Associated Documents

The following documents must be read together with this supplement:

Relevant Tiger 320 Series User Manual

The user manual provides general information on the relevant Tiger 320 Series meter.

Tiger 320 Series Programming Code Sheet

The programming code sheet provides all meter programming codes including set-point programming codes.

Analog Output Module Supplement

This supplement provides detailed descriptions of the analog output module.

This document was written using Tiger 320 Series Code Version 3.02n.

The totalizer for earlier versions of code may differ to that shown.

Consult your Programming Code Sheet (NZ101) for relevant totalizer settings.

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.

Note

It is assumed that you are familiar with the Programming Conventions used throughout the range of Texmate Tiger 320 Series literature as described in the user manual.

This document is designed to supplement the information described in the Tiger 320 Series user manual. It covers the meter's Totalizing and Batching Functions.

Contents

List of Figures

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

Error Message

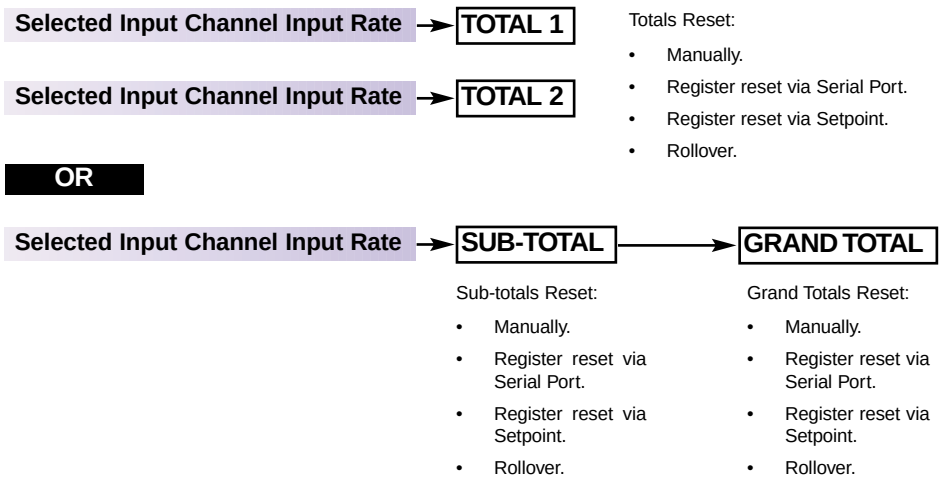
ERR 2

If the input signal goes overrange while the totalizer is displayed on the operational display, the totalizer stops counting and [ERR 2] is displayed. If the input signal goes overrange while the totalizer is running in the view mode (running in the background), the totalizer also stops counting, but does not display [ERR 2].

A totalizer is a user selectable software function of the meter that converts an input rate to an input total over time. For example:

> A customer has a settling tank being filled with water. The flow rate is metered and input to a Tiger 320 Series meter. The flow rate indicates the speed at which the volume of water travels past a set point, but not the total volume accumulated in the tank. The meter's totalizer performs this function and provides the customer with the total amount of water currently in the tank. This then allows the customer to make control decisions, such as when to turn the tap off before the tank overflows.

Each Tiger 320 Series meter has two independent totalizers suitable for a wide variety of totaling and batching applications. Each totalizer can operate independently or combine to generate a sub-total and grand total. Totals can be reset using one of a number of methods. Setpoints can be used to reset a sub-total and increment a grand total.



Before You Start Setting the Totalizer

Configuring the meter for a totalizer application requires some basic settings to be decided beforehand. These settings are the **unit input rate**, the **resolution of the unit input rate**, and the **resolution of the totalizer**. When the settings are known, enter the calibration mode and calibrate the selected input channel to be totalized.

Unit Input Rate

This is the term for the unit amount of the input signal to be totalized in relation to time. For example, the unit input rate of a flow rate of 100 liters per second is **liters per second**. Some other examples of the unit input rate would be revolutions per minute or joules per hour.

Input Signal Resolution

This uses the position of the decimal point to determine how coarse or how fine the units of an input signal are displayed on the meter. Input signal resolution must be set correctly for the selected input channel.

Input Signal Calibration

The input signal must be calibrated to suit the **unit input rate**, taking into consideration the required **input signal resolution**. For example:

> If we wanted to display an input flow rate of 350 gallons per minute (GPM) in tenths (0.1) of a gallon, the meter could be scaled to read 0 counts for 0 GPM and 3500 counts for 350 GPM. With the input signal resolution set to tenths, the meter would then display 350.0 counts for 350 GPM, or 276.9 counts for 276.9 GPM.

Totalizer Resolution

This also uses the position of the decimal point to determine resolution. In this case it is how coarse or how fine the units of the totaled amount are displayed on the meter. For example:

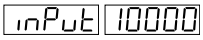
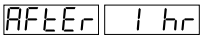
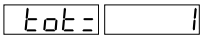
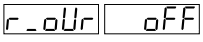
Using our 350 GPM flow rate again, we want to display 1 kilogallon for every 1,000 gallons totaled. With the display resolution configured with no decimal point, we would add 1 to the totalizer after 1,000 gallons. But, if we wanted the totalizer to display to the nearest 100 gallons, we would then place the decimal point between the last two digits. Therefore, 1,000 gallons would display as 1.0 on the totalizer, but 1652 gallons would display as 1.6.

Totalizer Settings

The totalizer settings are configured in the calibration mode. To enter the totalizer settings mode, enter the calibration mode and select [23X].

Selecting **2** in the 1st digit selects **related calibration functions**, selecting **3** in the 2nd digit selects the **totalizer settings mode**. Select **1** in the 3rd digit to select **totalizer 1** or **2** to select **totalizer 2**.

Entering the totalizer settings mode allows you to configure the following settings for the selected totalizer:

- **Input Rate**. Displayed as: . . . . . 
- **Running Time**. Displayed as: . . . . . 
- **Required Total**. Displayed as: . . . . . 
- **Cutoff**. Displayed as: . . . . . 
- **Rollover**. Displayed as: . . . . . 

Input Rate

The input rate has a default setting of 10,000 counts. This can be adjusted to suit the known input rate of an application.

So, using our 350 GPM flow rate example, to display in units of 1 gallon we can adjust the input rate from 10,000 counts to 350 counts. Or, if we wanted to display the total in tenths of a gallon, we can adjust the input rate to 3500 counts, making sure the totalizer resolution is set for tenths (0.1). This gives us a display of 350.0 for 350 GPM.

Running Time

The running time is the period over which the input rate is accumulated in the totalizer. The following running times are selectable in the meter:

Running Times				
Seconds	**Minutes**	**Hours**	**Days**	**Weeks**
1	**1**	**1**	**1**	**1**
10	**10**	**10**	**-**	**-**

Total Required

This is the total you wish to see after a selected running time. The time unit of the input rate is normally selected as the running time. For example, if gallons per minute is the rate unit, then you would use **1 minute** as the running time. Or, if liters per hour is the rate unit, then you would use **1 hour** as the running time.

So once again, using our 350 GPM flow rate, the running time is **1 minute**. This means that when we set the required **total**, it is with the understanding that the total is expressed as a unit of gallons per minute. For example:

If we wish to display 1 kilogallon for every 1,000 gallons totalled, we would set the required **total** to **1**.

But, if we wanted the totalizer to display to the nearest 100 gallons, we would have to move the decimal point to add an extra unit. Therefore, instead of setting the required **total** as **1**, we would set it to **10**. The 1,000 gallons would then display as 1.0 on the totalizer as long as the input signal resolution is set to 0.1 (tenths).

Cutoff

This is normally set to 0 to prevent counts being subtracted from the total, but it can be set anywhere from –19999 to 32767 counts, depending on the application.

For example, if the meter is scaled from 0 to 100 counts for a 4-20 mA input and the input power goes off, –25 counts would be subtracted from the total for the 0 mA signal. With cut-off set to 0.0, the totalizer ignores any counts below this setting (i.e. –25 counts).

Rollover

When set to ON, rollover automatically resets the total to 0 when the total value exceeds the maximum count possible on the display by one count (99,999 for 5-digit, 999,999 for 6-digit, and 99,999,999 for 8-digit meters). If the total is exceeded by more than one count, the amount over the maximum display is added to the new total.

Note, the totalizer does not increment any other register to record the rollover.

Current Total			New Total
99999	+ 1	Rollover resets to	0
99999	+ 2	Rollover resets to 0 and 1 is added to new total	1
99999	+ 9	Rollover resets to 0 and 8 is added to new total	8

Note:
The rollover feature should not be used with the setpoint reset feature as this could cause inaccurate results. See Resetting the Total from a Setpoint.

How it all Works

Using example customer applications, examples 1 and 2 show the totalizer settings required when configuring the meter as a totalizer.

Example 1

Our customer has a flow sensor and wishes to convert the flow rate of 1,500 gallons per minute (GPM) to total volume. The customer requires the flow rate to display directly in GPM and the total volume to display in hundredths of a kilogallon (0.01 of a kilogallon).

Texmate installed a Tiger 320 Series DI-50 meter and calibrated the input for a full scale range of 1,500 GPM.

- **Engineering Units Required**:

  Gallons per minute (GPM) for input flow rate.

  Kilogallons (0.01 of a kilogallon) for total volume.
- **Input Rate**: 1500 counts displayed as 1500 GPM.
- **Input Channel Resolution Setting**: XXXXX

  The display is directly read in GPM.

  For example, [1214] on the display would be 1,214 gallons.
- **Totalizer Resolution Setting**: XXX.XX

  The totalizer displays in hundredths of a kilogallon (0.01).

  For example, [121.40] on the display would be 121,400 gallons.

  Note, resolution is set twice: first for the selected input channel, then for the selected totalizer.
- **Running Time**: 1 minute.

  It is always best to select the **time unit** as the running time. For example, if the time unit is gallons per minute then the running time should be set to **1 minute**.
- **Desired Total**: 150.

  So an assumed input rate of 1,500 GPM produces 1,500 gallons (1.5 kilogallons) in total after 1 minute. Therefore, the desired total is set at 150, as the totalizer resolution has been set to display in 0.01 of a kilogallon. So 1,500 gallons displays as 1.50.

INPUT SIGNAL

Data Source — Select the data source for the **PRIMARY** display in **CODE 1 [X50]**

Then select **CH1** in the **SOURCE** sub-menu

Resolution — Enter **CODE 1 [X6X]** Then set the position of the decimal point to display the flow rate in gallons **DISP [XX0]**

5-digit Display	
X·X X X X	Ten Thousandths
X X·X X X	Thousandths
X X X·X X	Hundredths
X X X X·X	Tenths
X X X X X	One

Calibration — Enter **CALIBRATION MODE [111]** And calibrate the input channel using two-point calibration.

TOTALIZER 1

Data Source — Select the data source for **Totalizer 1** in **CODE 1 [X56]**

Then select **CH1** in the **SOURCE** sub-menu

Resolution — Enter **CODE 1 [X6X]** Then set the position of the decimal point to display the total in hundredths of 1 kilogallon **DISP [XX5]**

5-digit Display	
X·X X X X	Ten Thousandths
X X·X X X	Thousandths
X X X·X X	Hundredths
X X X X·X	Tenths
X X X X X	One

Totalizer 1 Settings — Enter **CAL MODE [231]** And select the following **Totalizer 1** settings:

INPUT Set an **input rate** of: **1500**

AFTER Select a **running time** of: **1 minute**

1 second.
10 seconds.
1 minute.
10 minutes.
1 hour.
10 hours.
1 day.
1 week.

TOTAL Select desired **total value** to be displayed after the selected **running time** expires **150**

CUTOFF Set to **0** Not a mandatory setting

Can be anywhere between –19999 to 32767.

ROLLOVER Set to **OFF**

Example 2

Our customer requires to directly measure power usage in an installation and wishes to convert the power (energy/time) kilowatts into energy in units of megawatt hours using a totalizer.

Texmate installed a Tiger 320 Series DI-50 meter with a single phase power module and calibrated the input for a full scale range of 200 kW. The meter is configured to display the power (input) reading in tenths of a kilowatt (0.1 kW) on the operational display, and the energy (total kW used) reading in hundredths of a megawatt (0.01 MW) in the view channel mode:

- **Engineering Units Required**:

  Power input in kilowatts (kW).

  Totalized energy in megawatt hours (MW hr).
- **Input Rate**: 2000 counts displayed as 200.0 kW.
- **Input Channel Resolution Setting**: XXXX.X

  The display is read in tenths of a kW (0.1).

  For example, [196.4] on the display would be 196.4 kW.

- **Totalizer Resolution Setting**: XXX.XX

  The totalizer displays in hundredths of a megawatt hour (0.01).

  For example, [21.40] on the display would be 21.40 megawatt hours.

  Note, resolution is set twice: first for the selected input channel, then for the selected totalizer.

- **Running Time**: 1 hour.

  Note, it is always best to select the unit input rate as the running time. For example, if the unit input rate is kilowatts then the running time should be set to 1 hour.

- **Desired Total**: 0.20.

  So an input rate of 200 kW displays as 200.0 kW. Therefore, 200.0 kW over an hour is equivelant to 200.0 kW hr or 0.20 MW hr.

INPUT SIGNAL

Data Source — Select the data source for the **PRIMARY** display in **CODE 1 [X50]**

Then select **CH1** in the **SOURCE** sub-menu

Resolution — Enter **CODE 1 [X6X]** Then set the position of the decimal point to display in tenths of 1 kW **DISP [XX6]**

Calibration — Enter **CALIBRATION MODE [111]** And calibrate the input channel using two-point calibration.

5-digit Display	
X·X X X X	Ten Thousandths
X X·X X X	Thousandths
X X X·X X	Hundredths
X X X X·X	**Tenths**
X X X X X	One

TOTALIZER 1

Data Source — Select the data source for **Totalizer 1** in **CODE 1 [X56]**

Then select **CH1** in the **SOURCE** sub-menu

Resolution — Enter **CODE 1 [X6X]** Then set the position of the decimal point to display the total in hundredths of 1 MW hr **DISP [XX5]**

5-digit Display	
X·X X X X	Ten Thousandths
X X·X X X	Thousandths
X X X·X X	**Hundredths**
X X X X·X	Tenths
X X X X X	One

Totalizer 1 Settings — Enter **CAL MODE [231]** And select the following **Totalizer 1** settings:

INPUT **Input rate** of: **2000**

AFTER Select a **running time** of: **1 hour**

1 second.
10 seconds.
1 minute.
10 minutes.
1 hour.
10 hours.
1 day.
1 week.

TOTAL Select desired **total** value to be displayed after the selected **running time** expires **0.20**

CUTOFF Set to **0** Not a mandatory setting

Can be anywhere between –19999 to 32767.

ROLLOVER Set to **OFF**

Totalizer Programming Sequence

When configuring the meter as a totalizer, the following programming sequence must be followed to ensure that all configuration settings are correctly entered and saved:

START HERE

1. **Input Signal Display Configuration**
   - 1) Select the Display Data Source – Enter [Cod_1] [X50]
   - 2) Set the Input Signal Resolution – Enter [Cod_1] [X6X]
2. **Totalizer Display Configuration**
   - 1) Select the Totalizer Data Source – Enter [CAL] [23X]
   - 2) Set the Totalizer Resolution – Enter [Cod_1] [X56] or [X56]
3. **Input Signal Calibration**
   - 1) Calibrate the input signal – Enter [CAL] & select a calibration mode
4. **Totalizer Settings – [CAL] [23X]**
   - 1) Set the Input Rate
   - 2) Set the Running Time
   - 3) Set the Required Total
   - 4) Set the Cutoff Setting
   - 5) Select the Rollover Setting

Input Signal Display Configuration

Selecting the source of data for the display and setting the display resolution is the first step in configuring the meter as a totalizer.

Select the Display Data Source

Enter Code 1 and select the **input signal channel** (normally channel 1) as the data source for the **primary display**. This is done by setting Code 1 to [X50] and selecting [Ch1] in the **select data source** mode.

Set the Input Signal Resolution

On all 5, 6, and 8-digit meter versions, the decimal point can be individually selected for all four input channels. The decimal point can be placed between any digit on the 5-digit display, anywhere between the six least significant digits on the 6 and 8-digit meters, or not shown at all (see Figure 1). Configuring the decimal point can produce the following display resolutions:

- One hundred thousandths (9.99999)(6 or 8-digit display only).
- Ten thousandths (99.9999).
- Thousandths (999.999).
- Hundredths (9999.99).
- Tenths (99999.9).
- One (999999).

Select the position of the decimal point to suit the resolution required for the input signal channel. This is done by selecting [X6X] in Code 1 and entering the **display format mode**. Once in this mode select the position of the decimal point using the 3rd digit.

For example, to display units in multiples of one unit (i.e. no decimal point) select **0** in the 3rd digit. Or to display units in multiples of 0.1 (tenths), select **6** in the 3rd digit.

See Code 1 Display Configuration diagram on Page 14.

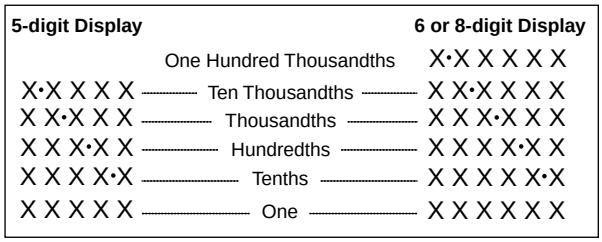


Figure 1 – Decimal Point Placement

Totalizer Display Configuration

Select the Totalizer Data Source

Enter Code 1 and select the relevant **channel** (CH1 or CH2) as the data source for the selected **totalizer**. This is done by setting Code 1 to [X56] and selecting [Ch1] in the Select Data Source mode.

Set the Totalizer Resolution

The resolution of the selected totalizer is also configured in the Display Format Mode of Code 1 [X6X]. Placing the decimal point in the same position as the input signal produces the same resolution (see Figure 1).

Display Alternatives

It is possible to configure the display to view the **total as the main display** (operational display) and the **flow rate as the recall display** (seen in the **view mode**). This is done by selecting the relevant register as the data source for the primary display in the **select data source** mode in Code 1.

See Input Signal Display Configuration on Page 8 for further details on selecting the data source for the primary display.

To view the flow rate on the recall display, press the UP button until the display toggles between [Ch 1] and the flow rate value. For example, if the display shows [Ch1] [100]. This indicates a flow rate of 100 gallons per minute.

Input Signal Calibration

Before configuring the totalizer settings, all input signals to be totalized must be calibrated. There are four calibration modes available:

- Manual Calibration.
- Two-point Calibration.
- Thermocouple Calibration.
- RTD Calibration.

Depending on the input signal type, select a calibration mode and calibrate the input signal of the selected input channels. The most commonly used calibration method is the two-point calibration mode. This method requires an input signal source that covers the input signal's high and low limits.

Scaling Parameters

Tiger 320 Series meters use 5, 6, or 8-digit displays. The range of a 5-digit display is –19999 to 99999 counts on the display, providing a total range of 120,000 counts. The range of a 6-digit display is –199999 to 999999 counts on the display, providing a total range of 1,200,00 counts. The range of an 8-digit display is –19999999 to 99999999 counts on the display, providing a total range of 120,000,000 counts. An input signal can be scaled (calibrated) across all or any part of these ranges.

Input Signal Filtering and Averaging

Input signal filtering and averaging is configured in the calibration mode. Programmable averaging allows you to program the number of samples you want to average the input signal over (from 1 to 255 samples).

A programmable averaging window provides a quick response time to large input signal changes. The averaging window can be set to between 1 and 65535 counts.

Totalizer Settings Configuration

For the totalizer to perform the K factor calculations and provide a total, the following settings must be programmed into the meter in the **totalizer settings mode** of the calibration mode:

- Input Rate.
- Running Time.
- Required Total.
- Cutoff.
- Rollover.

See Totalizer Settings on Page 4 for detailed descriptions of these settings.

Resetting the Total

Resetting the total is an important feature of any totalizer or integrator. Both totalizers can be reset using one of the following methods (see Figure 2):

- **Front Panel UP/DOWN Buttons**. Pressing both the UP and DOWN buttons on the front panel at the same time when the meter displays the total flow as the main or recall display (view mode).
- **LOCK or HOLD Pins**. Using the LOCK or HOLD pin at the back of the meter, as configured in Code 9.

  See Pin Descriptions in the Tiger 320 Series meter user manual.
- **Reset Message via Serial Port**. Sending a reset message to the relevant register from a terminal program via the meter's serial port.

  See Serial Communications Module Supplement (NZ202) for serial output details.
- **Reset TOTAL register via setpoint**. Using a setpoint to reset one totalizer is the only method of incrementing the other totalizer.

  See Resetting the Total from a Setpoint below.
- **Reset TOTAL register via rollover feature** in the **totalizer settings** mode.

  See Rollover description above.

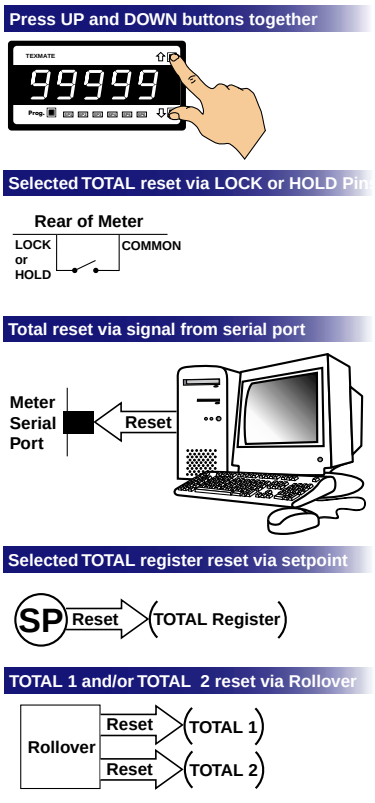


Figure 2 – Resetting the Total

Resetting the Total from a Setpoint

The **advanced functions mode** of the setpoint programming mode allows any selectable register in the meter to be reset. This means that a selected totalizer can be programmed to reset at any setting within the range of the totalizer. This feature also allows one totalizer to be reset while the other totalizer increments by one count (sub-total increments grand total).

Figure 3 is a graph showing the relationship between the volume over time and the sub-total and total registers (either can be selected as total 1 or total 2).

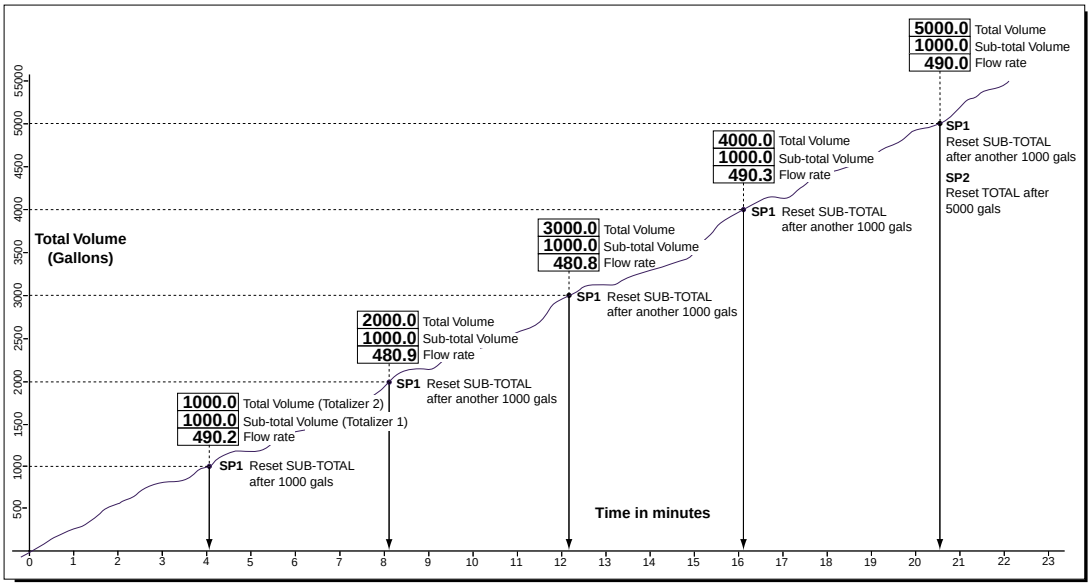


Figure 3 – Graph showing Flow over Time with Sub-total and Total

Pulse Output

Some applications require a pulse output to be sent to other equipment such as a remote counting device. This is also a feature of the **advanced functions mode**.

While resetting the meter's totalizer register, a pulse output from the setpoint relay can increment the display on an external totalizer such as a remote counting device. When the total exceeds the setpoint setting, the setpoint activates and energizes the relay sending a pulse to the counting device. One sample time later (100 ms), the setpoint is not in violation (as it has dropped back to the reset value) and the relay is de-energized (see Figure 4).

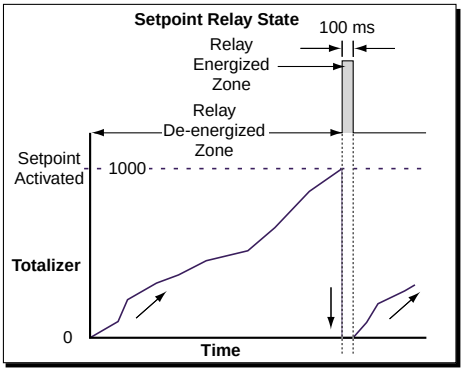


Figure 4 – Pulse Output from Relay

See Example 2 – Advanced Totalizing of a Flow Input for full details on configuring a pulse output from a relay.

See Setpoints & Relays Supplement (NZ201) for further information on configuring setpoints and relays.

Analog Output

Some applications require an external device to be driven by an analog output signal. This could be, for example, a chart recorder recording the flow rate, or a digital display displaying the total.

See Example 2 – Advanced Totalizing of a Flow Input for full details on configuring the analog output module.

See Analog Output Module Supplement (NZ200) for further information on configuring the analog output module.

Meter Programming Codes

The meter's programming codes are divided into two modes (see Figure 5):

- 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.

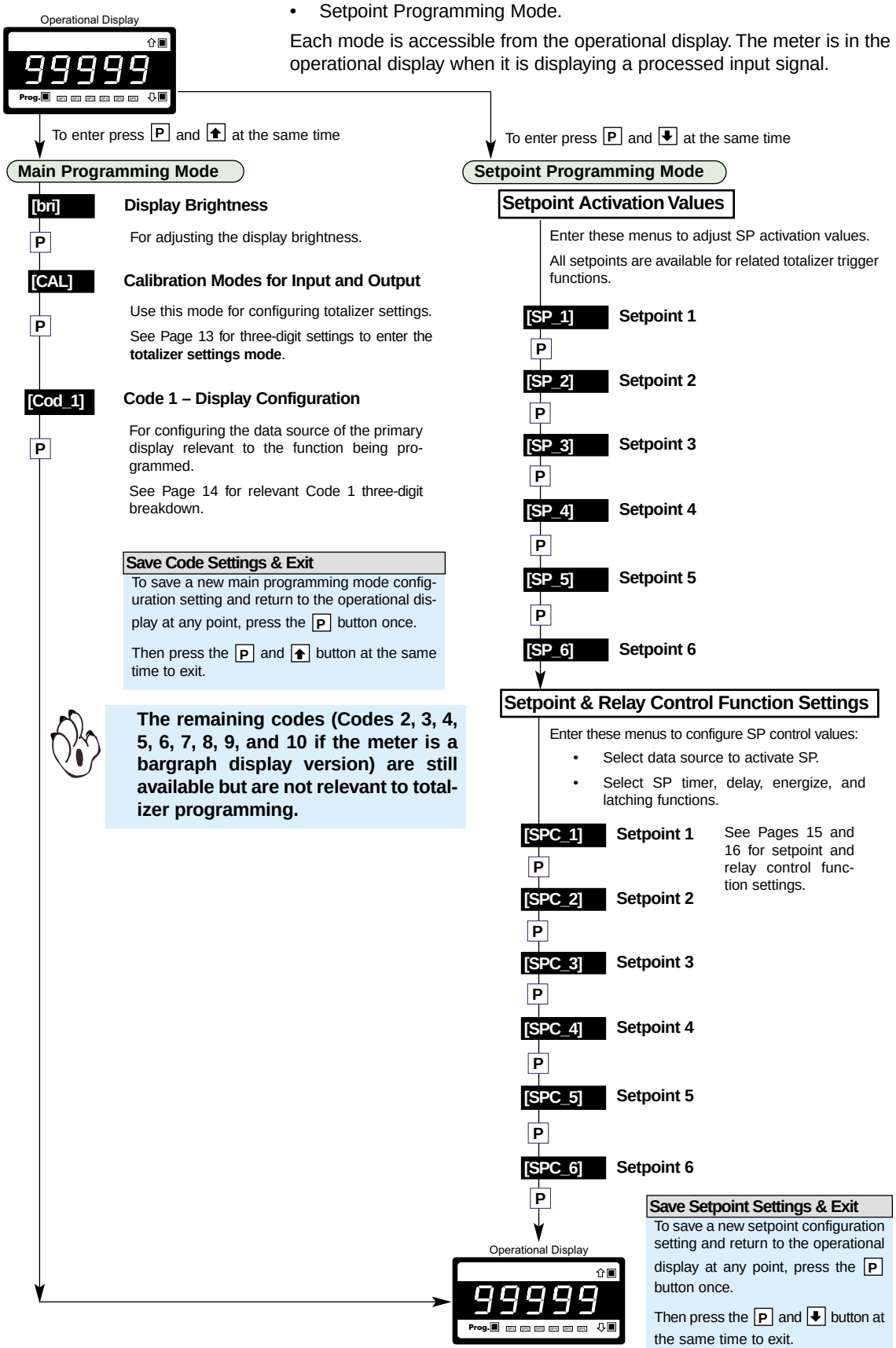


Figure 5 – Programming Code List

Totalizer Configuration Programming Codes

Totalizer functions are configured in the following codes:

- Calibration Mode.
- Code 1.
- Setpoint Programming Mode.

Pressing the P and ⬆ buttons at the same time enters the **main programming mode**. To save a new configuration setting in the main programming mode and return to the operational display, press the P button once and then press the P and ⬆ buttons at the same time.

Pressing the P and ⬇ buttons at the same time enters the **setpoint programming mode**. To save a new configuration setting in the setpoint programming mode 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** 1 Total 1 2 Total 2
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	**0 Serial Communications Properties** 1 Set Auto Zero Maintenance for 3rd digit 2 Set Averaging Samples & Averaging Window for 3rd digit 3 Totalizer Settings Mode 4 Setup 32-point Linearization Tables 5 Scale Analog Output LOW/HIGH (zero/span) Display Readings 6 - 7 -	
3 -		

Note:
The required totalizer must be selected.

10,000 counts is the default Input Rate value.

Use ⬆⬇ buttons to set required Input Rate value

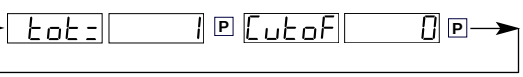
Use ⬆⬇ buttons to set Time Delay Period

Time Delay Periods available

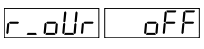
- 1 second.
- 10 seconds.
- 1 minute.
- 10 minutes.
- 1 hour.
- 10 hours.
- 1 day.
- 1 week.

Use ⬆⬇ buttons to set total from 1 to 65535

Use ⬆⬇ buttons to set Cutoff from –19999 to 32767



Use ⬆⬇ buttons to set Rollover to ON or OFF



CODE 1 – DISPLAY CONFIGURATION: SELECT DATA SOURCE

FIRST DIGIT
FRONT PANEL ANNUNCIATORS
0 ON when Setpoints are ON (relay energized)
1 ON when Setpoints are OFF (relay de-energized)
2 Always OFF. *See Note 1*
3 LED SP1 ON indicates RISING signal trend. LED SP2 ON indicates FALLING signal trend.

SECOND DIGIT
DATA DISPLAY SOURCE
0 Normal Display Mode (i.e. operational display shows selected register) updates every 0.5 seconds
1 Manual Loader Mode (Direct Display).
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

THIRD DIGIT
SELECT DATA SOURCE FOR
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

See Select Data Source diagram

See Select Display Format diagram

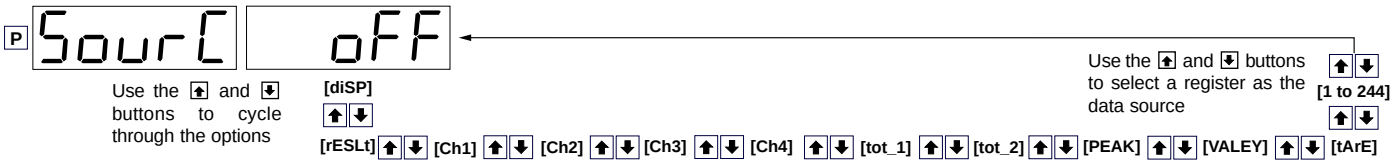
See Select Text Character diagram

Note 1:

LED annunciators are always off, except when the meter is in single channel VOLTAGE or CURRENT mode and Code 3 = [X6X], or Code 7 = [X6X] in which case the LEDs indicate which 32-point table has been selected from the rear pins (SP1 = Table 1, SP2 = Table 2, SP3 = Table 3, SP4 = Table 4).

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.



Display Format Mode

Program the three digits to the required display function mode

FIRST DIGIT
LAST DIGIT ROUNDING
0 No rounding
1 Rounding by 2's
2 Rounding by 5's
3 Rounding by 10's

SECOND DIGIT
DISPLAY UNITS
0 Decimal
1 24-hour clock mode Hours: Minutes: Seconds (6-digit version only)
2 12-hour clock mode (12:30 am is displayed as 12:30A. 12:30 pm is displayed as 12:30P)
3 24-hour clock mode Days: Hours:Minutes (6-digit version only)
4 -
5 -
6 -
7 Octal

THIRD DIGIT
DECIMAL POINT PLACEMENT
0 No decimal point
1 XX.XX.XX (6-digit version only)
2 X.XXXXX (6-digit version only)
3 X.XXXX
4 X.XXX
5 X.XX
6 X.X
7 Decimal Point set from the rear (X.XXXXX to XXXXXX). *See Note 3.*

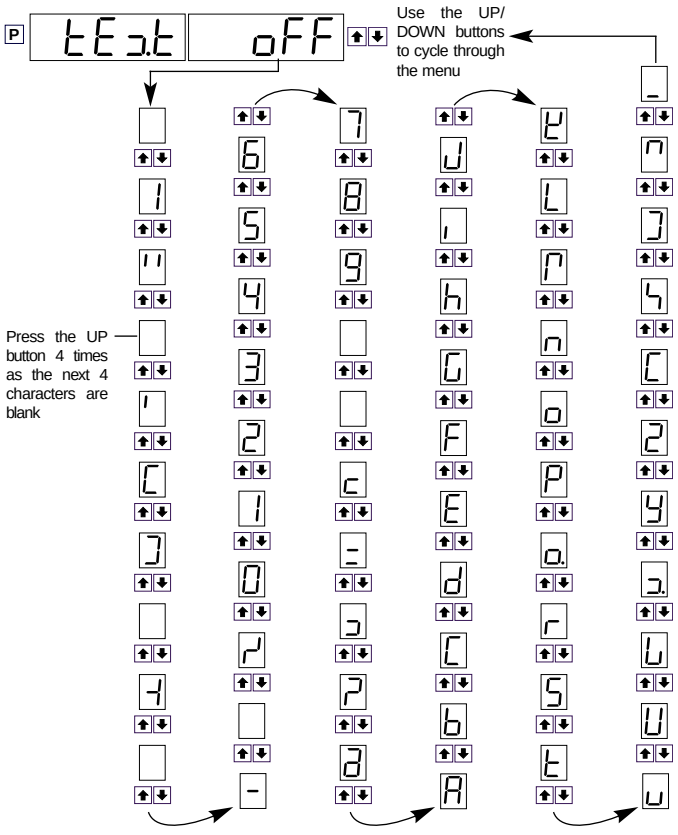
Also See Note 4

Note:
Selecting 1, 2, or 3 in the 2nd digit of this mode configures the display of the selected channel as a clock.

Note 3:
These functions are only available on selected input modules.

Note 4:
If Code 1's display modes have been entered (second digit set to 5, 6, or 7), the display will cycle between Code 1 and the display functions mode each time the PROGRAM button is pressed. To leave the cycle, the Code 1 digits must be reset to any relevant function between [X00] to [X20]. This takes you into Code 2.

Select Last Digit Text Character



SETPOINT PROGRAMMING MODE – SETPOINT CONTROL SETTINGS

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

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

→ **Set Up Timer Mode Delay Settings** See diagram below

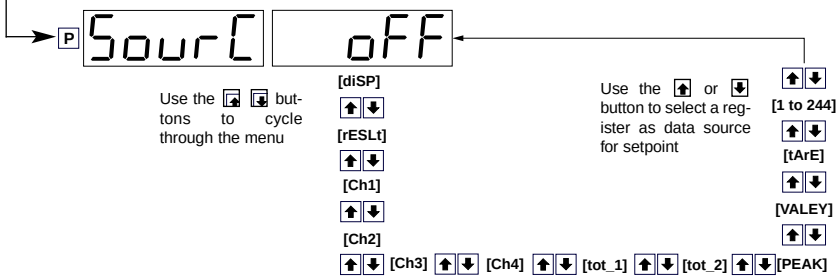
Note:
With PID active, all SP1 functions set in [XX6] are not functional.

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

→ **Advanced Functions Mode – Register Reset & Setpoint Trigger Functions** See diagram on Page 16

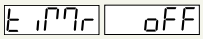
Note:
[XX5], [XX6], and [XX7] are set up procedure settings only. To finish, reset to 0-4 as required for setpoint latching and relay reset modes.

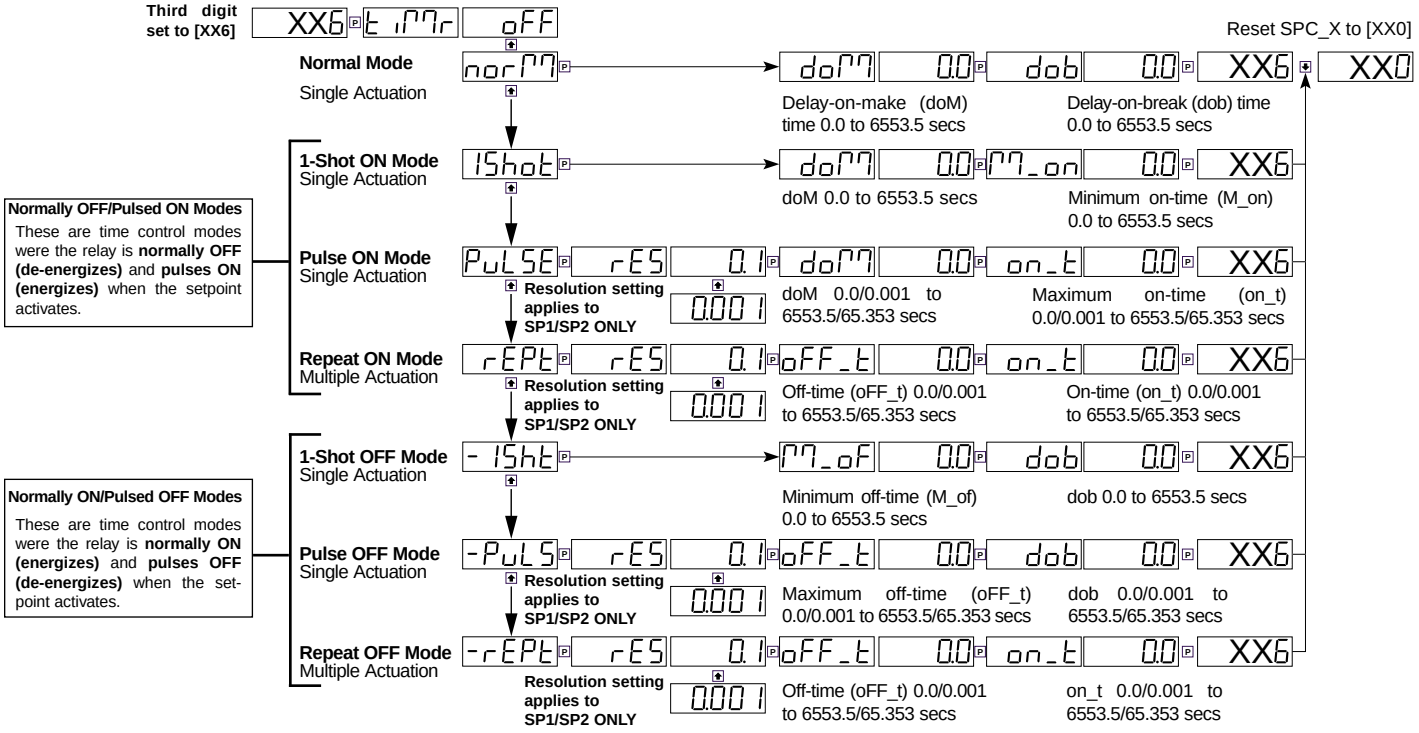
Select Source for Setpoint Functions



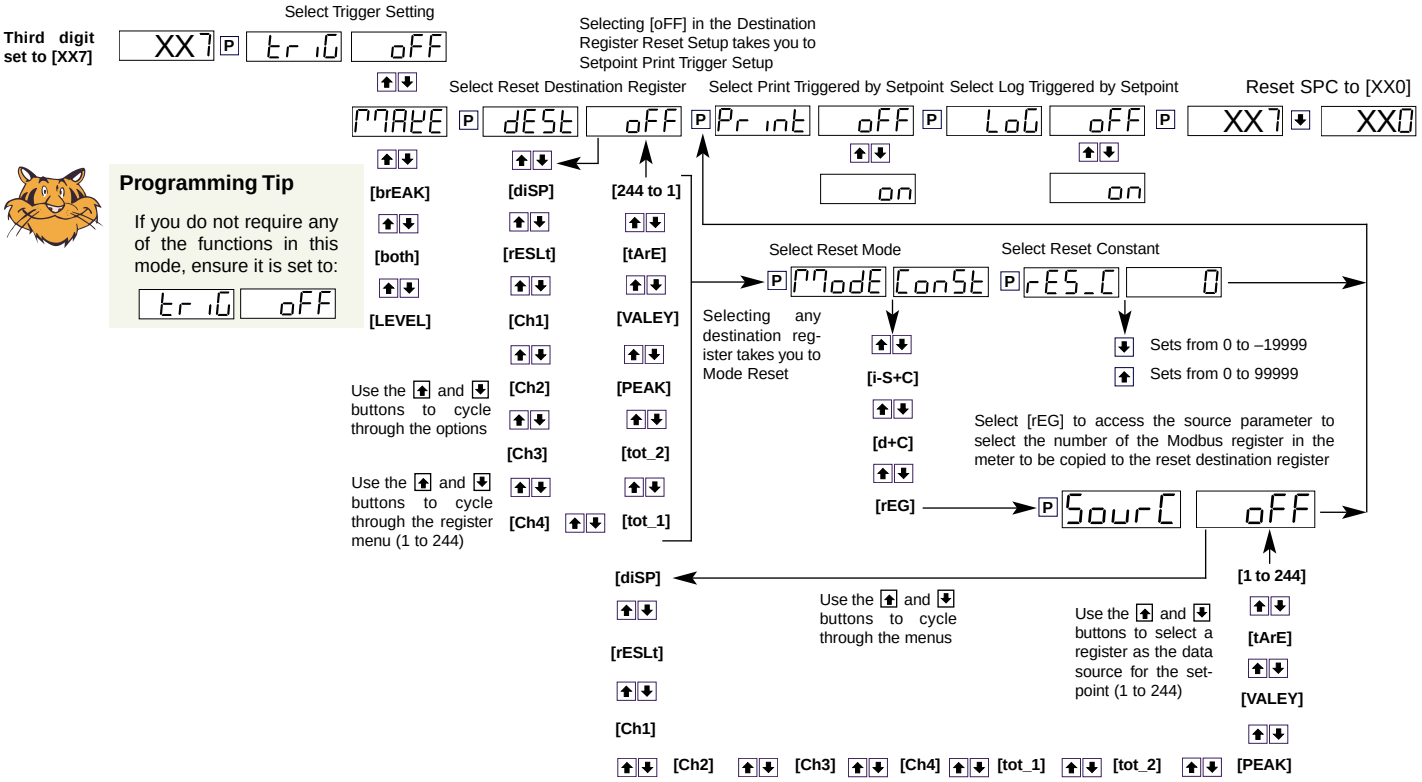
Programming Tip

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





Advanced Functions Mode – Register Reset and Setpoint Trigger Functions



Totalizer Examples

Example 1 – Totalizing a Single Volume Input

Our customer wishes to display a flow rate of 100 liters per minute with a resolution of 0.01 liters. They also wish to totalize the volume from the 100 liters per minute flow rate and display this in units of 1 per 1,000 liters (1 per kiloliter) with a resolution of 0.01 of a kiloliter and the total reset to 0 after 1,000 kiloliters on the totalizer.

See Figure 6.

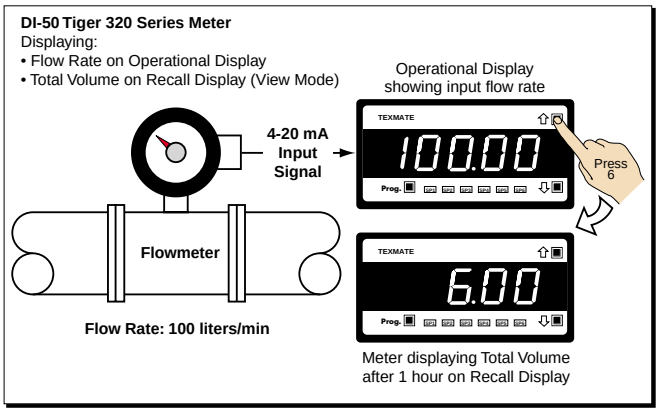


Figure 6 – Totalizing a Single Volume Input

Configuration Settings

To perform as our customer requires in this example, the input signal channel and totalizer must be configured with the following settings:

Input Signal Channel

- Select: **Primary Display**
- Set source of primary display to: **CH1**
- Calibrate the input signal over 0 to 10,000 counts
- Set resolution of CH1 to: **Hundredths**

  Positions the decimal point to display flow rate at **0.01** liters resolution (hundredths of a liter

Totalizer 1

- Set source of totalizer 1 to: **CH1**
- Set resolution of totalizer 1 to: **Hundredths**

  Positions the decimal point to display total at **0.01** resolution (hundredths of a kiloliter)
- Set **input rate** to: **10000** counts

  100 liters/min with 0.01 resolution requires 10000 counts
- Set **running time** to: **1** minute
- Set the required **total** to: **0.10**
- Set **cutoff** to: **0**
- Select **rollover**: **ON**

  Resets totalizer after **999.99** kiloliters

INPUT SIGNAL

Data Source Select data source for **PRIMARY** display in **CODE 1 [X50]** then select **CH1** in the **SOURCE** sub-menu *See Configure Data Source Procedure*

Resolution Enter **CODE 1 [X61]** *See Configure Display Format Mode Procedure* Then set the position of the decimal point to display the flow rate in hundredths of 1 liter **DISP [XX5]**

5-digit Display	
X·X X X X	Ten Thousandths
X X·X X X	Thousandths
X X X·X X	Hundredths
X X X X·X	Tenths
X X X X X	One

Calibration Enter **CALIBRATION MODE [111]** *See Two-point Calibration Procedure* And calibrate the input channel using two-point calibration over 0 to 10,000 counts.

TOTALIZER 1

Data Source Select data source for **Totalizer 1** in **CODE 1 [X56]** then select **CH1** in the **SOURCE** sub-menu *See Configure Data Source Procedure*

Resolution Enter **CODE 1 [X66]** *See Configure Display Format Mode Procedure* Then set the position of the decimal point to display the total in hundredths of 1 kiloliter **DISP [XX5]**

5-digit Display	
X·X X X X	Ten Thousandths
X X·X X X	Thousandths
X X X·X X	Hundredths
X X X X·X	Tenths
X X X X X	One

Totalizer 1 Settings Enter **CAL MODE [231]** And select the following **Totalizer 1** settings:

See Configure Totalizer Settings Procedure

INPUT **Set an input rate** of: **10000**

AFTER Select a **running time** of: **1 minute**

1 second.
10 seconds.
1 minute.
10 minutes.
1 hour.
10 hours.
1 day.
1 week.

TOTAL Select desired **total** value to be displayed after the selected **running time** expires **0.10 kiloliters**

CUTOFF Set to **0**

ROLLOVER Set to **On** to reset the totalizer to **0** when it reaches 999.99 kiloliters

Example 2 – Advanced Totalizing of a Flow Input

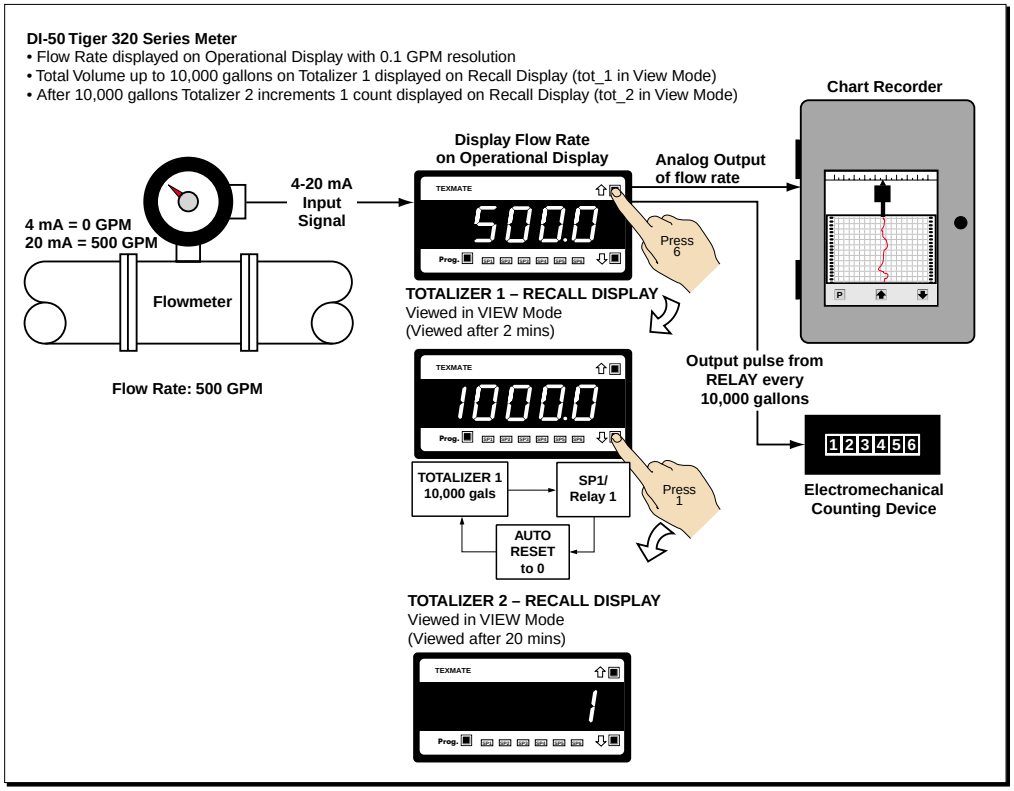


Figure 7 – Advanced Totalizing Functions

Example 2 – Advanced Totalizing of a Flow Input highlights the steps required to configure the meter as an advanced totalizer with pulse and analog output. The Programming Procedures on Page 23 are written using this example.

In Example 2, a 4-20 mA input represents a flow rate of 500 gallons per minute (GPM) with:

- **4 mA representing zero flow, and**
- **20 mA representing 500 GPM.**

Our customer requires:

- **The flow rate displayed in units of 0.1 GPM on the operational display.**
- **The total volume up to 10,000 gallons calculated and displayed in units of 0.1 of a gallon on the recall display of Totalizer 1 in the View Mode.**
- **A second total incremented by 1 count every 10,000 gallons on the recall display of Totalizer 2 in the View Mode.**
- **A pulse output every 10,000 gallons to a remote totalizer (electromechanical counting device).**
- **An analog output to a chart recorder to record flow rate.**

See Figure 7.

To View Totalizer 1:

Press the UP button 6 times to enter the **display view mode** and view Totalizer 1.

To View Totalizer 2:

Press the DOWN button once after viewing the Totalizer 1 recall display to enter the **display view mode** and view Totalizer 2.

Configuration Settings

To perform as our customer requires in Example 2, the input signal channel, totalizers 1 and 2, and the analog output must be configured with the following settings:

Input Signal Channel

- Select: **Primary Display**
- Set source of primary display to: **CH1**
- Calibrate input signal over 0 to 5000 counts
- Set resolution of CH1 to: **Tenths**

  Positions the decimal point to display flow rate at **0.1** GPM resolution

Totalizer 1

- Set **source** of totalizer **1** to: **CH1**
- Set **resolution** of totalizer **1** to: **Tenths**

  Positions the decimal point to display total at **0.1** GPM resolution
- Set **input rate** to: **5000** counts
- Set running time to: **1 minute**
- Set the required **total** to: **500.0**
- Totalize **CH1** flow rate up to **10,000** gallons and activate pulse output from SP1 to increment **totalizer 2** by 1 count
- Reset to **0** at **10,000** gallons activated from SP1
- Cut Off: **0**
- Rollover: **OFF**

Totalizer 2

- Set **source** of totalizer **2** to: **CH1**
- Set **resolution** of totalizer **2** to: **Ones**

  Positions the decimal point to display totalizer **2** resolution in units of **1** per 10,000 gallons
- Set **input rate** to: **5000** counts
- Set running time to: **1 hour**

  At input rate of 500 GPM x 20 min totalizer 2 displays **1 (**10,000 gal). So after 1 hour, totalizer 2 displays **3** (30,000 gal).
- Set the required **total** to: **3**

  Totalizer 2 displays **1** every 10,000 gallons recorded by totalizer 1
- Cut Off: **0**
- Rollover = **ON**

Setpoint 1 (for Pulse and Reset)

Activation Value:
- SP1 Activation Value: **9999.9**

Activation Source Settings:
- SP1 Activation Source: **Total 1**

Advanced Function Settings:
- Reset Trigger: **MAKE** (reset to 0.0)
- Reset Destination Register: **Total 1**
- Reset Mode: **I–S+C**
- Reset Constant: **0**
- Remaining Settings: **OFF**

Pulse Output:
- Relay output connected to remote totalizer

  Increments electromechanical counting device by 1 count every 10,000 gallons

Analog Output

- Selection Header setting: **CURRENT**
- Scale Range: **0.0 to 500.0** counts
- Calibration Range: **4 to 20** mA
- Source: **CH1**

Also see Analog Output Module Supplement (NZ200) for a full description of the analog output module.

INPUT SIGNAL

Data Source Select the data source for **PRIMARY** display in **CODE 1 [X50]** then select **CH1** in the **SOURCE** sub-menu *See Configure Data Source Procedure*

Resolution Enter **CODE 1 [X61]** *See Configure Display Format Mode Procedure* Then set the position of the decimal point to display the flow rate in tenths of 1 gallon **DISP [XX6]**

5-digit Display	
X·X X X X	Ten Thousandths
X X·X X X	Thousandths
X X X·X X	Hundredths
X X X X·X	Tenths
X X X X X	One

Calibration Enter **CALIBRATION MODE [111]** And calibrate the input channel using two-point calibration over 0 to 5000 counts.

See Two-point Calibration Procedure

TOTALIZER 1 (Sub-total)

Data Source Select data source for **Totalizer 1** in **CODE 1 [X56]** then select **CH1** in the **SOURCE** sub-menu *See Configure Data Source Procedure*

Resolution Enter **CODE 1 [X66]** *See Configure Display Format Mode Procedure* Then set the position of the decimal point to display the total in tenths of a gallon **DISP [XX6]**

5-digit Display	
X·X X X X	Ten Thousandths
X X·X X X	Thousandths
X X X·X X	Hundredths
X X X X·X	Tenths
X X X X X	One

Totalizer 1 Settings Enter **CAL MODE [231]** And select the following **Totalizer 1** settings:

See Configure Totalizer Settings Procedure

INPUT **Set an input rate** of: **5000**

AFTER Select a **running time** of: **1 minute**

1 second.
10 seconds.
1 minute.
10 minutes.
1 hour.
10 hours.
1 day.
1 week.

TOTAL Select desired **total** value to be displayed after the selected **running time** expires **500.0**

CUTOFF Set to **0**

ROLLOVER Set to **OFF** Select **OFF** as we are using a setpoint to reset totalizer 1

TOTALIZER 2
(Grand Total)

Data Source Select the data source for **Totalizer 2** in **CODE 1 [X57]** then select CH1 **Ch1** in the **SOURCE** sub-menu *See Configure Data Source Procedure*

Resolution Enter **CODE 1 [X67]** Then set the position of the decimal point to display the total in units of 1 **DISP [XX0]**

See Configure Display Format Mode Procedure

5-digit Display	
X·X X X X	Ten Thousandths
X X·X X X	Thousandths
X X X·X X	Hundredths
X X X X·X	Tenths
X X X X X	One

Totalizer 2 Settings Enter **CAL MODE [232]** And select the following **Totalizer 2** settings:

See Configure Totalizer Settings Procedure

INPUT Set **input rate** to: **5000**

AFTER Select a **running time** of: **1 hour**

1 second.
10 seconds.
1 minute.
10 minutes.
1 hour.
10 hours.
1 day.
1 week.

TOTAL Select desired **total** value to be displayed after the selected **running time** expires **3**

CUTOFF Set to **0**

ROLLOVER Set to **ON** Select **ON** to reset **totalizer 2** to **0** after it reaches the meter's maximum total

SETPOINT 1
(Pulse Output, Reset Totalizer 1)

Activation Value Enter **SP1** and set the **activation value** to: **9999.9**

See Configure Setpoint and Relay Settings Procedure

Data Source Enter **SPC_1 [X1X]** then select Total 1 **tot_1** in the **SOURCE** sub-menu

See Configure Data Source Procedure

SP1 Reset Settings Reset **SPC_1 to [XX7]** And select the following **reset** settings:

See Configure Setpoint and Relay Settings Procedure

RESET TRIGGER: **MAKE** (Reset to 0.0)

RESET DESTINATION REGISTER: **tot_1** (Total 1)

RESET MODE: **I–S+C**

RESET CONSTANT: **0**

REMAINING SETTINGS: **OFF**

ANALOG OUTPUT 1

Header Set the header position to: **CURRENT**

Analog Output 1 Scale Settings Enter **CAL MODE [251]** and **scale** Analog Output 1:

See Configure Analog Output Procedure

ZERO: **0.0**

FULL SCALE: **500.0**

Analog Output 1 Calibration Settings Enter **CAL MODE [151]** and **calibrate** Analog Output 1:

See Configure Analog Output Procedure

CAL LOW: **4 mA**

CAL HIGH: **20 mA**

See also Analog Output Module Supplement (NZ200) for full details to configure the meter for analog output.

Standard Procedures

Following are the standard procedures required to configure the meter to perform the various related totalizing functions. Each procedure has been written for **Example 2 – Advanced Totalizing of a Flow Input** to help describe the procedure. Each procedure must be tailored to suit your particular application.

1 CONFIGURE DATA SOURCE PROCEDURE

See Totalizer Configuration Programming Codes on Page 14 for details of 2nd and 3rd digit selections in Code 1.

CODE 1 [X5X]

1) Select the data source for the 3rd digit selection.

See Configure Data Source Procedure on Page 25 for an example.

*This procedure selects channel 1 as the data source for the **operational display** in Example 2.*

2 CONFIGURE DISPLAY FORMAT MODE PROCEDURE

CODE 1 [X6X]

1) Set the display resolution of the selected channel.

See Configure Display Format Procedure on Page 26 for an example.

This procedure selects 0.1 as the resolution (decimal point placement) for the operational display in Example 2.

The display format mode allows you to configure the following display settings to suit the application requirements:

- Last Digit Rounding.
- Display Settings.
- Decimal Point Placement (resolution of selected display).

Note:
The Configure Data Source and Configure Display Format procedures form part of the Display Configuration settings set up in Code 1. These are initial set-up procedures and should be configured before any other application settings.

3

CALIBRATION MODE

1) Select the calibration mode to calibrate the selected input channel.
2) Set the input signal filtering and averaging settings for the selected input channel.

See Two-point Calibration Mode Procedures on Page 27 for an example.

*This procedure uses the two-point calibration procedure in Example 2 to calibrate **channel 1**.*

4

CALIBRATION MODE [23X]

1) Enter the calibration mode.
2) Enter the **totalizer settings mode** [23X] for the required totalizer and configure selected totalizer settings (the 3rd selects totalizer 1 or 2).

See Configure Totalizer Settings Procedure on Page 29 for an example.

*This procedure uses the set up for **totalizer 1** in Example 2 as an example.*

5 CONFIGURE PULSE OUTPUT PROCEDURE

SETPOINT PROGRAMMING MODE

1) Enter the setpoint programming mode.
2) Select a setpoint and set the **setpoint activation value**.
3) Enter the **setpoint and relay control function settings** mode and configure the following settings where applicable:
   - Select source for setpoint mode [X1X].
   - Timer mode settings [XX6].
   - Advanced functions mode [XX7].

See Configure Pulse Output Procedure on Page 31 for an example.

*This procedure uses the set up of **setpoint 1** as a pulse output for **totalizer 1** in Example 2 as an example.*

The pulse output settings vary for each different application, but always require a source to trigger the setpoint (this is Total 1 in Example 2).

Timer mode settings depend on application requirements for the activation of the setpoint and relay, such as single or multiple actuation, and relay energize delays on make or break.

Advanced function mode settings depend on application requirements for trigger actions such as starting and stopping equipment in a process, or resetting a register in the meter such as the totalizer.

6 CONFIGURE ANALOG OUTPUT PROCEDURE

1) Ensure the analog output module selection header is set to the correct position.

   For Example 2, set the selection header to CURRENT.

   See Analog Output Module Supplement (NZ200) for details on the selection header position.

CALIBRATION MODE

2) Enter the calibration mode and scale and calibrate the relevant analog output.

   For Example 2, scale analog output 1 from 0.0 to 500.0 counts. Calibrate analog output 1 over 4 to 20 mA.

See Configure Analog Output Procedure on Page 33 for an example.

CODE 1

3) Select the data source for the analog output.

   For Example 2, select **channel 1** as the data source for analog output 1.

See Configure Data Source Procedure on Page 25 for an example.

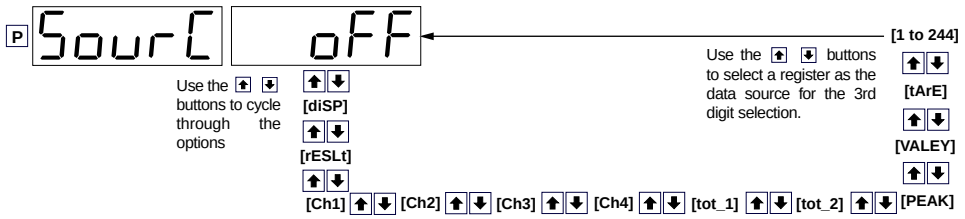
The analog output is active when the selection header is in the correct position, the selected analog output (1 or 2) is scaled and calibrated, and the data source has been selected.

Configure Data Source Procedure – For Example 2

Example Procedure:

Configure the **primary** display (selected in 3rd digit) with channel 1 [Ch1] as the data source by setting Code 1 to [**X50**]. See diagram opposite for data source selection options.

Select Data Source



Programming Tip

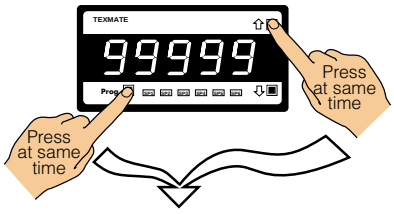
To enter the **main programming mode** press the P and ▲ buttons at the same time. To exit and return to the operational display, press the P and ▲ buttons again at the same time.

At the end of any procedure (Step 8 in this procedure) the P button must be pressed before the P and ▲ buttons are pressed, otherwise the meter returns to the operational display without saving the new settings.

START HERE

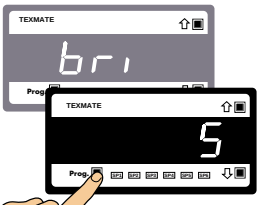
CONFIGURE DATA SOURCE

Operational Display



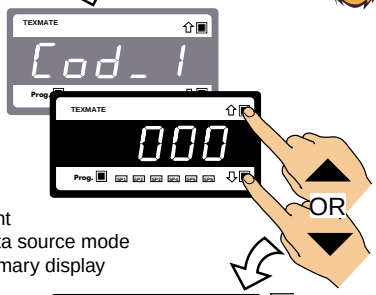
Step 1

Enter brightness mode



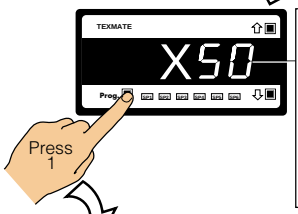
Step 2

Pass brightness and calibration modes and enter Code 1



Step 3

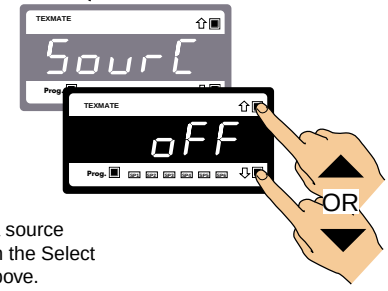
Set Code 1 to [X50]:
1st Digit = X Not relevant
2nd Digit = 5 Selects data source mode
3rd Digit = 0 Selects primary display



Step 4

Enter the select data source mode.

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



Step 5

Select [Ch1] as the data source from the options listed in the Select Data Source diagram above.

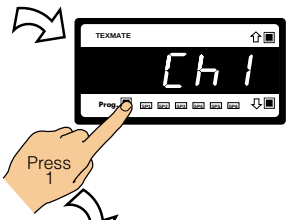
Programming Tip

Pressing the ▼ button reaches [000] faster.

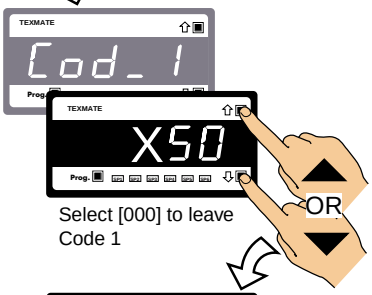
Programming Tip

Pressing the ▲ and ▼ buttons at the same time increases the displayed parameter in increments of 100 counts.

From Step 5

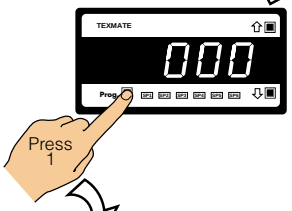


Step 6



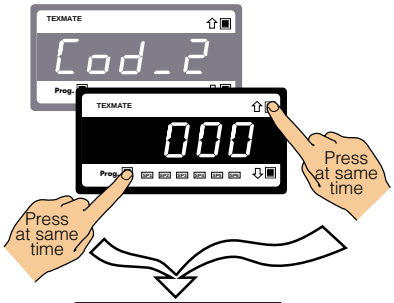
Select [000] to leave Code 1

Step 7



Step 8

Save CH1 as the data source for the primary display



Step 9

Exit Code 2. Return to operational display

Operational Display

Note:

Options 1 and 2 listed for the third digit in Step 3 above 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.

Configure Display Format Mode Procedure – For Example 2

Example Procedure:

Configure the display format mode for channel 1 with **no rounding**, **decimal** display units, and the **decimal point** placed between display digits 4 and 5 (0.1 resolution) by setting Code 1 to [**X61**].

Display Format Mode

P | dISP | 000 — Program the three digits to the required display format mode

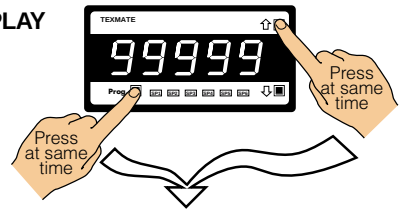
FIRST DIGIT LAST DIGIT ROUNDING	SECOND DIGIT DISPLAY UNITS	THIRD DIGIT DECIMAL POINT PLACEMENT
0 No rounding	**0 Decimal**	**0 No decimal point**
1 Rounding by 2's	1 24-hour clock mode Hours: Minutes: Seconds (6-digit version only)	1 -
2 Rounding by 5's	2 12-hour clock mode (12:30 am is displayed as 12:30A. 12:30 pm is displayed as 12:30P)	2 -
3 Rounding by 10's	3 24-hour clock mode Days: Hours:Minutes (6-digit version only)	3 X.XXXX
	4 -	4 X.XXX
	5 -	5 X.XX
	6 -	**6 X.X**
	7 Octal	7 Decimal Point set from the rear (X.XXXX to XXXXX)

Note:
Selecting 1, 2, or 3 in the second digit of the Display Format Mode configures the display of the selected channel as a clock.

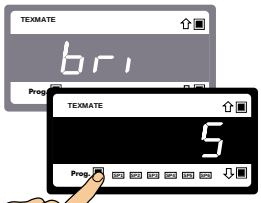
START HERE

CONFIGURE DISPLAY FORMAT MODE

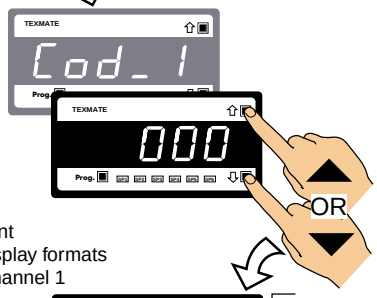
Operational Display



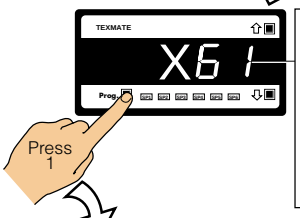
Step 1
Enter brightness mode



Step 2
Pass brightness and calibration modes and enter Code 1

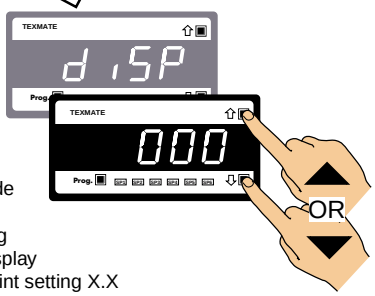


Step 3
Set Code 1 to [X61]:
1st Digit = X Not relevant
2nd Digit = 6 Selects display formats
3rd Digit = 1 Selects Channel 1



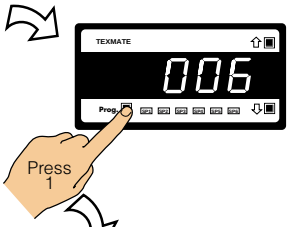
0 Result
1 Channel 1
2 Channel 2
3 Channel 3
4 Channel 4
5 Default Display
6 Total 1
7 Total 2

Step 4
Enter the display format mode

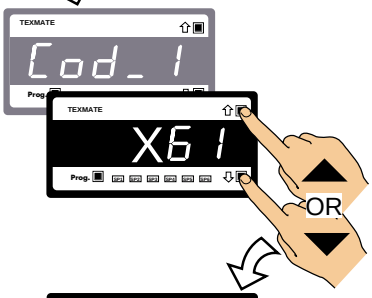


Step 5
Select the following display format from the three digits listed in the Display Format Mode diagram above:
1st Digit = 0 No rounding
2nd Digit = 0 Decimal display
3rd Digit = 6 Decimal point setting X.X

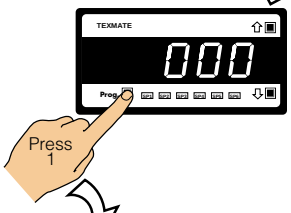
From Step 5



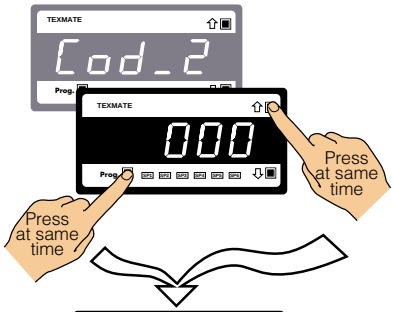
Step 6



Step 7
Select [000] to leave Code 1



Step 8
Save display format setting



Step 9
Exit Code 2. Return to operational display

Operational Display

Two-point Calibration – For Example 2

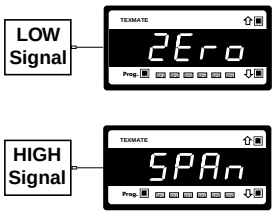
Example Calibration Procedure:

Calibrate Channel 1 (CH1) using the two-point calibration method. Set the calibration mode display to **[111]**.

Set the [ZEro] input to [0.0] and the [SPAn] input to [500.0].

The LOW input source is applied to the meter when setting the zero value.

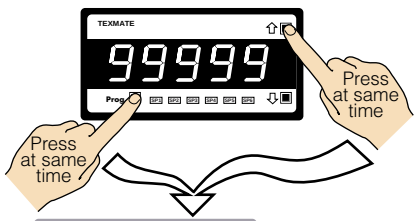
The HIGH input source is applied to the meter when setting the span value.



START HERE

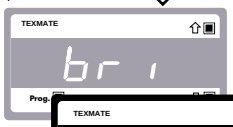
TWO-POINT CALIBRATION

Operational Display



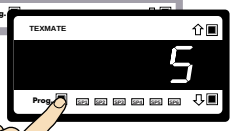
Step 1

Enter brightness mode



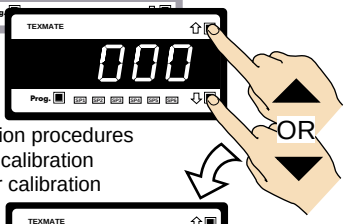
Step 2

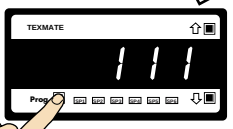
Pass brightness mode and enter calibration mode



Step 3

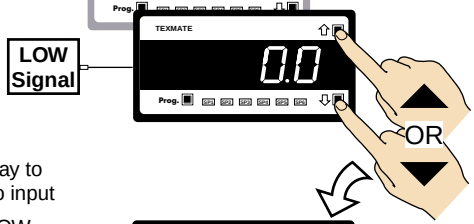
Set CAL to [111]:
1st Digit = 1 Selects calibration procedures
2nd Digit = 1 Selects 2-point calibration
3rd Digit = 1 Selects CH1 for calibration





Step 4

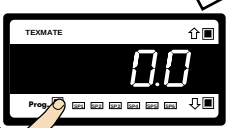
Enter CAL mode [111] For 2-point calibration of CH1



Step 5

5.1. Adjust display to read 0.0 for zero input

5.2. Apply the LOW input signal

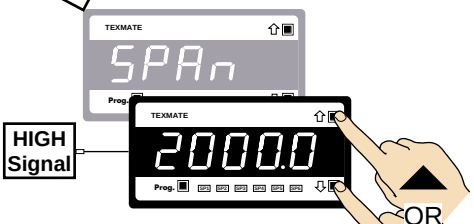


Step 6

Set reading for zero load into meter and enter span mode

To Step 7

From Step 6



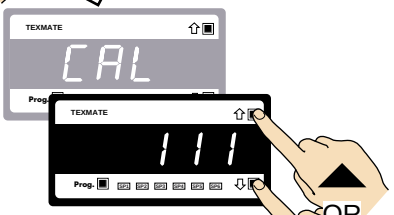
Step 7

7.1. Adjust display to read 500.0 for span input

7.2. Apply the HIGH input signal

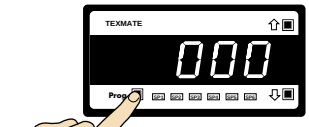
Step 8

Save zero and span settings and re-enter calibration mode



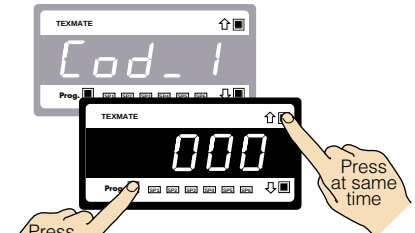
Step 9

Select the **no function** calibration mode [000]



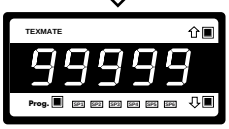
Step 10

Save calibration mode [000] setting and enter Code 1



Step 11

Exit Code 1 and return to operational display



Operational Display

Input Signal Filtering and Averaging – For Example 2

Example Procedure:

The following example settings are arbitrary and used only as a guideline. Select the input signal filtering and averaging settings that suit your application example.

See Advanced Calibration & On Demand Mode Supplement (NZ203), Related Calibration Functions for a detailed description of input signal filtering and averaging.

Example Procedure:

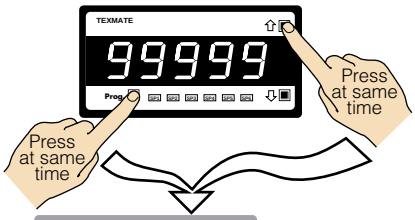
Select an averaging sampling rate of 10 samples and an averaging window of 1,000 counts for channel 1 by setting [CAL] to [**221**].

See *Calibration Mode Procedures Supplement* for further calibration procedures.

START HERE

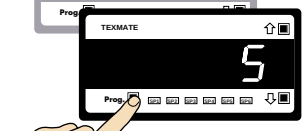
INPUT SIGNAL FILTERING & AVERAGING

Operational Display

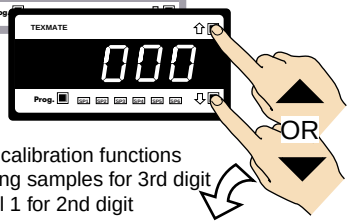


Step 1
Enter brightness mode

Step 2
Pass brightness mode and enter calibration mode



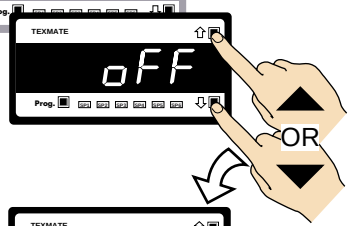
Step 3
Set calibration mode to [221]:
1st Digit = **2** Selects related calibration functions
2nd Digit = **2** Selects averaging samples for 3rd digit
3rd Digit = **1** Selects channel 1 for 2nd digit

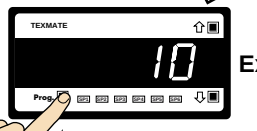


	Result
0	
1	Channel 1
2	Channel 2
3	Channel 3
4	Channel 4

Step 4
Save settings

Step 5
Select averaging sampling rate from 1 to 255 samples

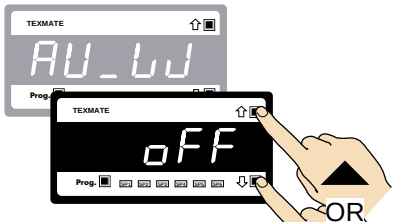




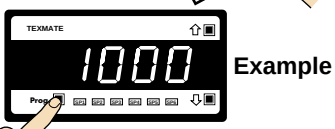
Step 6
Save averaging sampling rate setting

To Step 7

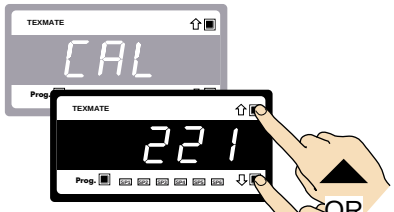
From Step 6



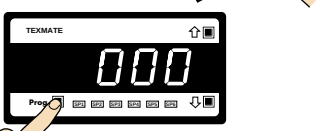
Step 7
Select averaging window between 1 and 65535 counts



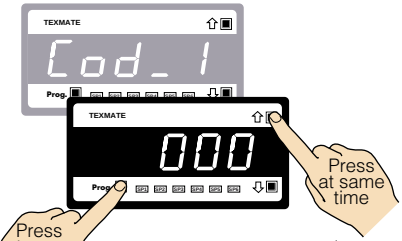
Step 8
Save averaging window settings



Step 9
Select [000] to leave the calibration mode



Step 10
Save settings



Step 11
Exit Code 1 and return to operational display

Operational Display

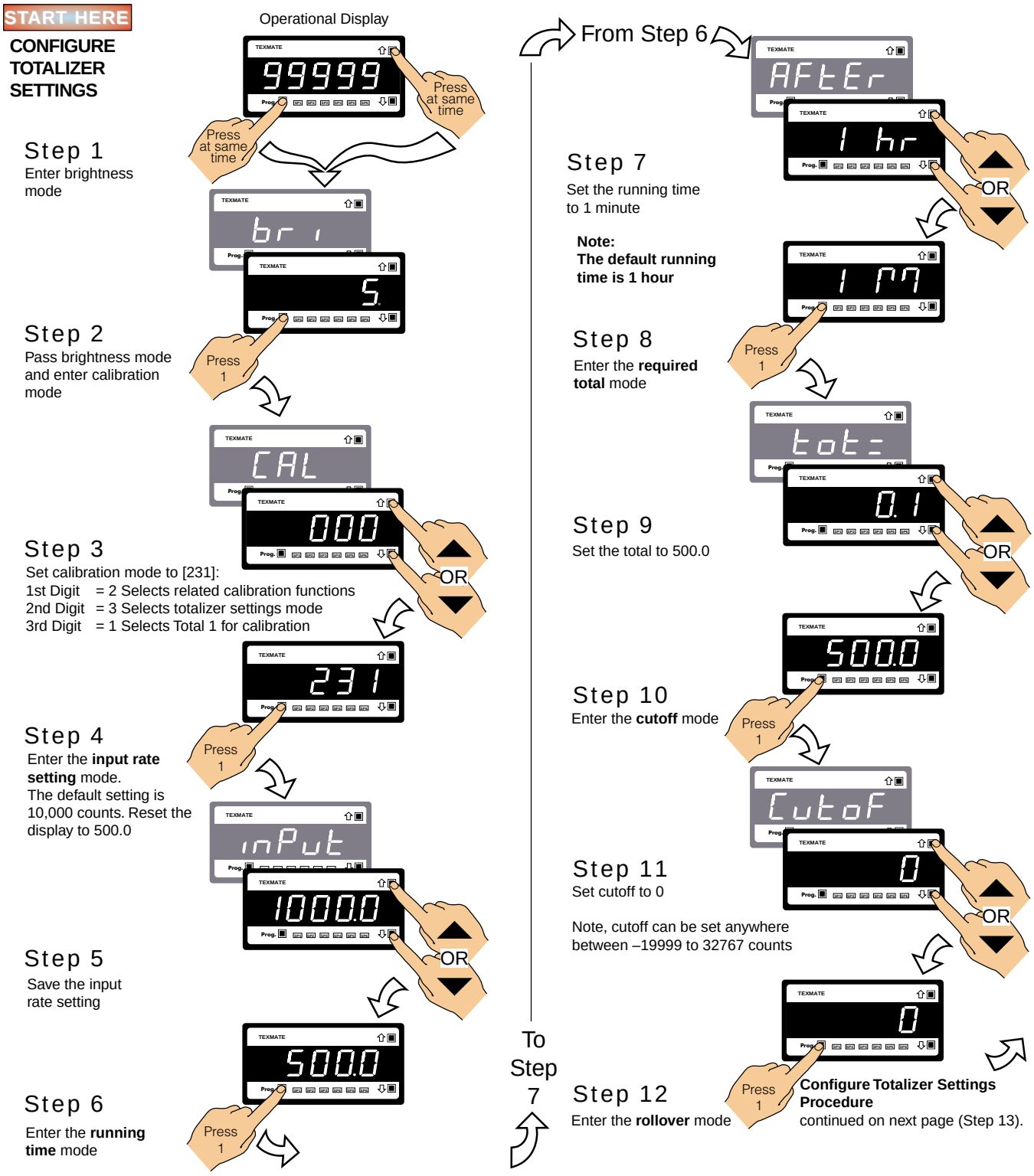
Configure Totalizer Settings Procedure – For Example 2

Example Procedure: Totalizer 1

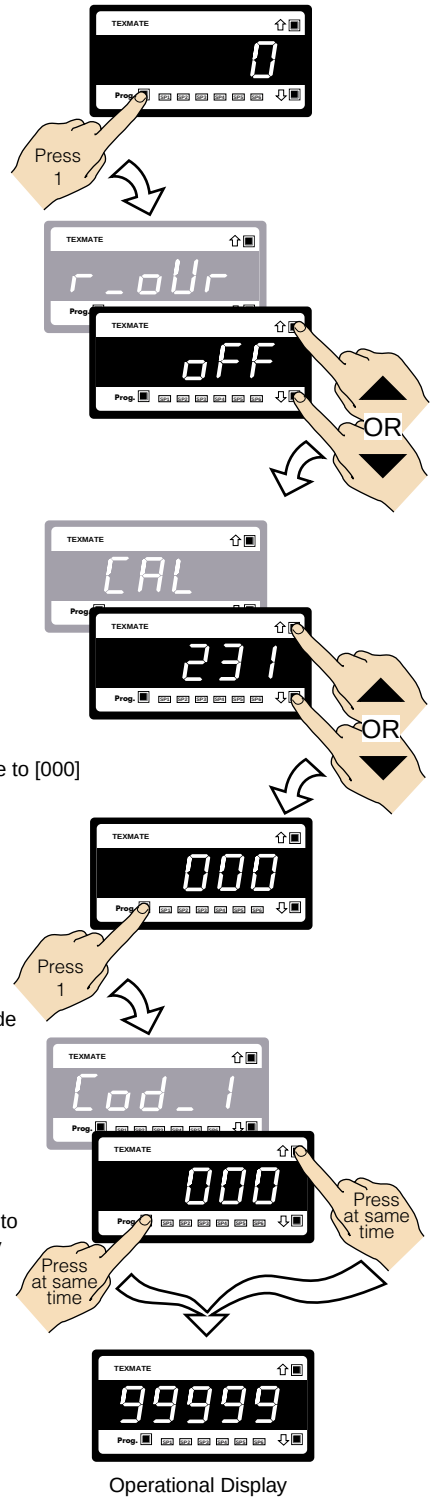
Enter the calibration mode and configure the totalizer settings for **totalizer 1** according to the settings in Example 2.

Example Procedure: Totalizer 2

Carry out the same procedure described for totalizer 1 but change the settings to those listed for **totalizer 2** (See Page 21).



Configure Totalizer Settings Procedure
continued from bottom of previous page



Step 11
Enter the Rollover Mode

Step 12
Set the Rollover Mode to OFF

Step 13
Reset Calibration Mode to [000]

Step 14
Exit the Calibration Mode and enter Code 1

Step 15
Exit Code 1 and return to the Operational Display

Configure Pulse Output Procedure – For Example 2

Example Procedure:

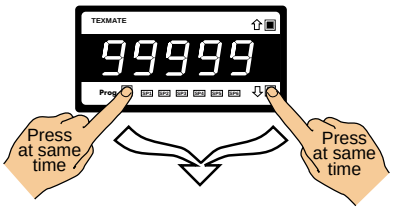
Enter the **setpoint programming mode** and configure Setpoint 1 (SP1) to activate at 10,000 counts (9999.9 on a 5-digit display).

Enter the **setpoint and relay control function settings** mode and configure SPC_1 for the settings listed in **Example 2 – Advanced Totalizing of a Flow Input**.

START HERE

CONFIGURE PULSE OUTPUT

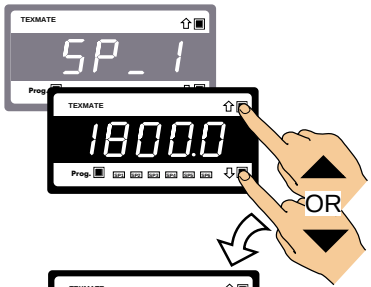
Operational Display



Step 1

Enter the setpoint programming mode

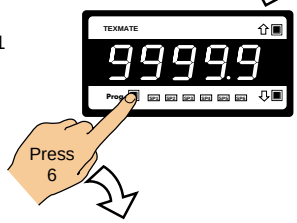
Setpoint Activation Values Mode



Step 2

Adjust the setpoint activation value to **9999.9** counts

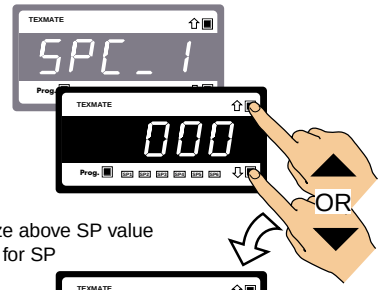
Note: The **decimal point** is displayed in the position previously selected for the **primary display** in Code 1



Step 3

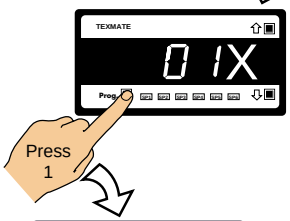
Save the settings and proceed to SPC_1 of the **setpoint & relay control function settings mode**

Setpoint & Relay Control Function Settings Mode



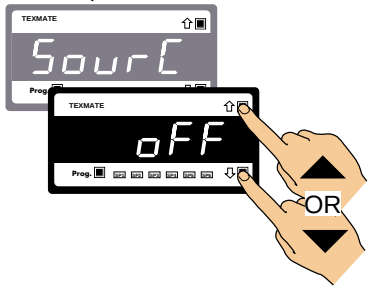
Step 4

Set SPC_1 to [01X]:
1st Digit = 0 Selects energize above SP value
2nd Digit = 1 Selects source for SP
3rd Digit = X Not relevant



Step 5

Enter the **select source for SP functions** mode

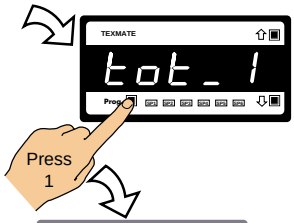


Step 6

Select **Total 1** as the source of data for SP1

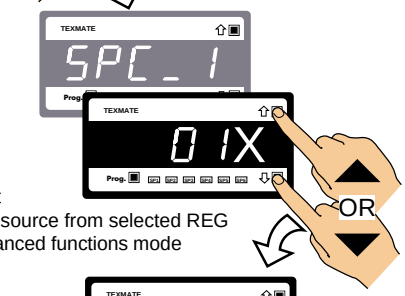
To Step 7

From Step 6



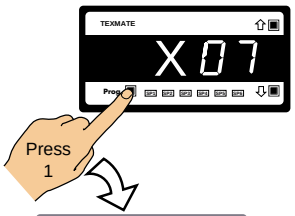
Step 7

Save the SP source setting



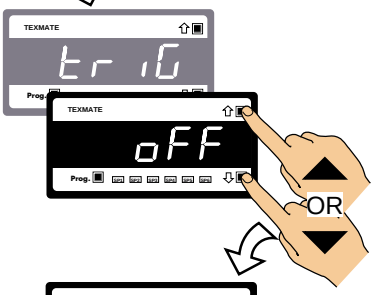
Step 8

Reset SPC_1 to [X07]:
1st Digit = X Not relevant
2nd Digit = 0 Activate SP source from selected REG
3rd Digit = 7 Selects advanced functions mode



Step 9

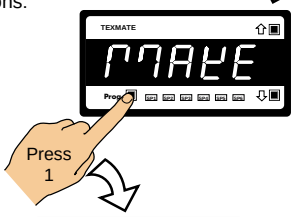
Enter **advanced functions** mode



Step 10

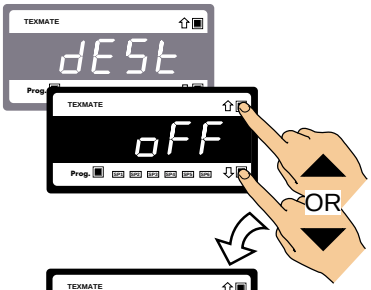
Select [MAKE] as the edge of the relay operation the trigger will activate on

Relay operation edge options:
- Make
- Break
- Both
- Level



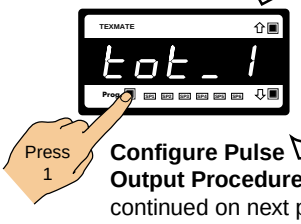
Step 11

Save the setting



Step 12

Select [tot_1] as the reset destination register mode

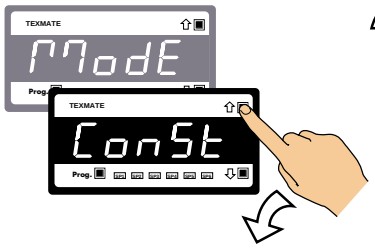


Step 13

Configure Pulse Output Procedure
continued on next page

Configure Pulse Output Procedure

continued from bottom of previous page



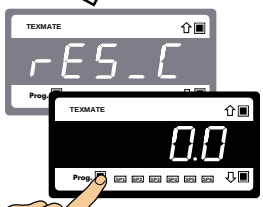
Step 14
Select [i-S+C] as the reset mode

Reset mode options:
- Const
- i-S+C
- d+C
- rEG

See Setpoint & Relay Supplement (NZ201) for full details

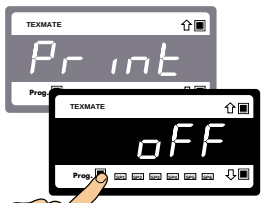
Press 1

Step 15
Save the [i-S+C] setting



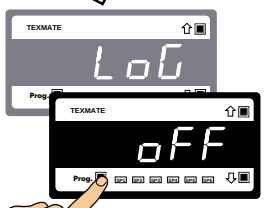
Press 1

Step 16
Ensure **reset constant** is set to 0.0



Press 1

Step 17
Ensure **print trigger** is set to [oFF]

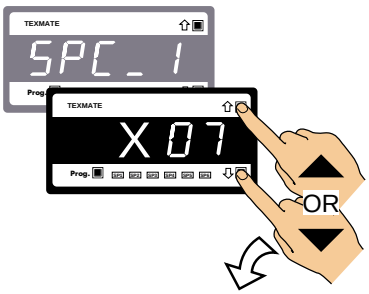


Press 1

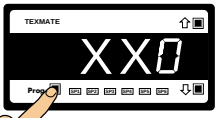
Step 18
Ensure **log trigger** is set to [oFF]

To Step 19

From Step 18

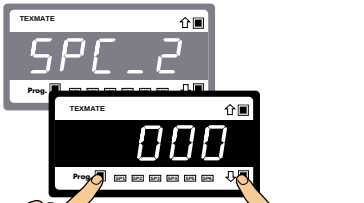


Step 19
Reset SPC_1 to [XX0]



Press 1

Step 20
Save SPC_1 settings



Press at same time

Press at same time

Step 21
Exit SPC_2 and return to the operational display

Operational Display

Configure Analog Output Procedure – For Example 2

Calibration Setup Procedure

The calibration procedure is in two parts: scaling and calibration. The scaling settings can be changed independently of the calibration settings and vice versa. Before scaling and calibration:

1) Make sure the **analog output selection header** on the analog output module is set in the appropriate position: VOLTAGE or CURRENT.
2) Connect a multimeter to the analog output connector at the rear of the meter (pin 16 positive, pin 17 negative). See Figure 8.
3) Make sure the multimeter is set to read the appropriate signal type: volts or milliamps.

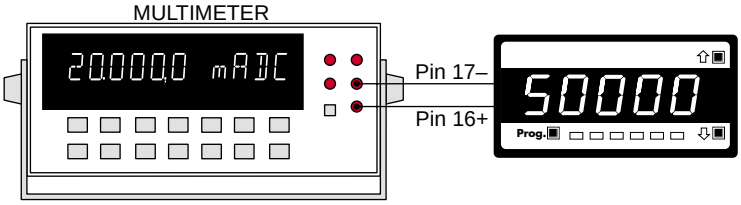


Figure 8 – Multimeter to Meter Connections

Scaling

Scaling the analog output requires setting the zero [ZEro] and full scale [F_SCL] parameters in [CAL] setting [251].

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.

Calibrating

Calibrating the analog output requires setting the [CAL_L] and [CAL_h] parameters in [CAL] setting [151]. [CAL] [151] internally calibrates the output in mA or volts independent of the meter input signal while in the calibration mode. [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.

Example

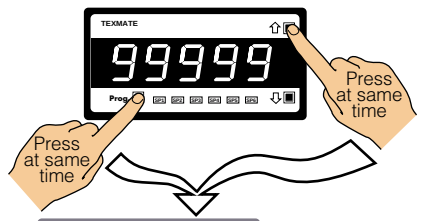
In our example procedure we decribe how to calibrate the analog output signal for 4 to 20 mA over the scaled range of 0.0 to 500.0 counts. With a display of 0.0 counts, the analog output must be 4.000 mA. With a display of 500.0 counts, the analog output must be 20 mA.

Steps 1 to 8 describe how to set the **zero** [ZEro] and **full scale** [F_SCL] parameters. Steps 9 to 19 describe how to calibrate the meter's analog output mA/V **low** [CAL_L] and **high** [CAL_h] settings.

START HERE

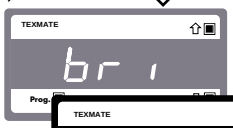
SCALE ANALOG OUTPUT

Operational Display



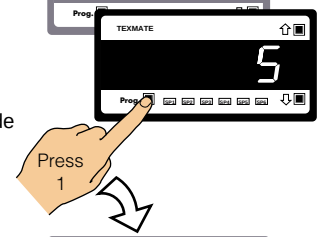
Step 1

Enter brightness mode



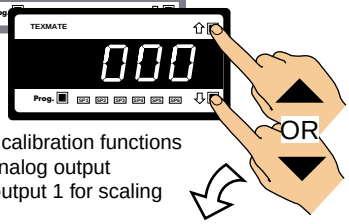
Step 2

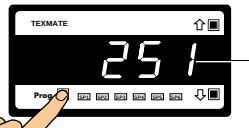
Pass brightness mode and enter calibration mode



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

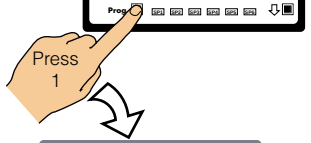




0	–
1	Analog Output 1
2	Analog Output 2
3	
4	

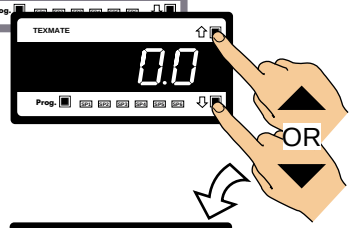
Step 4

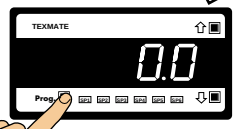
Enter [ZEro] setting mode



Step 5

If not 0.0, adjust the **low analog output signal** counts to **0.0**





Example

Step 6

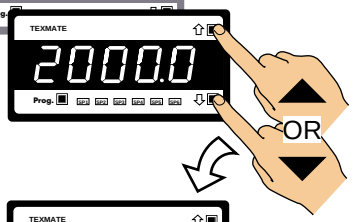
Save zero setting and enter full scale setting mode

To Step 7

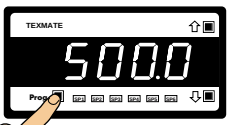
From Step 6

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.



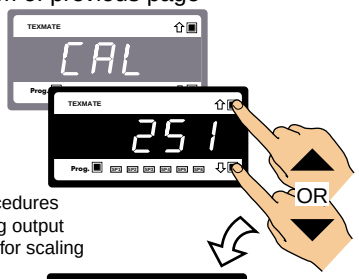
Or to **Calibrate the Analog Output Signal** continue to next page (Step 9).

Step 8

Save scale settings (zero and full scale). To return directly to the Operational Display, proceed to Step 17

CALIBRATE ANALOG OUTPUT

Configure Analog Output Procedure
continued from bottom of previous page

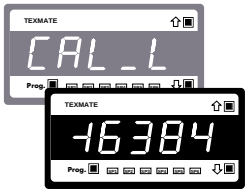


Step 9

Set CAL to [15X]:
1st Digit = 1 Selects calibration procedures
2nd Digit = 5 Selects calibrate analog output
3rd Digit = 1 Select analog output 1 for scaling as per Step 3

Step 10

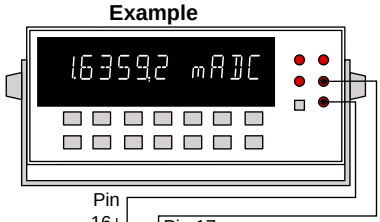
Enter analog output LOW signal calibration mode



Example

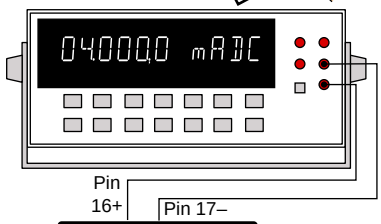
Step 11

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



Step 12

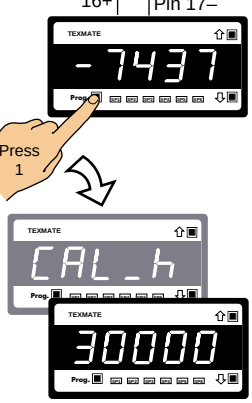
If not correct, press the ↑ OR ↓ button on the Tiger meter until the reading on the multimeter display is correct.



Example

Step 13

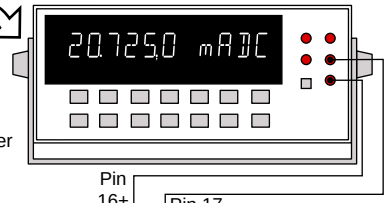
Save the **low** analog output signal setting. Enter analog output **high** signal calibration mode



From Step 13

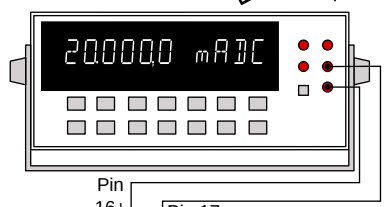
Step 14

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



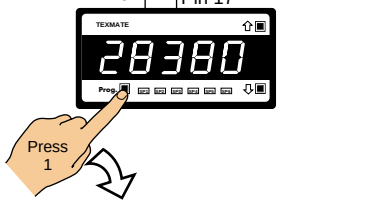
Step 15

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



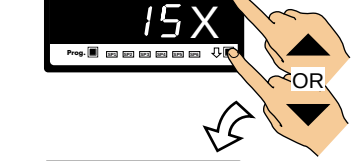
Step 16

Return to the calibration mode [CAL] menu



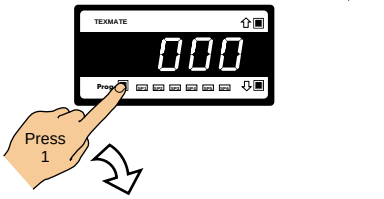
Step 17

Reset calibration mode setting to [000]



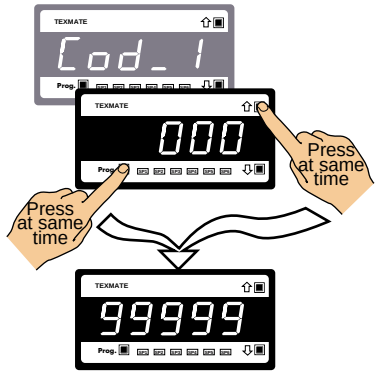
Step 18

Save calibration mode [000] setting and enter Code 1



Step 19

Exit Code 1 and return to operational display



Operational Display

To Step 14

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