TEXMATE INC

Fits Tiger 320 Series

16-BIT SMART DUAL DC VOLTS INPUT MODULE

Stable Voltage Reference.
10 ppm/C.

Excitation Header.
External +24 V available.

On-board Digital Signal Processor.
Software selectable gains, output rates and noise rejection frequency.

8-Pin Input Connector.
Dual voltage inputs and excitation voltage output.

Interface to Tiger Meter.

Attenuation Header.
1:1000 selectable voltage divider for each input channel.

Crystal Controller 50/60 Hz.
Noise rejection.

Ultra-low Noise 16-bit A/D Convertor.
Approaches 19-bit performance with additional software filtering.

State-of-the-art Electromagnetic Noise Suppression Circuitry.
Ensures signal integrity even in harsh EMC conditions.

An extremely flexible and powerful dual input mV/V Input Module

This input module comes with a myriad of hardware and software options to satisfy the requirements of precision voltage measurement and dual input functionality. When combined with the Tiger 320 Series operating system, the OEM has a powerful solution to applications ranging from small voltage measurement through to process control, all at a very affordable price.

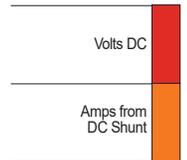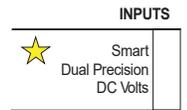## Input Module Order Code Suffix

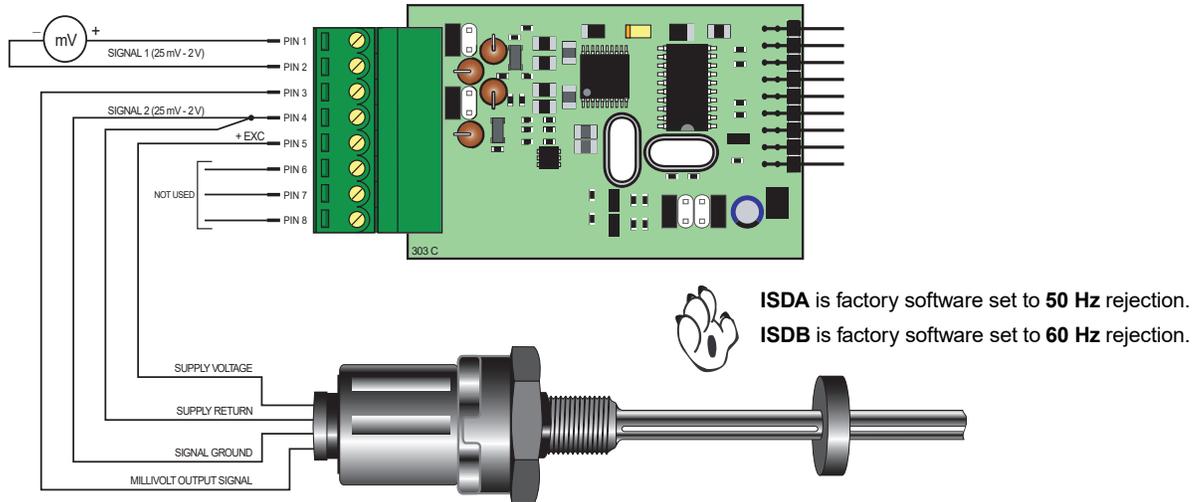### ISDA (50 Hz Rejection)
ISDB (60 Hz Rejection)

Hardware Module Specifications	
Input Range	Software selectable from 25 mV to 2 V, +2.1 V common mode. Maximum 60 V using signal attenuation header.
Input Channels	Dual with independent gains. Zero X-talk between channels each having 19-bit effective resolution.
Input Sensitivity	0.08 µV/Count maximum.
Zero Drift	± 40 nV/ °C typical.
Span Drift	± 5 ppm/ °C of full scale maximum.
Non-linearity	± 0.003 % of full scale maximum.
Input noise	160 nVp-p typical at 1 Hz output rate.
Signal Processing Rate	20 Hz maximum, 1 Hz minimum.
Excitation Voltage	+24 V (50mA) available to power external sensors.

Software Module Features	
Output Rates	Choice of 4 average response outputs, 1-20 Hz.
Gain Select	Choice of 7 voltage ranges from ± 25 mV to ± 2 V.
Frequency Select	50/60 Hz noise rejection (Software selectable).

Some Relevant Tiger 320 Series Operating System Features
Auto Zero Maintenance.
Set TARE, Reset TARE.
Setpoint Timer Functions.
Setpoint Register Reset and Trigger Functions.
On-demand Calibration.
Macro Compiler for PLC Functions.
32-Point Linearization.
Totalizer and Serial Printing.

INPUTS

⭐ Smart Dual Precision DC Volts

Volts DC

Amps from DC Shunt

Connector Pinouts

ISDA is factory software set to **50 Hz** rejection.

ISDB is factory software set to **60 Hz** rejection.

Smart Setup Registers

The meter has three smart setup registers to configure all smart input modules.

ISDA and ISDB require smart registers 1 and 2 to be configured. Because this is a dual input module, independent sensor inputs can be software selected for Tiger 320 Series meter channels 1, 2, 3, and 4. This module produces two output registers. One of these registers can be transferred to Channel 1 via Code 2, the same or another register to Channel 2 via Code 4, the same or another register to Channel 3 via Code 5, and the same or another register to Channel 4 via Code 6.

Smart Setup Register – Operational Flow Diagram
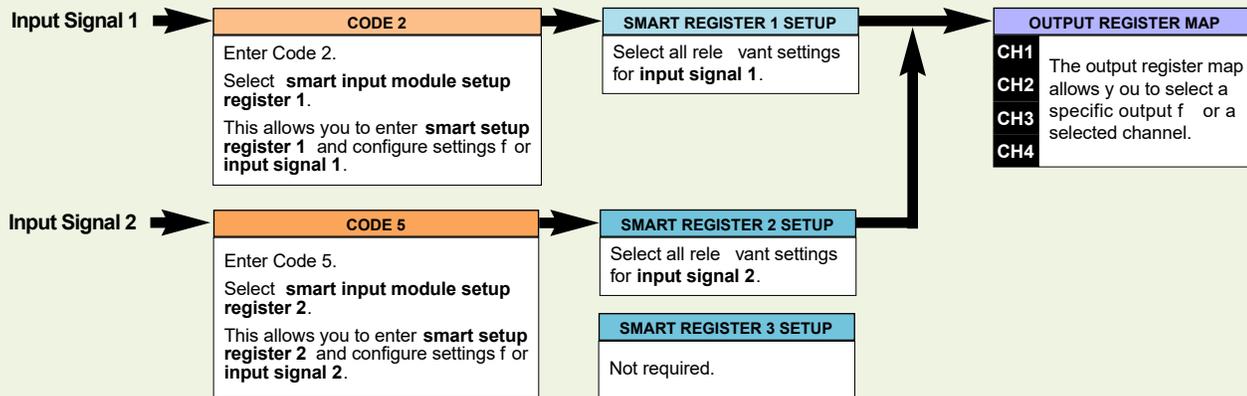
Programming Procedures

The following programming procedures cover all the steps required to configure smart input module ISDA and ISDB. Steps 1 to 5 describe how to select the **input signal 1** voltage range, line frequency rejection, and the output rate through **smart setup register 1**.

Steps **6** to **9** describe how to select **input signal 2** voltage range through **smart setup register 2**.

Steps **10** to **19** describe how to select the output register 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 twice to enter Code 2 for **input signal 1** configuration settings. Set Code 2 to [X77].

`Cod_2    X77`

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

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

FIRST DIGIT	SECOND DIGIT	THIRD DIGIT
TIGER PROCESSING RATE	**MEASUREMENT TASK**	**OUTPUT REGISTER MAP**
0 10 Hz	**0 Voltage, Current**	**0 Averaged Signal 1**
1 10 Hz	1 TC (3rd digit selects type of TC)	1 Averaged Signal 2
2 100 Hz	2 RTD 3-wire (3rd digit selects type of RTD)	2 -
3 100 Hz	3 RTD 2- or 4-wire (3rd digit selects type of RTD)	3 -
	4 Frequency	4 -
	5 Period	5 -
	6 Counter	6 -
	7 Smart Input Module	**7 Smart input module register 1 code setup**

3 Press the [P] button.

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

This menu provides settings unique to **smart register 1** of the ISDA and ISDB input module.

`5П7E1    000`

Note:

When the input signal is greater than 2 V the 1:100 attenuation header is set to ON.

For signals up to 10V select the ±100 mV range for best resolution.

For signals larger than 10 V select ±1 V range.

FIRST DIGIT	SECOND DIGIT	THIRD DIGIT
REFERENCE VOLTAGE	**SIGNAL 1 VOLTAGE RANGE**	**OUTPUT RATE**
0 -	**0** ±2 V	**0** 1 Hz averaged
1 60 Hz rejection (ISDB default setting)	1 ±1 V	1 5 Hz averaged
2 -	2 ±500 mV	2 10 Hz averaged
3 50Hz rejection (ISDA default setting)	3 ±250 mV	3 20 Hz averaged
	4 ±100 mV	4 -
	5 ±50 mV	5 -
	6 ±25 mV	6 -
	7 -	7 -

4 Using the [▲][▼] buttons, select the relevant **line frequency rejection**, the voltage range for **signal 1**, and the **output rate common to both signals**.

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.

`X70`

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

7 Press the [P] button three times to enter Code 5 for **input signal 2** configuration settings. Set Code 5 to [X77].

`Cod_5    X77`

Note the output registers in the 3rd digit are specific to ISDA and ISDB. These registers vary for each different smart input module.

FIRST DIGIT	SECOND DIGIT	THIRD DIGIT
CH3 POST PROCESSING	**MEASUREMENT TASK**	**OUTPUT REGISTER MAP**
0 Direct Display of Input (no processing)	**0 No function**	**0 Averaged Signal 1**
1 Square Root of Channel 3	1 Voltage, current	1 Averaged Signal 2
2 Inverse of Channel 3	2 TC	2 -
3 Meters with 4 kB memory NO Linearization	3 RTD	3 -
Meters with 32 kB memory 32-point Linearization of CH3 using Table 3	4 Real time clock & timer	4 -
Note:	5 -	5 -
All linearization tables are set up in the Calibration Mode [24X].	6 -	6 -
	7 Smart input module	7 Smart input module **register 2** code setup

8 Press the [P] button.

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

`5П7E2    000`

9 Using the [▲][▼] buttons, select the **sensor 2 input** from the 3rd digit.

10 Press the [P] button to save the settings.

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

`Cod_5    X77`

FIRST DIGIT	SECOND DIGIT	THIRD DIGIT
Not Relevant	**Not Relevant**	**SIGNAL 2 VOLTAGE RANGE**
		0 ±2 V
		1 ±1 V
		2 ±500 mV
		3 ±250 mV
		4 ±100 mV
		5 ±50 mV
		6 ±25 mV
		7 -

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

12 Press the [P] and [▲] buttons 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 setting in the 3rd digit.

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

CH1 `Cod_2    X7X`

FIRST DIGIT	SECOND DIGIT	THIRD DIGIT
TIGER PROCESSING RATE	**MEASUREMENT TASK**	**OUTPUT REGISTER MAP**
0 10 Hz	**0 Voltage, Current**	**0 Averaged Signal 1**
1 10 Hz	1 TC (3rd digit selects type of TC)	1 Averaged Signal 2
2 100 Hz	2 RTD 3-wire (3rd digit selects type of RTD)	2 -
3 100Hz	3 RTD 2- or 4-wire (3rd digit selects type of RTD)	3 -
	4 Frequency	4 -
	5 Period	5 -
	6 Counter	6 -
	7 Smart Input Module	7 Smart input module **register 1** code setup

16 If required enter Code 4 and select the required register map settings for **CH2** in the 2nd digit. Note, the 1st digit must be set to 0.

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		*Note:
0 Channel 2 Disabled		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 smart register 1 map (3rd digit):
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)*		

2nd Digit	Output Register Map	
4 selects	0	Averaged Signal 1
5 selects	1	Averaged Signal 2
6 selects	2	-
7 selects	3	-

17 If required enter Code 5 and select the required post processing settings for **CH3** in the 1st digit and the required register map setting 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**
1 Averaged Signal 2
2 -
3 -
4 -
5 -
6 -
7 Smart input module register 1 code setup

18 If required enter Code 6 and select the required post processing settings for **CH4** in the 1st digit and the required register map setting 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].

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

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

Example Setup Procedure

Our customer is monitoring the light levels and relative humidity in a greenhouse using a thermopile and a capacitance sensor. The thermopile produces a small millivolt output (<15 mV) while the capacitance sensor has a 0-100 % RH scaled as 0-1 volt. There is no requirement for a fast response as the ambient conditions in the greenhouse change slowly.

The thermopile is connected to the **signal 1** input and the capacitance sensor to the **signal 2** input. Select 50 Hz as the input line frequency rejection and a 1 Hz output rate.

1 Select 50 Hz input line frequency, with a 1 Hz averaged output rate for both signals. Select voltage range ±25 mV for signal 1:

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

Display toggles between `SMt1` `000`

Set `SMt1` to `360`

2 Select ±1 V voltage range for signal 2 output:

In `CODE 5` reset to `X77` then press `P` button.

Display toggles between `SMt2` `000`

Set `SMt2` to `XX1`

3 Select thermopile for CH1:

In `CODE 2` select `X70`

4 Select the capacitance sensor for CH3:

In `CODE 5` select `X71`

Customer Configuration Settings:

	1st Digit	2nd Digit	3rd Digit
`SMt1`	____	____	____
`SMt2`	____	____	____

CH1	`Cod_2`	1st Digit	2nd Digit	3rd Digit
		____	7	____

CH2	`Cod_4`	1st Digit	2nd Digit	3rd Digit
		0	____	0

CH3	`Cod_5`	1st Digit	2nd Digit	3rd Digit
		____	7	____

CH4	`Cod_6`	1st Digit	2nd Digit	3rd Digit
		____	7	____

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