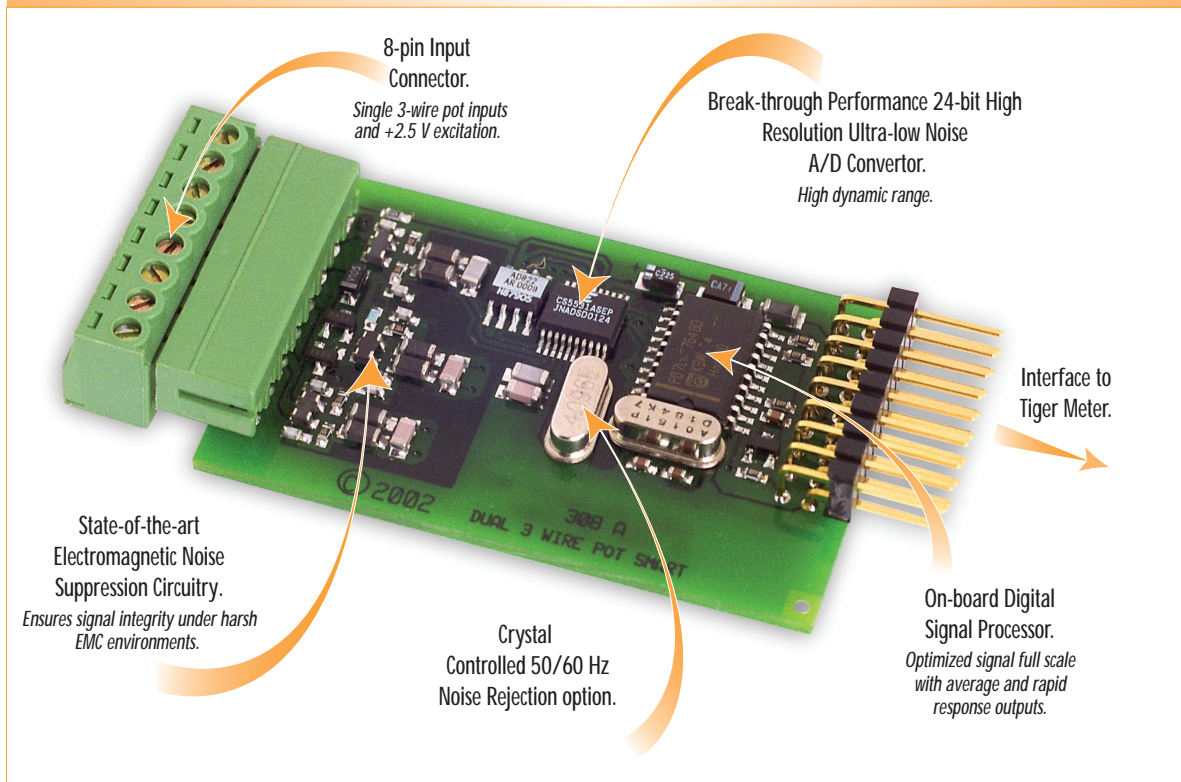


SINGLE 3-WIRE POTENTIOMETER SMART MODULE

SINGLE 3-WIRE POTENTIOMETER



Incredible resolution for linear position transducer now available.

Designed exclusively for continuous linear displacement measurements, ISR1 and ISR2 provide unprecedented resolution with over 8,000,000 denominator counts available full scale. Combined with the Tiger 320 Series operating system, the user has the design solution for the most demanding industrial applications.

Input Module
Order Code Suffix

ISR1 (50 Hz Rejection)

ISR2 (60 Hz Rejection)



Hardware Module Specifications

A/D Convertor	Single channel high performance 24-bit
	A/D with post processing signal averaging.
Input Sensitivity	0.02 μV /count maximum.
Zero Drift	$\pm 40 \text{ nV/}^\circ\text{C}$ typical.
Span Drift	$\pm 5 \text{ ppm/}^\circ\text{C}$ of full scale maximum.
Non-linearity	$\pm 0.002\%$ of full scale maximum.
Input Noise	80 $\mu\text{Vp-p}$.
Potentiometer Inputs	Single, + 2.5 V excitation (10 mA) ratiometric referenced to A/D.
Resolution	1:8,000,000 counts of full scale.
Frequency Select	ISR1 50 Hz; ISR2 60 Hz.

Software Module Features

Output Rates	A choice of average response outputs, 1-50 Hz.
Gain Select	Optimized for +2.5 Volt excitation.

Some Relevant Tiger 320 Series Operating System Features

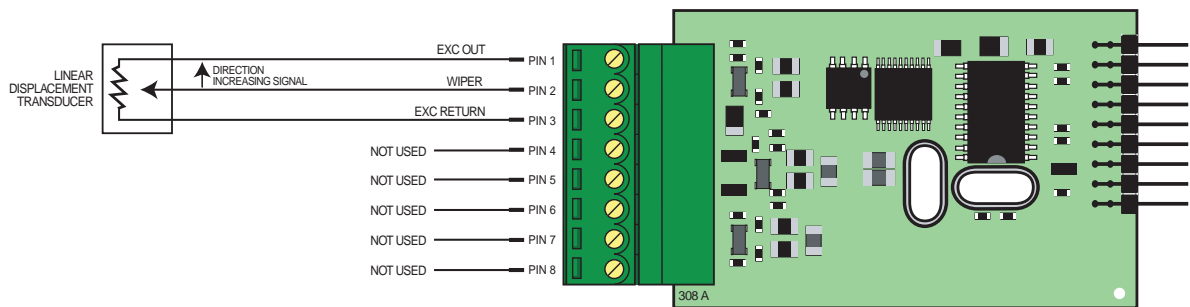
Setpoint Timer Functions.
Setpoint Register Reset and Trigger Functions.
On-demand Calibration.
Macro Compiler for PLC Functions.
32-Point Linearization.
Totalizator and Serial Printing.

INPUTS

★ Smart
High Resolution
24-bit Accuracy

Resistance

Connector Pinouts



ISR1/ISR2 Single 3-wire Potentiometer Smart Input Module configured for displacement measurement

Smart Setup Registers

The meter has three smart setup registers to configure smart input modules. ISR1 and ISR2 requires smart register 1 to be configured. The averaged potentiometer signal can be software selected for Tiger 320 Series meter channels 1, 2, 3, & 4. The signals 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.

Programming Procedures

The following programming procedures cover all the steps required to configure smart input module ISR1. Steps 1 to 5 describe how to select the **reference voltage**, the **potentiometer default full scale range**, and the **output rate** through smart register 1.

Steps 8 to 17 describe how to select the output registers for channels 1, 2, 3, or 4 as required.

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.

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
OUTPUT REGISTER MAP
0 Averaged POT signal
1 Rapid POT signal *
2 Peak signal *
3 Valley signal *
4 Capture signal **
5 Rate of change signal
6 -
7 Smart input module register 1 code setup

3 Press the **[P]** button.

SMt1 [000]

This menu provides settings unique to **smart register 1** of input module ISR1.

FIRST DIGIT
REFERENCE VOLTAGE
0 -
1 +2.5 V ref.
2 -
3 -

SECOND DIGIT
POTENTIOMETER FULL SCALE
0 +2.5 V
1 -
2 -
3 -
4 -
5 -
6 -
7 -

THIRD DIGIT
OUTPUT RATE
0 1 Hz averaged, 50/60 Hz rapid
1 10 Hz averaged, 50/60 Hz rapid
2 10 Hz averaged, 800/900 rapid
3 50/60 Hz averaged, 800/900 rapid
4 50/60 Hz averaged, 400/480 rapid
5 50/60 Hz averaged, 200/240 rapid
6 -
7 -

4 Using the **[↑]** **[↓]** buttons, select the **+2.5 V reference voltage**, the **+2.5 V potentiometer full scale operating voltage**, and the **averaged output rate**.

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.

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

Select a Channel

Select the output register for the required channels

- 7 Press the **P** and **↑** button at the same time again to re-enter the main programming mode, then press the **P** button three times to enter Code 2.
- 8 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



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

* Signal output at the A/D sampling rate.

** Hardwire initiated from meter Capture pin.

THIRD DIGIT
OUTPUT REGISTER MAP
0 Averaged signal
1 Rapid response signal*
2 Peak signal*
3 Valley signal*
4 Capture signal**
5 Rate of change of signal
6 -
7 Smart input module register 1 code setup

- 9 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 output register map (3rd digit):

2nd Digit
4 selects
5 selects
6 selects
7 selects

Output Register Map
0 Averaged signal
1 Rapid response signal*
2 Peak signal*
3 Valley signal*

- 10 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
OUTPUT REGISTER MAP
0 Averaged signal
1 Rapid response signal*
2 Peak signal*
3 Valley signal*
4 Capture signal**
5 Rate of change of signal
6 -
7 Smart input module register 1 code setup



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

* Signal output at the A/D sampling rate.

** Hardwire initiated from meter Capture pin.

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

CH4 Cod_6 X7X

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

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].

- 12 Press the **P** and **↑** buttons at the same time to return to the operational display.

Example Setup Procedure

A plant engineer requires a record of the speed at which a rapid (frequency >10 Hz) linear displacement takes place in an assembly process.

The mechanical shift is monitored by connection to a 10 K rectilinear potentiometer, wired to an ISR1 3-wire potentiometer smart input module installed in a Tiger 320 Series meter.

- 1 Select the +2.5 V reference voltage, the +2.5 V full scale for a 10 K pot, and the 50 Hz (800 readings) averaged response for a fast mechanical shift :

In **CODE 2** select **X77** then press **P** button.

Display toggles between **SMt1** **000**

Set **SMt1** to **103**

- 2 Select rate of change signal as speed is to be recorded:

In **CODE 2** reset to **X75** then press **P** button.

Note:

In this example the speed is calculated from the average of 800 samples and output every 20 ms (50 Hz rate).

Customer Configuration Settings:

	1st Digit	2nd Digit	3rd Digit
	5	7	7
CH1	Cod_2		
		7	
CH2	Cod_4		
	0		
			0
CH3	Cod_5		
		7	
CH4	Cod_6		
		7	

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