
SourC

TEXMATE
d ıSP

OR

Step 9
Select [diSP] as the Data Source for the Primary Display from the Select Data Source menu. See Select Data Source diagram on Page 14 for options.
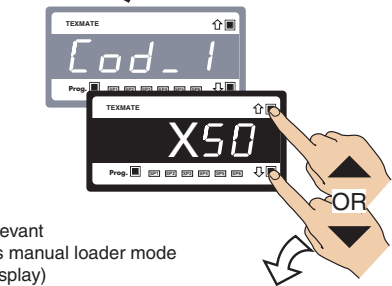
TEXMATE
d ıSP
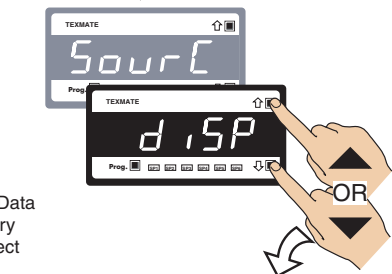
Step 10
Save the Data Source settings and re-enter Code 1.
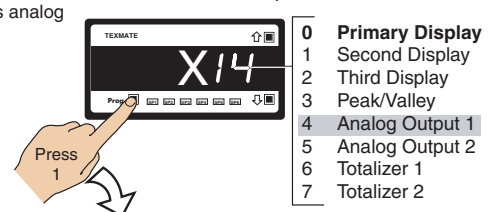
Press 1

TEXMATE
Cod_1

TEXMATE
X50
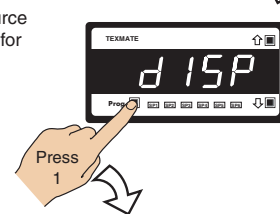
Step 11
Set Code 1 to [X14]
1st Digit = X Not relevant
2nd Digit = 1 Selects manual loader mode (direct display)
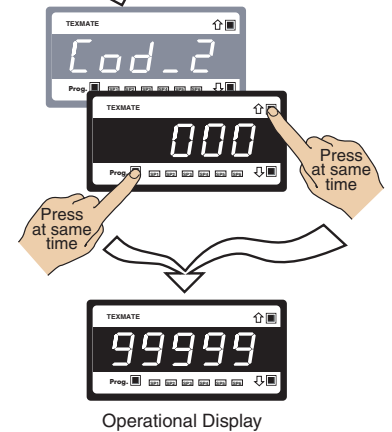3rd Digit = 4 Selects analog output 1

OR

TEXMATE
X14

0	**Primary Display**
1	Second Display
2	Third Display
3	Peak/Valley
4	Analog Output 1
5	Analog Output 2
6	Totalizer 1
7	Totalizer 2

Step 12
Save the Code 1 settings

Press 1

TEXMATE
Cod_2

TEXMATE
000

Press at same time

Step 13
Exit Code 2 and return to the operational display

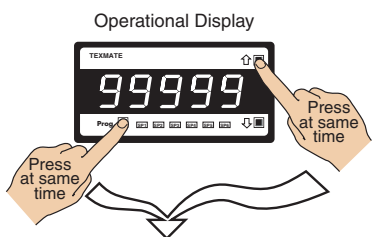Press at same time

TEXMATE
99999

Operational Display

On Demand Manual Loader Mode Setup Procedure

The following procedure decribes how to configure the meter to function as an **on demand manual loader** via the analog output in the calibration mode.

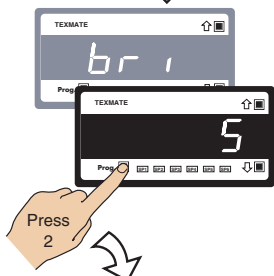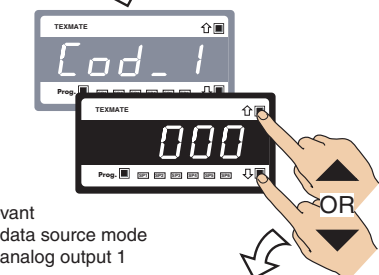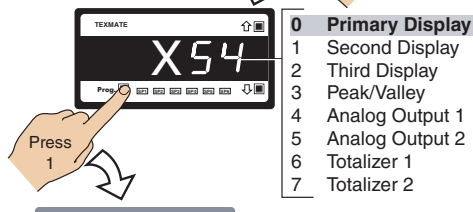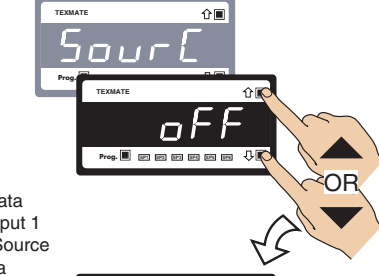*Also see Select Data Source diagram on Page 14.*

Operational Display

TEXMATE
99999

Press at same time

Press at same time

Step 1
Enter the Brightness Mode

TEXMATE
br i

TEXMATE
5

Press 2

Step 2
Pass Brightness and Calibration modes and enter Code 1

TEXMATE
Cod_1

TEXMATE
000

OR

Step 3
Set Code 1 to [X54]
1st Digit = X Not relevant
2nd Digit = 5 Selects data source mode
3rd Digit = 4 Selects analog output 1

TEXMATE
X54

0	**Primary Display**
1	Second Display
2	Third Display
3	Peak/Valley
4	Analog Output 1
5	Analog Output 2
6	Totalizer 1
7	Totalizer 2

Press 1

Step 4
Enter the Select Data Source menu.

TEXMATE
SourC

TEXMATE
oFF

OR

Step 5
Select [diSP] as the Data Source for Analog Output 1 from the Select Data Source menu. See Select Data Source diagram on Page 14 for options.
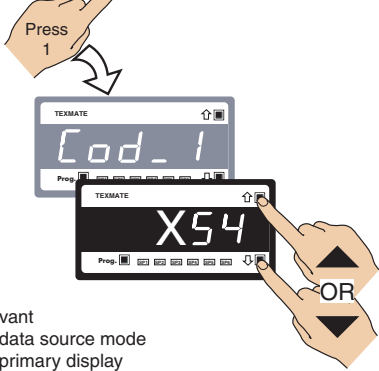
TEXMATE
diSP

Press 1

Step 6
Exit the Select Data Source menu
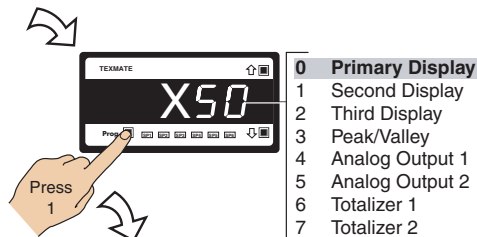
TEXMATE
Cod_1

TEXMATE
X54

OR

Step 7
Set Code 1 to [X50]
1st Digit = X Not relevant
2nd Digit = 5 Selects data source mode
3rd Digit = 0 Selects primary display

From Step 7

TEXMATE
X50

0	**Primary Display**
1	Second Display
2	Third Display
3	Peak/Valley
4	Analog Output 1
5	Analog Output 2
6	Totalizer 1
7	Totalizer 2

Press 1

Step 8
Re-enter the Select Data Source menu.
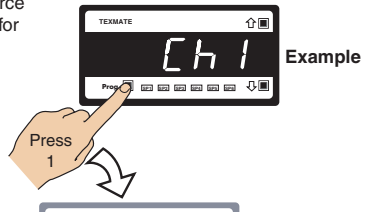
TEXMATE
SourC

TEXMATE
oFF

OR

Step 9
Select a channel (CH1 to CH4) as the Data Source for the Primary Display from the Select Data Source menu. See Select Data Source diagram on Page 14 for options.
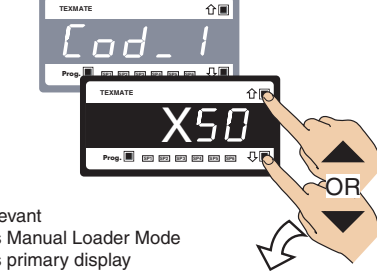
TEXMATE
Ch1   **Example**

Press 1
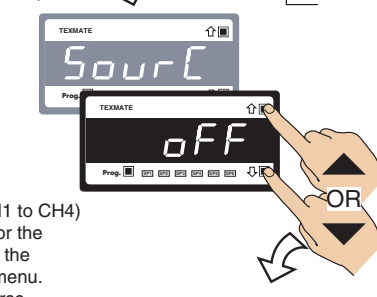
Step 10
Exit the Select Data Source menu

TEXMATE
Cod_1

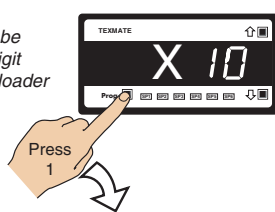**TEXMATE**
X50

OR

Step 11
Set Code 1 to [X00]
1st Digit = X Not relevant
2nd Digit = 1 Selects Manual Loader Mode
3rd Digit = 0 Selects primary display

Note:
Manual Loader must be selected in the 2nd digit [X10] for the manual loader to operate.
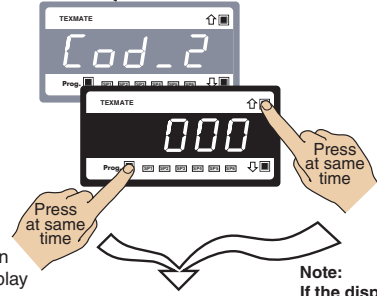
TEXMATE
X 10

Press 1

Step 12
Save the settings

TEXMATE
Cod_2

TEXMATE
000

Press at same time

Press at same time

Step 13
Exit Code 2 and return to the operational display

TEXMATE
99999

Operational Display

Note:
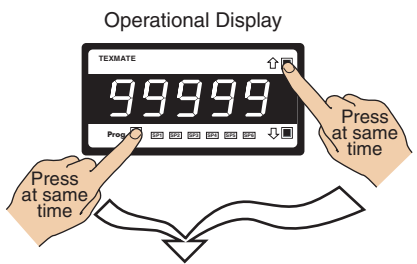**If the display says [undEr] or [oVEr], press the UP and DOWN buttons at the same time to clear.**
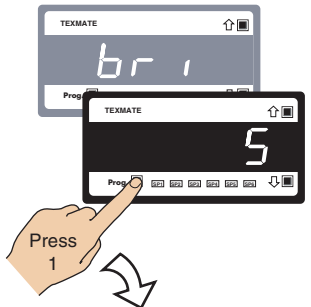
Step 14

ON DEMAND MANUAL LOADER MODE Setup Procedure
continued on next page

continued on next page

Page 16   Texmate Inc. Tel. (760) 598-9899 • www.texmate.com   18 December, 2003 • Analog Output Mod. (NZ200.1)

Operational Display

TEXMATE
99999
Prog.

Press
at same
time

Press
at same
time

Step 14
Enter the
Brightness
Mode

TEXMATE
br ı
Prog.

TEXMATE
5
Prog.

Step 15
Pass Brightness
and enter
Calibration
Mode

Press
1

TEXMATE
CAL
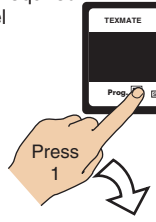Prog.

Example

TEXMATE
000
Prog.

OR

Step 16
Set Code 1 to [051]:
1st Digit = 0 Functions activated by Prog. button
2nd Digit = 5 Selects on demand manual loader
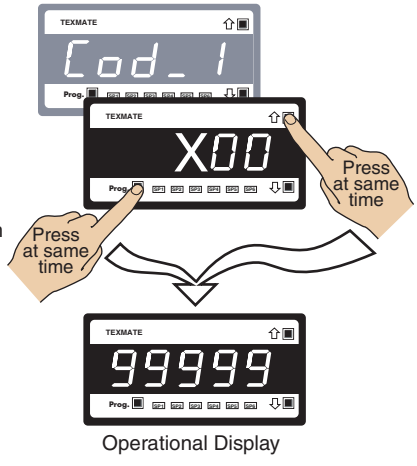mode
3rd Digit = 1 Selects required
channel

TEXMATE
051
Prog.

0	–
1	Channel 1
2	Channel 2
3	Channel 3
4	Channel 4
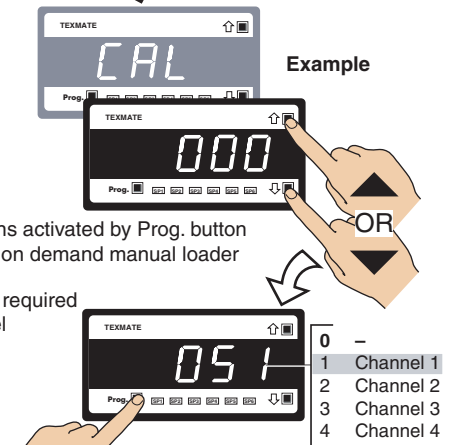
Step 17
Save the settings

Press
1

TEXMATE
Cod_1
Prog.

TEXMATE
X00
Prog.

Press
at same
time

Step 18
Exit Code 1 and return
to the operational
display

Press
at same
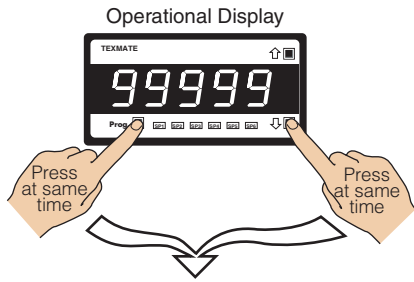time

TEXMATE
99999
Prog.

Operational Display

NOTE

Setpoints SP5 and SP6 provide upper and lower
limits and should be set to the meter's calibrated
span range. We suggest that these are used to
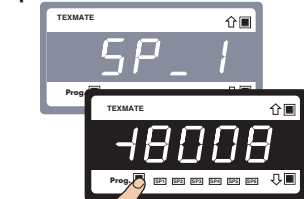limit your manual adjustment range.

Configure Manual Loader Mode Upper/Lower Limits Procedure

The following example procedure decribes how to set upper and lower limits for the manual loader mode. This is done using the setpoint activation values of setpoints SP5 and SP6 of the setpoint programming mode.

Operational Display

TEXMATE
99999

Step 1

Enter Setpoint Activation Values Mode

Press at same time

Press at same time

Setpoint Activation Values Mode

TEXMATE
SP_1

TEXMATE
-18008

Step 2

Pass SP1 to SP4 and enter SP5

Press **4**

TEXMATE
SP_5

TEXMATE
10000

Step 3

Set SP5 to the UPPER limit

OR

TEXMATE
20000   **Example**

Step 4

Save UPPER limit and enter SP6

Press 1

To Step 5

From Step 4

TEXMATE
SP_6

TEXMATE
50000
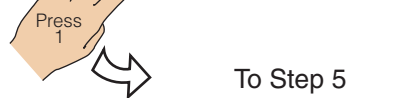
Step 5

Set SP6 to the LOWER limit

OR

TEXMATE
0   **Example**
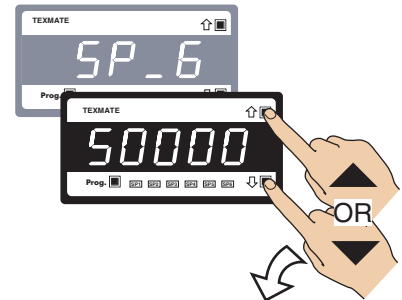
Step 6

Save LOWER limit and enter SPC_1

Press 1

TEXMATE
SPC_1

TEXMATE
000
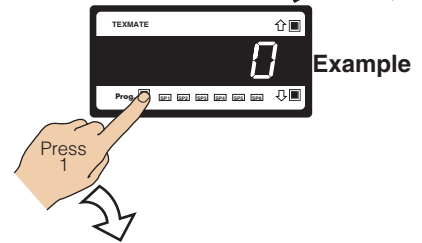
Step 7

Exit the Setpoint Activation Values Mode and return to the Operational Display

Press at same time

Press at same time

TEXMATE
99999

Operational Display
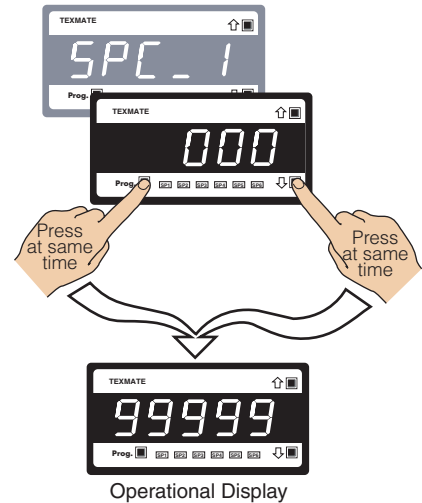
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The document revision number appears in the footer of every page and forms part of the document code.

Document Code

18 December, 2002 • Analog Output Mod. (NZ212.1)

Print Date   Document Title   Revision Number

Document Number
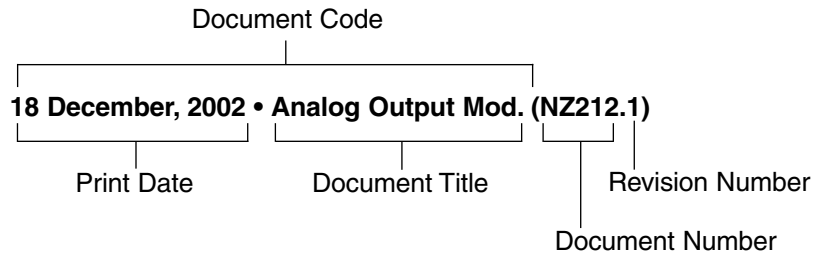
The Revision History Table describes the major changes made to the supplement during each revison. Any page numbers quoted refer to the previous version.

Revision History

Revision Code	Revision Date	Revision Remarks
0	12 March, 2003	Original production.
1	18 December, 2003	Changes to various pages to add new dual 0-10 V DC analog output board option ADV.

TEXMATE INC

995 Park Center Drive • Vista, CA 92083-8397

Tel: (760) 598-9899

Fax: (760) 598-9828

URL: http://www.texmate.com

For ordering info call: 1-800-TEXMATE (1-800-839-6283)

For tech assistance call: . . . .(760) 598-9899)

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