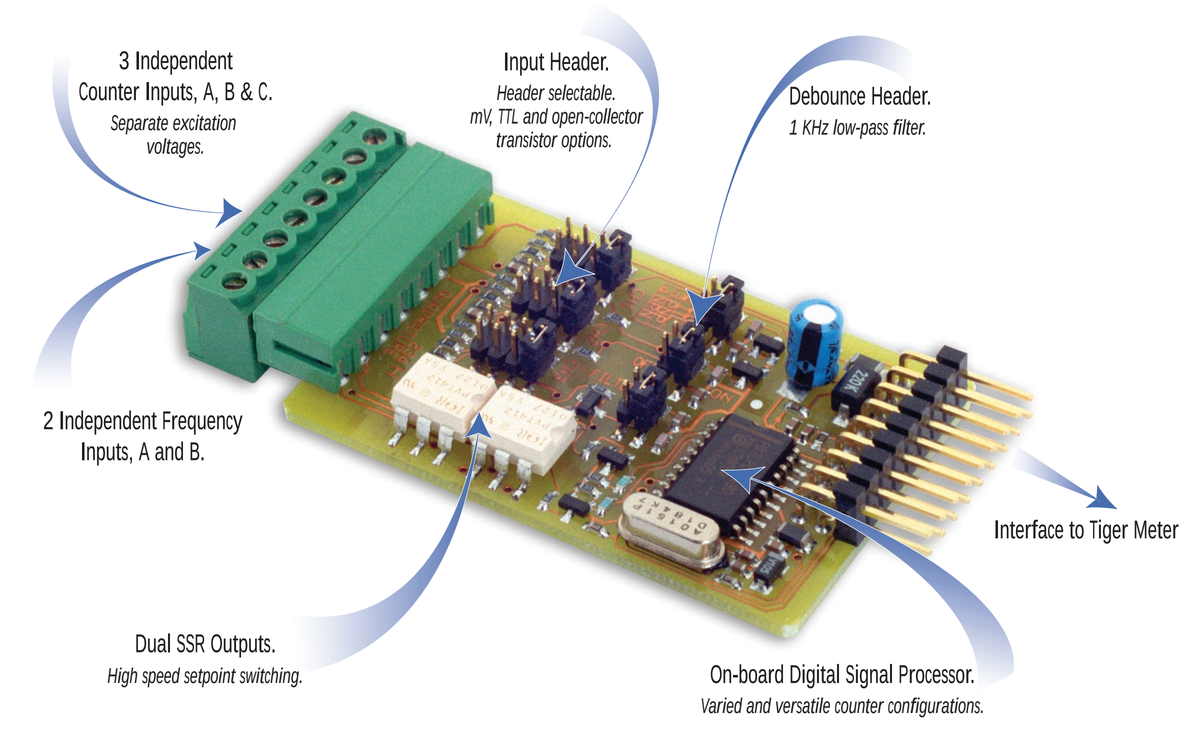
TEXMATE INC

Fits Tiger 320 Series

QUADRATURE ENCODER SMART INPUT MODULE



The total solution to incremental shaft encoder control

With this module you can not only sense position and direction of rotation, but the additional third channel can be used as the zero signal for precise determination of reference position. A variety of interface options and excitation voltages are provided to satisfy all user requirements including multiple counter inputs, a choice of two frequency channels and many interactive modes. When interfaced to the Tiger 320 Series operating system, these powerful software features provide the solution to all your counting needs in process control applications.

Input Module Order Code Suffix

IC02 (No SSR)

IC03 (with 2 SSRs)

Hardware Module Specifications	
Counter Inputs	3 independent hardware counters.
Input Header	Configured for mV, TTL, O.C (npn)
	or O.C (pnp) interface. Switching speed typically 20 kHz,
	operating mode dependent. *(See Table 1).*
Excitation Voltage	24 Vdc (50 mA maximum) available for all counter inputs.
SSRs	Dual, setpoint switching, solid-state relays.
	17 Ω output impedance, ± 400 V isolation,
	140 mA maximum load current.
Debounce Header	Set to OFF position for high-speed encoding. Set to ON
	position for 1 kHz low-pass filter
	useful in contact push-button debounce inputs.

Software Module Features	
Quadrature Mode	Choice of x1, x2 and x4 modes for increased resolution.
A, B Modes	A & B independent counter inputs arranged in various
	combinations.
C Mode	C counter control to capture, reset to predetermined
	counts, zero and / or restart A & B counters.
SSR Switching	Independent fast >1 ms setpoint switching of each SSR using
	counter selected from smart output register.
	Can be NO or NC relay outputs.
Frequency Option	100 kHz on A input, 500 kHz on B input.

Some Relevant Tiger 320 Series Operating System Features
Dual Rate (Frequency) On A and B.
Setpoint Timer Functions.
Setpoint Register Reset and Trigger Functions.
Macro Compiler for PLC Functions.

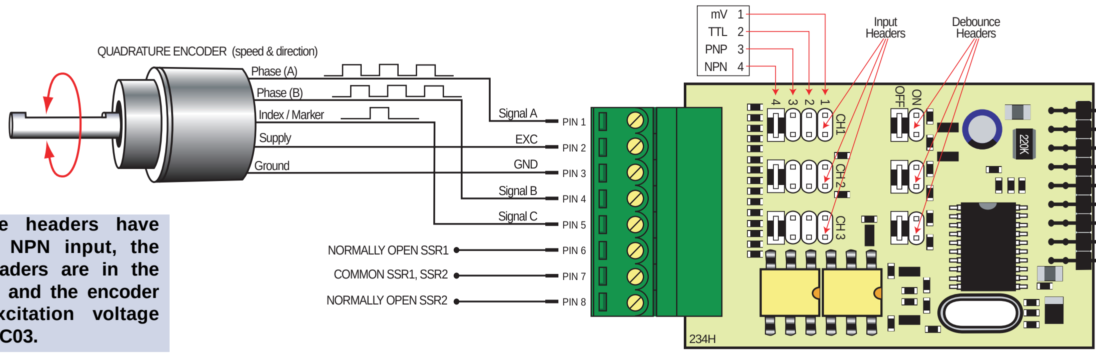
QUADRATURE ENCODER

INPUTS

★Smart UP/DOWN Counter
Multi Counter
Optional Dual High-speed S.S.R. Output

RPM, Pulse, Counter

Connector Pinouts



The interface headers have been set to NPN input, the debounce headers are in the OFF position, and the encoder takes its excitation voltage directly from IC03.

Figure 1 – IC03 Smart Input Module Wired to a Quadrature Encoder

Detailed Description

Smart Setup Registers

The meter has three smart setup registers to configure smart input modules. Smart input module IC02 requires only **smart register 1** to be set up, while IC03 requires **smart registers 1 and 2** to be set up. Figure 2 shows the functions of quadrature smart input modules IC02 and IC03 with input signals from a standard quadrature encoder.

IC02 & IC03

Signal A
Signal B
Signal C

CODE 2

Enter Code 2.

Select **smart register 1 setup [X77]**.

This allows you to enter **smart register 1 setup** and configure settings for **input signals A, B, & C**.

SMART REGISTER 1 SETUP

Select all relevant settings for **input signals A, B, & C**.

SECOND DIGIT C SIGNAL FUNCTIONS	
0	**No Function**
1	Capture A, B
2	Gate Count A, B
3	Gate Count & Reset A, B
4	Reset to Offset & Start A, B
5	C Count
6	Reset to Offset A, B
7	-

THIRD DIGIT A&B SIGNALS FUNCTIONS	
0	**Quadrature x 1**
1	Quadrature x 2
2	Quadrature x 4
3	A + B Count
4	A – B Count
5	A, B Independent Count
6	A Count, B Direction
7	-

Note: Settings for the 1st digit are not relevant

REGISTER OUTPUT MAP

CH1
CH2
CH3
CH4

The register output map allows you to select a specific output for a selected channel.

THIRD DIGIT SMART REGISTER 1 OUTPUT MAP	
0	**PRIMARY Counter**
1	SECONDARY Counter
2	PRIMARY Capture
3	SECONDARY Capture
4	Gate PRIMARY Counter
5	Gate SECONDARY Counter
6	-
7	Smart input module register 1 code setup

IC03 Only

PRIMARY Counter
SECONDARY Counter
PRIMARY Capture
SECONDARY Capture
Gate PRIMARY Counter
Gate SECONDARY Counter

CODE 5

Enter Code 5.

Select **smart register 2 setup [X77]**.

This allows you to enter **smart register 2 setup** and configure settings for **setpoint 5 (SP5) and setpoint 6 (SP6)**.

SMART REGISTER 2 SETUP

Select all relevant settings for **SP5 and SP6**.

FIRST DIGIT SMART RELAY OUTPUT MODE
0 SR1 & SR2 NO
1 SR1 NC, SR2 NO
2 SR1 NO, SR2 NC
3 SR1 & SR2 NC

SECOND DIGIT SP6 SOURCE	
0	**PRIMARY Counter**
1	SECONDARY Counter
2	PRIMARY Capture
3	SECONDARY Capture
4	Gate PRIMARY Counter
5	Gate SECONDARY Counter
6	-
7	-

THIRD DIGIT SP5 SOURCE	
0	**PRIMARY Counter**
1	SECONDARY Counter
2	PRIMARY Capture
3	SECONDARY Capture
4	Gate PRIMARY Counter
5	Gate SECONDARY Counter
6	-
7	-

SMART REGISTER 3 SETUP

Not required.

Figure 2 – IC02 & IC03 Quadrature Smart Setup Registers – Operational Flow Diagram

Smart Register 1

Smart register 1 allows you to select either the quadrature, combined, or independent counting mode for input signals A and B. Input signal C is the control mode for input signals A and B to capture, gate, zero, reset, or start the counters and is also selected through smart register 1. Input signal C can also be set as an independent counter without control over input signals A and B.

The resultant count produced by each mode is stored in the smart register output map in primary, secondary, capture or gate counters. Any of the counters can be transferred to Channel 1 via Code 2, to Channel 2 via Code 4, to Channel 3 via Code 5, and to Channel 4 via Code 6.

Smart Register 2 (IC03 Only)

Smart register 2 allows you to select the setpoint control settings of smart relay 1 (SR1) and smart relay 2 (SR2) using either the primary, secondary, capture, or gate counters of the smart register 2 output map. All other settings for SR1 are configured via setpoint 5 and for SR2 via setpoint 6 in the meter's setpoint programming mode.

Counter Functions

Counter inputs A, B, and C can be portrayed as a train of pulses having a **rising** edge (OR) and **falling** edge (OR) between a low and high signal level. Depending on the counter function selected, these inputs may vary in phase to each other. In the case of a shaft encoder, the **A** signal lags the **B** signal by 90° and the primary counter decrements when the shaft is rotated clockwise. To change the direction of rotation to counterclockwise, reverse the A and B signal inputs at the connector (see Figure 1). The **C** signal occurs once per revolution.

See Figure 3.

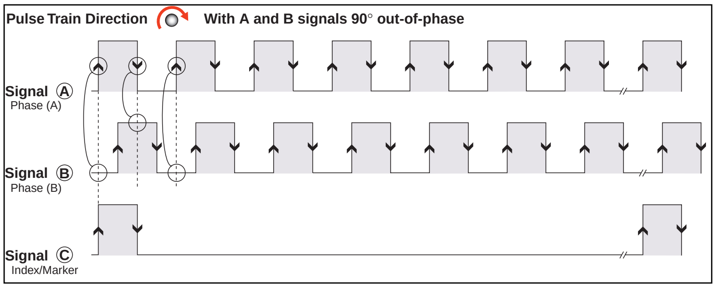


Figure 3 – Counter Input Signals

Table 1 Counter Modes Switching Speeds

Counter Mode	Max. Frequency for A, B & C Inputs
Quadrature x1	20 kHz
Quadrature x2	20 kHz
Quadrature x4	10 kHz
A+B	10 kHz
A–B	10 kHz
A, B Independent	10 kHz
A Count, B Direction	10 kHz
Capture A, B	10 kHz
Gate Count A, B	10 kHz
Gate Count Reset A, B	10 kHz
Reset to Offset & Start A, B	10 kHz
C Count	38 kHz
Reset to Offset A, B	10 kHz

Table 1 lists the counter functions available and the maximum input frequency for each mode.

A and B Signal Functions

Quadrature Modes

The quadrature modes are shown for a shaft encoder as an example. Depending on the direction of rotation, the **A** signal leads or lags the **B** signal.

Using the same shaft encoder, the angular / linear resolution of the x1 Mode can be increased by 2 using the x2 Mode, or by 4 using the x4 Mode.

x1 Mode

This is the most commonly used counter function and operates as follows:

See Figures 4 and 5.

Direction of rotation: Clockwise

- The primary counter **decrements** on a **rising** edge ( ) **A** signal when **B** is low.

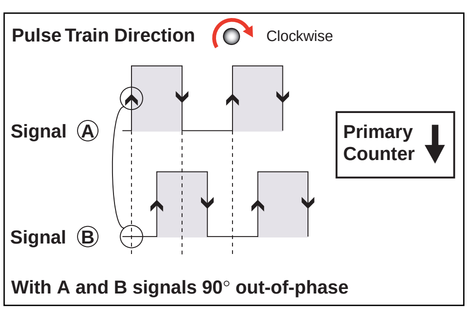


Figure 4 – x1 Mode: Primary Counter Decrements

Direction of rotation: Counterclockwise

- The primary counter **increments** on a **falling** edge ( ) **A** signal when **B** is low.

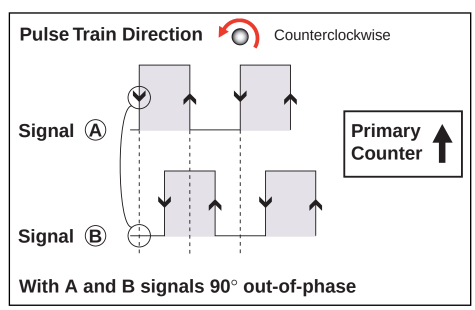


Figure 5 – x1 Mode: Primary Counter Increments

x2 Mode

The x2 mode operates as follows:

See Figures 6 and 7.

Direction of rotation: Clockwise

- The **primary** counter **decrements** on a **rising** edge (↑) **A** signal when **B** is low.
- The **primary** counter **decrements** on a **falling** edge (↓) **A** signal when **B** is high.

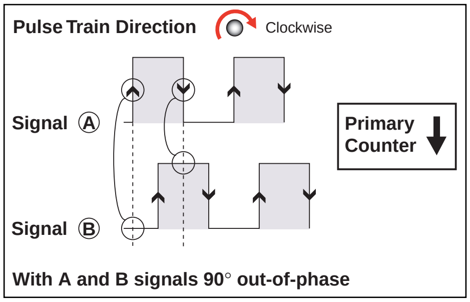


Figure 6 – x2 Mode: Primary Counter Decrements

Direction of rotation: Counterclockwise

- The **primary** counter **increments** on a **rising** edge(↑) **A** signal when **B** is high.
- The **primary** counter **increments** on a **falling** edge (↓) **A** signal when **B** is low.

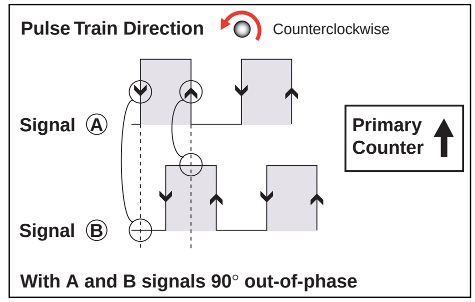


Figure 7 – x2 Mode: Primary Counter Increments

x4 Mode

The x4 mode operates as follows:

See Figures 8 and 9.

Direction of rotation: Clockwise

- The **primary** counter **decrements** on a **rising** edge (↑) **A** signal when **B** is low.
- The **primary** counter **decrements** on a **rising** edge (↑) **B** signal when **A** is high.
- The **primary** counter **decrements** on a **falling** edge (↓) **A** signal when **B** is high.
- The **primary** counter **decrements** on a **falling** edge (↓) **B** signal when **A** is low.

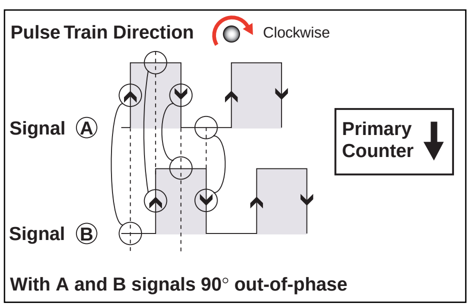


Figure 8 – x4 Mode: Primary Counter Decrements

Direction of rotation: Counterclockwise

- The **primary** counter **increments** on a **rising** edge (↑) **A** signal when **B** is high.
- The **primary** counter **increments** on a **rising** edge (↑) **B** signal when **A** is low.
- The **primary** counter **increments** on a **falling** edge (↓) **A** signal when **B** is low.
- The **primary** counter **increments** on a **falling** edge (↓) **B** signal when **A** is high.

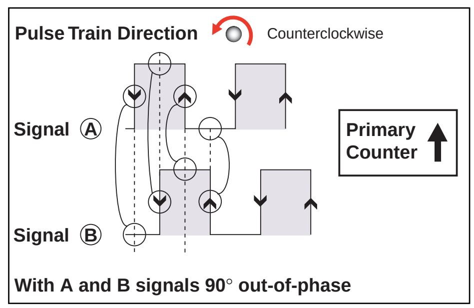


Figure 9 – x4 Mode: Primary Counter Increments

A+B Signal Count Mode (Anticoincident)

There is no fixed relationship between A and B. Signal A increments the primary counter on every rising edge. Signal B increments the primary counter on every rising edge.

The A+B signal count mode operates as follows:

See Figure 10.

- The **primary** counter **increments** on a **rising** edge (↑ OR ↑) **A** signal.
- The **primary** counter **increments** on a **rising** edge (↑ OR ↑) **B** signal.

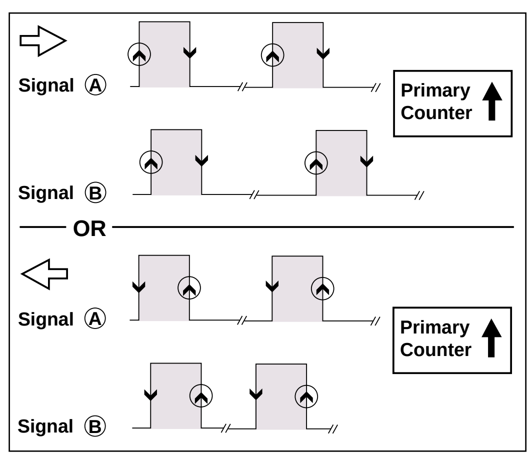


Figure 10 – A+B Signal Count Mode: Primary Counter Increments

Application:

You may have two production lines in a factory with a sensor on each line. By adding the totals of each counter you can determine the total output of the factory.

A–B Signal Count Mode (Anticoincident)

The A and B signals are linked in a phase relationship. Signal A increments the primary counter on every rising edge, while signal B decrements the primary counter on every rising edge.

The A–B signal count mode operates as follows:

See Figure 11.

- The **primary** counter **increments** on a **rising** edge (OR) **A** signal.
- The **primary** counter **decrements** on a **rising** edge (OR) **B** signal.

Application:

This mode is useful when the difference between two counts is required. For example, a carpark building where the A signal represents an incoming car and the B signal represents an outgoing car. A minus B lets you know how many cars are in the building at any one time.

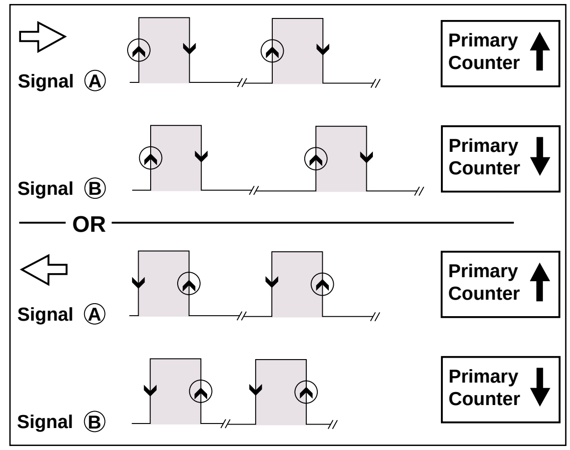


Figure 11 – A–B Signal Count Mode: Primary Counter Increments/Decrements

A&B Independent Mode (Anticoincident)

There is no fixed relationship between signals A and B. Signal A increments the primary counter on every rising edge. Signal B increments the secondary counter on every rising edge.

The A&B independent mode operates as follows:

See Figure 12.

- The **primary** counter **increments** on a **rising** edge (OR) **A** signal.
- The **secondary** counter **increments** on a **rising** edge (OR) **B** signal.

Application:

This mode is useful for dual counting systems.

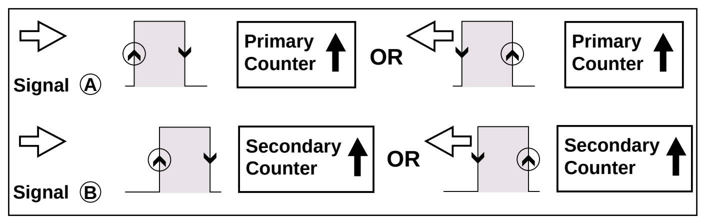


Figure 12 – A&B Independent Mode: Primary Counter Increments, Secondary Counter Increments

A Count, B Direction Mode

The A and B signals are linked in a phase relationship. Signal A increments the primary counter on every rising edge when signal B is low. Signal A also decrements the primary counter on every rising edge when signal B is high.

The A count, B direction mode operates as follows:

See Figures 13 and 14.

- The **primary** counter **increments** on a **rising** edge (OR) **A** signal when **B** is low.

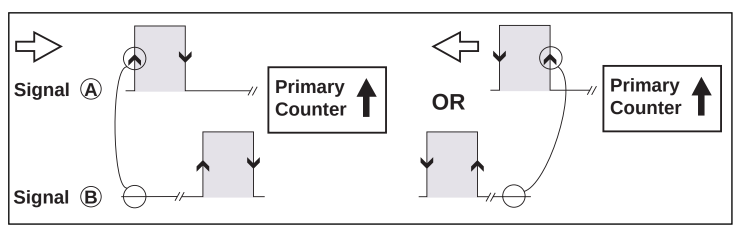


Figure 13 – A Count, B Direction Mode: Primary Counter Increments

- The **primary** counter **decrements** on a **rising** edge (OR) **A** signal when **B** is high.

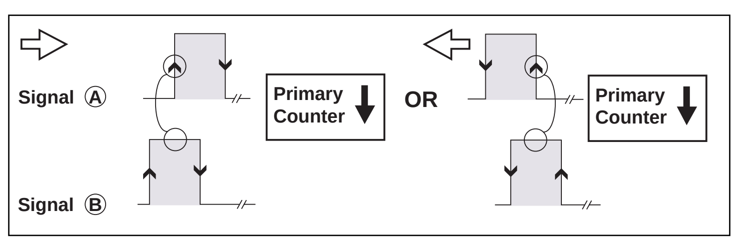


Figure 14 – A Count, B Direction Mode: Primary Counter Decrements

Application:

Some positional encoders have this type of output instead of a quadrature output.

C Signal Functions

C signal functions operate with the **A** and **B** signal functions and influence the primary and secondary gate and capture counters.

Capture A, B Mode

The capture A, B mode provides a snapshot of the primary and secondary counters. It is a straight transfer of the values from the primary and secondary counters to primary and secondary capture.

See Figure 15.

> *Note:*
> *The primary and secondary counters are not affected by the operation and no counts are lost.*

- The **primary counter** value is loaded into **primary capture** on a **falling** edge (↓) **C** signal.
- The **secondary counter** value is loaded into **secondary capture** on a **falling** edge (↓) **C** signal.

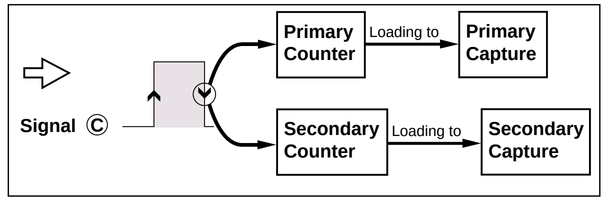


Figure 15 – Capture A, B Mode

Application:

This mode is useful to capture positional information in relation to an external event. To track if any errors occur, the positional information could be used as a reference that the encoder can be compared against.

Gate Count A, B

In this mode the primary and secondary gate counters are updated with the number of pulses that occur in the primary (A signal) and secondary (B signal) counters respectively between consecutive falling edge C signal pulses. The primary and secondary counters are not reset and continue to count after each update of the gate counters. The gate count A, B mode operates as follows:

See Figure 16.

- The value in the **primary** counter on the previous **falling** edge (↓) **C** signal is subtracted from the value in the **primary** counter on the most recent **falling** edge (↓) **C** signal and loaded into the **primary gate** counter. The **primary** counter continues to count up and is not reset after each event.
- The value in the **secondary** counter on the previous **falling** edge (↓) **C** signal is subtracted from the value in the **secondary** counter on the most recent **falling** edge (↓) **C** signal and loaded into the **secondary gate** counter. The **secondary** counter continues to count up and is not reset after each event.

> *Note:*
> *The gate secondary counter is only updated in the A & B independent mode.*

Application:

This mode is useful to capture rate information in relation to an external event. For example, you may want to know how much product was produced per shift. At the start of the shift, the operator could set a switch and reset it at the end of the shift. The resultant gate counter would let you know how much was produced during that shift.

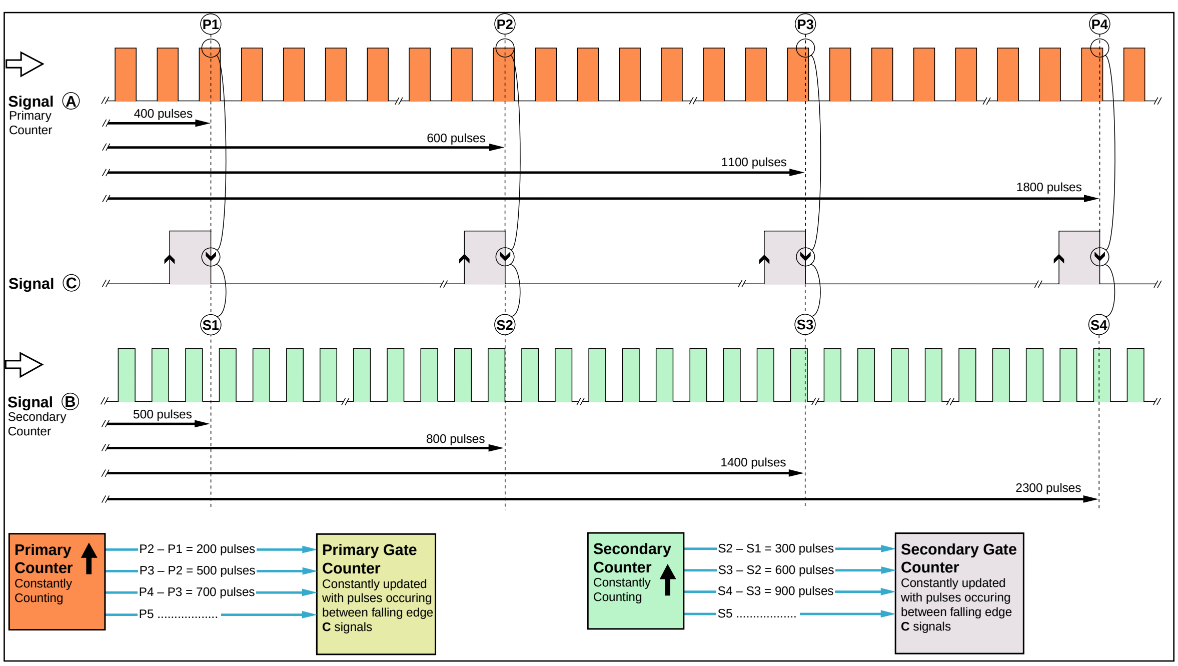


Figure 16 – Snapshot of Gate Count A, B Mode: Primary Counter

Gate Count & Reset A, B Mode

In this mode the primary and secondary gate counters are again updated with the number of pulses that occur in the primary (A signal) and secondary (B signal) counters respectively between consecutive falling edge C signal pulses. But, in this case, the primary and secondary counters are reset after each update of the gate counters. The gate count & reset mode operates as follows:

See Figure 17.

- The value in the **primary** counter on the previous **falling** edge (↓) **C** signal is subtracted from the value in the **primary** counter on the most recent **falling** edge (↓) **C** signal and loaded into the **primary gate** counter. The **primary** counter stops counting after each falling edge C signal event and is reset to 0.
- The value in the **secondary** counter on the previous **falling** edge (↓) **C** signal is subtracted from the value in the **secondary** counter on the most recent **falling** edge (↓) **C** signal and loaded into the **secondary gate** counter. The **secondary** counter stops counting after each falling edge C signal event and is reset to 0.

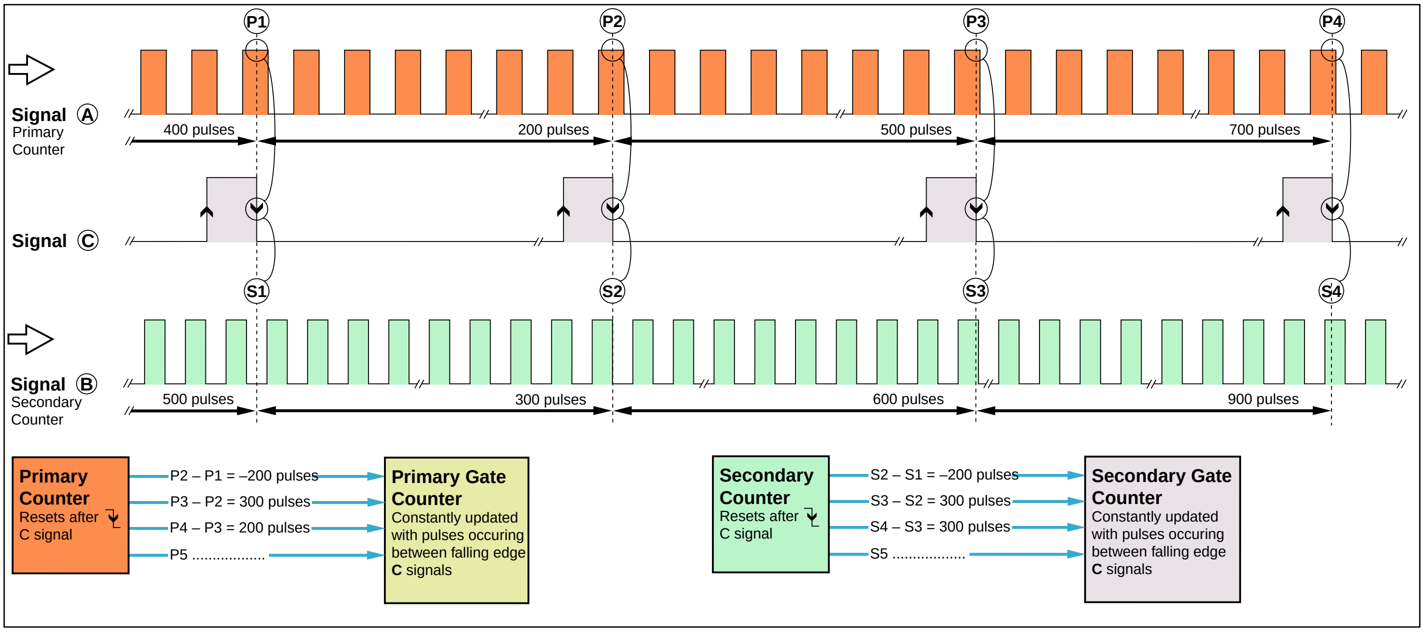


Figure 17 – Snapshot of Gate Count & Reset Mode

Reset to Offset & Start A, B Mode

In this mode the primary and secondary counters are reset to the value stored in the meter's primary and secondary reset offset registers (registers 121 and 122 respectively). Primary and secondary counters continue counting after being reset to the reset offset values.

The reset to offset & start A, B mode operates as follows:

See Figure 18.

- The primary and secondary counters begin counting on a **rising** edge (↑) **C** signal.
- On a **falling** edge (↓) **C** signal the **primary** counter is reset to the value stored in the **primary reset offset register (121)**, and the secondary counter reset to the value stored in the **secondary reset offset register (122)**.

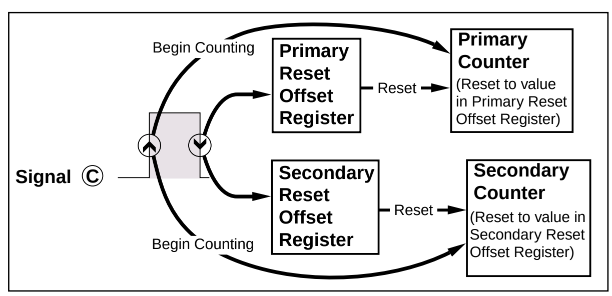


Figure 18 – Reset to Offset & Start Mode

The default setting of the primary and secondary reset offset registers is 0. To change the value stored in these registers:

- Connect the meter to a PC running a terminal program.
- Start the terminal program.
- Access register 121 and change the offset to the required value.
- Access register 122 and change the offset to the required value.

See Registers Supplement (NZ209), Registers 121 and 122 – Reset Offset Registers, for a detailed description of the reset offset registers.

Application:

This mode is useful for when an external reset is required. For example, A pushbutton on the C input can be used to reset to 0, or forward the counter to a known count. The counter starts again when the button is released.

C Count Mode

In this mode the **primary** counter **increments** on a **rising** edge (↑) **C** signal only.

See Figure 19.

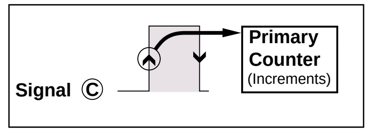


Figure 19 – C Count Mode

Application:

This mode is useful for multi-input systems.

Reset to Offset A, B Mode

In this mode the primary and secondary counters are also reset to the value stored in the meter's primary and secondary reset offset registers (registers 121 and 122 respectively). But, in this mode, the primary and secondary counters continue counting after being reset to the reset offset values.

See Figure 20.

The reset to offset A, B mode operates as follows:

- On a **falling** edge (↓) **C** signal the **primary** counter is reset to the value stored in the **primary reset offset register (121),** and the secondary counter reset to the value stored in the **secondary reset offset register (122)**.
- The primary and secondary counters continue to count on being reset.

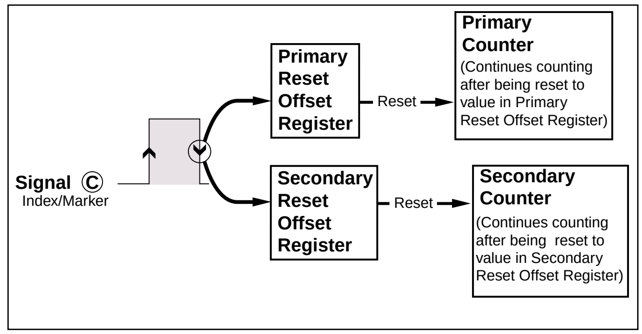


Figure 20 – Reset to Offset A, B Mode

Application:

This mode is useful for setting a position to a known reference position. For example, a microswitch can be positioned at 'home' and used as an input to C on a milling table. Now every time the 'home' position is encountered, the counter is set to a known position.

Programming Quick Start Guide

Programming Procedures

1 Press the [P] and [↑] buttons at the same time to enter the main programming mode.

2 Press the [P] button three times to enter Code 2. Set Code 2 to [X77].

Cod_2 X77

This setting enters the **smart register 1** code setup menu.

Note the register map is different for each smart input module type.

FIRST DIGIT
TIGER PROCESSING RATE
0 10 Hz
1 10 Hz
2 100 Hz
3 100 Hz

SECOND DIGIT	
MEASUREMENT TASK	
0	**Voltage, Current**
1	TC (3rd digit selects type of TC)
2	RTD 3-wire (3rd digit selects type of RTD)
3	RTD 2- or 4-wire (3rd digit selects type of RTD)
4	Frequency
5	Period
6	Counter
7	Smart Input Module

THIRD DIGIT	
SMART REGISTER 1 OUTPUT MAP	
0	**PRIMARY Counter**
1	SECONDARY Counter
2	PRIMARY Capture
3	SECONDARY Capture
4	Gate PRIMARY Counter
5	Gate SECONDARY Counter
6	-
7	Smart input module register 1 code setup

3 Press the [P] button.

SmtE1 000

This menu provides settings unique to **smart register 1** of the IC02/IC03 input module.

4 Using the [↑][↓] buttons, select the function for the A & B inputs and the function for the C input.

FIRST DIGIT
Not Relevant

SECOND DIGIT	
C SIGNALS FUNCTIONS	
0	**No Function**
1	Capture A, B
2	Gate Count A, B
3	Gate Count & Reset A, B
4	Reset to Offset & Start A, B
5	C Count
6	Reset to Offset A, B
7	-

THIRD DIGIT	
A&B SIGNALS FUNCTIONS	
0	**Quadrature x 1**
1	Quadrature x 2
2	Quadrature x 4
3	A + B Count
4	A – B Count
5	A, B Independent Count
6	A Count, B Direction
7	-

Note, see Detailed Description on Page 3 for a description of A, B, and C counter functions.

5 Press the **P** button. The display returns to [Cod_2] [X77].   Cod_2 | X77

6 Using the ⬇ button, reset the 3rd digit to zero [X70] to leave the smart register 1 menu.   07X

Note, leaving the 3rd digit as 7 means the display constantly cycles between [Cod_2] and [SMt1].

7 Press the **P** button 3 times to enter Code 5. Set Code 5 to [X77].

Cod_5 | X77

FIRST DIGIT
TIGER PROCESSING RATE
0 Direct Display of Input (no processing)
1 Square Root of Channel 3
2 Inverse of Channel 3
3 **Meters with 4 kB memory** NO Linearization **Meters with 32 kB memory** 32-point Linearization of CH3 using Table 3
Note: All linearization tables are set up in the Calibration Mode [24X].

SECOND DIGIT
MEASUREMENT TASK
0 No function
1 Voltage, current
2 TC
3 RTD
4 Real-time clock & timer
5 -
6 -
7 Smart input module

THIRD DIGIT
SMART REGISTER 2 OUTPUT MAP
0 PRIMARY Counter
1 SECONDARY Counter
2 PRIMARY Capture
3 SECONDARY Capture
4 Gate PRIMARY Counter
5 Gate SECONDARY Counter
6 -
7 Smart input module register 2 code setup

8 Press the **P** button.

This setting enters the **smart register 2** code setup menu.

Note the register map is different for each smart input module type.

SMt2 | 000

This menu provides settings unique to **smart register 2** of the IC02/IC03 input module.

FIRST DIGIT
SMART RELAY OUTPUT MODE
0 SR1 & SR2 NO
1 SR1 NC, SR2 NO
2 SR1 NO, SR2 NC
3 SR1 & SR2 NC

SECOND DIGIT
SP6 SOURCE
0 PRIMARY Counter
1 SECONDARY Counter
2 PRIMARY Capture
3 SECONDARY Capture
4 Gate PRIMARY Counter
5 Gate SECONDARY Counter
6 -
7 -

THIRD DIGIT
SP5 SOURCE
0 PRIMARY Counter
1 SECONDARY Counter
2 PRIMARY Capture
3 SECONDARY Capture
4 Gate PRIMARY Counter
5 Gate SECONDARY Counter
6 -
7 -

9 Select the setpoint source for switching from the smart output registers for SP5 in the 3rd digit and SP6 in the 2nd digit, and the operating mode of the solid state relays SR1 and SR2 in the 1st digit.

10 Press the **P** button to save the settings.

The display toggles between [Cod_5] and [X77].   Cod_5 | X77

11 Using the ⬇ button, reset the 3rd digit to 0 to leave the smart register 2 menu.

12 Press the **P** and ⬆ button at the same time to return to the operational display.

Select a Channel

Select the output register for the required channels

13 Press the **P** and ⬆ button at the same time again to re-enter the main programming mode.

14 Press the **P** button three times to enter Code 2.

15 Set Code 2 to [X7X]. Select the required processing rate for **CH1** in the 1st digit and the required register map settings in the 3rd digit.

CH1 Cod_2 | X7X

FIRST DIGIT
TIGER PROCESSING RATE
0 10 Hz
1 10 Hz
2 100 Hz
3 100 Hz

THIRD DIGIT
SMART REGISTER OUTPUT MAP
0 PRIMARY Counter
1 SECONDARY Counter
2 PRIMARY Capture
3 SECONDARY Capture
4 Gate PRIMARY Counter
5 Gate SECONDARY Counter
6 -
7 Smart input module register code setup

Note the register map is different for each smart input module type.

16 Set Code 4 to [0X0]. Select the required register map settings for **CH2** in the 2nd digit.

CH2 Cod_4 0X0

FIRST DIGIT	
MEASUREMENT TASK	
0	**Voltage, Current**
1	TC (type as per 2nd digit)
2	RTD (type as per 2nd digit)
3	Second Digital Input Channel (type as per 2nd digit)

SECOND DIGIT	
FOR VOLTAGE & CURRENT	
0	**Channel 2 Disabled**
1	Direct (no post processing)
2	Square Root of Channel 2
3	Inverse of Channel 2
4	Output Register 1 (smart module)*
5	Output Register 2 (smart module)*
6	Output Register 3 (smart module)*
7	Output Register 4 (smart module)*

**Note:*
The logic for CH2 is not the same as CH1, CH3, or CH4. The 1st and 3rd digits must both be set to 0. Selecting 040 to 070 in the 2nd digit of Code 4 directly selects one of the following settings in the register output map (3rd digit):

2nd Digit	Register Output Map
4 selects	**0 PRIMARY Counter**
5 selects	1 SECONDARY Counter
6 selects	2 PRIMARY Capture
7 selects	3 SECONDARY Capture

17 If required enter Code 5 and select the required register map settings for **CH3** in the 3rd digit.

CH3 Cod_5 X7X

FIRST DIGIT	
CH3 POST PROCESSING	
0	**Direct Display of Input (no processing)**
1	Square Root of Channel 3
2	Inverse of Channel 3
3	**Meters with 4 kB memory** NO Linearization **Meters with 32 kB memory** 32-point Linearization of CH3 using Table 3

Note:
All linearization tables are set up in the Calibration Mode [24X].

THIRD DIGIT	
SMART REGISTER 1 OUTPUT MAP	
0	**PRIMARY Counter**
1	SECONDARY Counter
2	PRIMARY Capture
3	SECONDARY Capture
4	Gate PRIMARY Counter
5	Gate SECONDARY Counter
6	-
7	Smart input module register 1 code setup

Note the register map is different for each smart input module type.

18 If required enter Code 6 and select the required register map settings for CH4 in the 3rd digit.

CH4 Cod_6 X7X

FIRST DIGIT	
CH4 POST PROCESSING	
0	**Direct Display of Input (no processing)**
1	Square Root of Channel 4
2	Inverse of Channel 4
3	**Meters with 4 kB memory** NO Linearization **Meters with 32 kB memory** 32-point Linearization of CH4 using Table 4

Note:
All linearization tables are set up in the Calibration Mode [24X].

Press the [P] button to save the settings.

Note, to measure frequency on A and B inputs select the appropriate options in Code 2 and Code 4 respectively.

19 Press the [P] and [↑] buttons at the same time to return to the operational display.

Customer Configuration Settings:

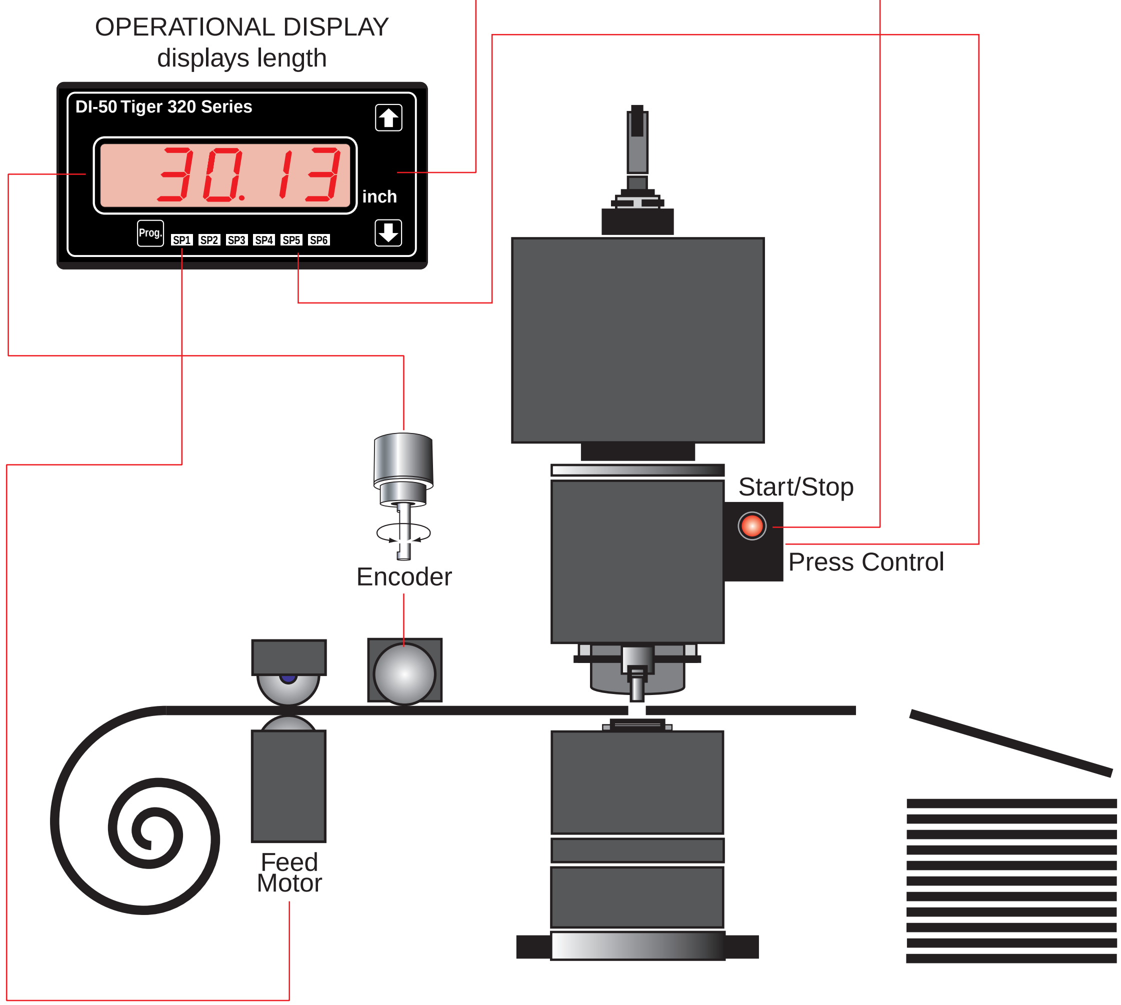
	1st Digit	2nd Digit	3rd Digit
SMt 1	___	___	___
SMt2	___	___	___
CH1 Cod_2	___	7	___
CH2 Cod_4	0	___	0
CH3 Cod_5	___	7	___
CH4 Cod_6	___	7	___

21 Cut to Length Controller

Our customer operates an automatic cut-to-length guillotine. A Texmate 320 Series programmable meter controller has been installed and programmed to measure length from an encoder input. Setpoint 1 is programmed to operate at the required cut-off length. A clutch and a clamp operate to stop the metal feed motor.

After a programmed OFF-time, (to enable the guillotine to complete its cut cycle) the displayed length is reset to 0. The clamp releases, the clutch engages, and the metal commences feeding, repeating the process. At each cut-off, 1 is added to a totalizer. (Viewed by pressing the UP button.)

CUT TO LENGTH CONTROLLER



APPLICATION VARIATIONS

- A total number of cuts can be programmed to SHUT OFF the guillotine at the required total.

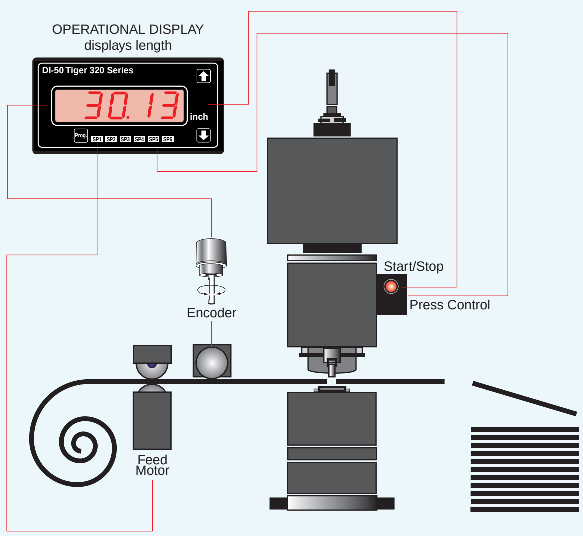
APPLICATION FUNCTIONS
RELAY OUTPUTS
TIMERS
TOTALIZERS
SEQUENCE CONTROLS
INPUTS
FREQUENCY

Example Quadrature Encoder with Setpoint Control Setup Procedure

Our customer operates a steel punch and wishes to automate the process using a rotary encoder. Texmate installed a Tiger 320 Series DI-50 meter with an IC03 quadrature encoder smart input module.

The encoder is used to set the length of steel plate being punched. The metal punch is activated using the module's smart relay output SR1.

The primary counter is read by channel 1 and configured in the x1 quadrature mode. This setting provides 1 to 1 encoder resolution. Setpoint 5 is configured to activate SR1 from the primary counter.



1 **Select the encoder resolution quadrature x1 for the A & B counter functions in the 3rd digit, and no function for the C counter function in the 2nd digit:**

In CODE 2 select X77 then press P button.

Display toggles between SMt1 000

Set SMt1 to X00

2 **Select the primary counter for CH1:**

In CODE 2 select X70

Note, in the quadrature mode the primary counter is always used to output positional count and direction of rotation.

3 **Set setpoint 5 (SP5) source to the primary counter with SR1 switch closure set to normally open (NO):**

In CODE 5 select X77 then press P button.

Display toggles between SMt2 000

Set SMt2 to 0X0

TEXMATE INC

995 Park Center Drive • Vista, CA 92081-8397

Tel: 1-760-598-9899 • USA 1-800-839-6283 • That's 1-800-TEXMATE

Fax: 1-760-598-9828 • Email: sales@texmate.com • Web: www.texmate.com

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