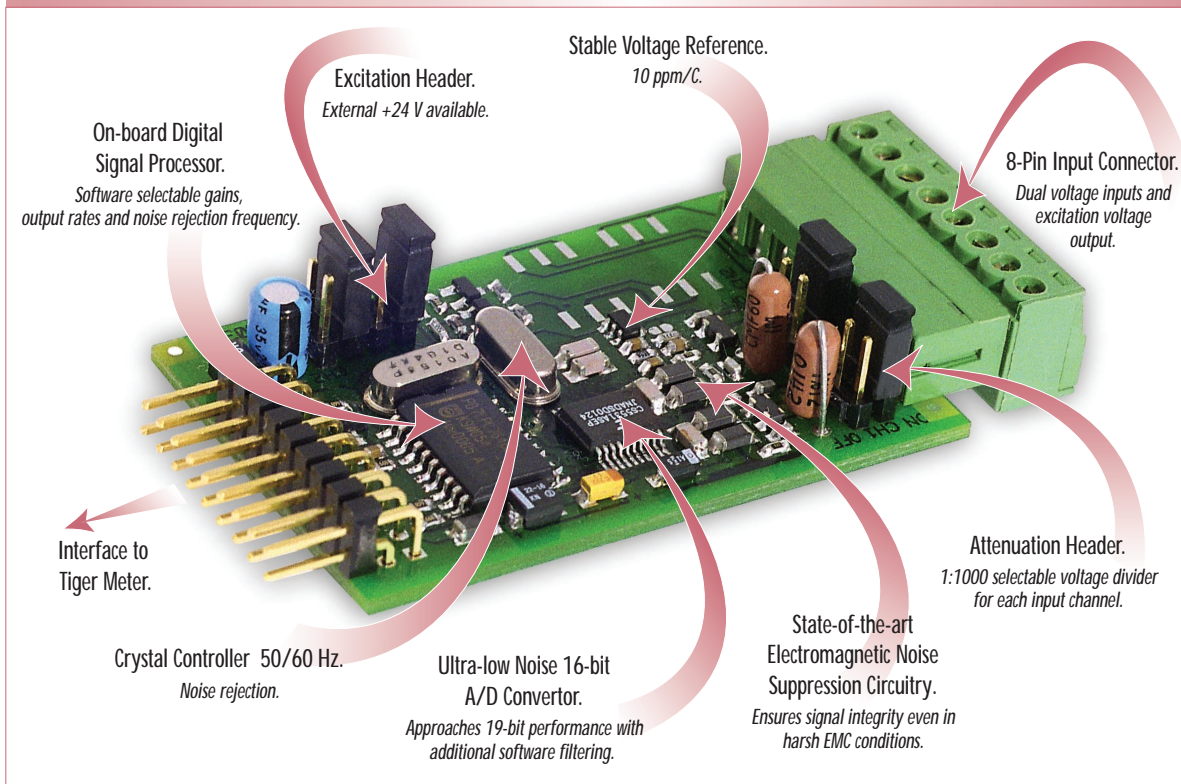


## 16-BIT SMART DUAL DC VOLTS INPUT MODULE

# 16-BIT SMART DUAL DC VOLTS



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

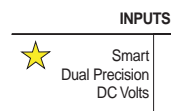
Input Range	Software selectable from 25 mV to 2 V, +2.1 V common mode. Maximum 60 V using signal attenuation header.
Input Channels	Dual with independent gains. Zero X-talk between channels each having 19-bit effective resolution.
Input Sensitivity	0.08 $\mu$ V/Count maximum.
Zero Drift	$\pm 40$ nV/ $^{\circ}$ C typical.
Span Drift	$\pm 5$ ppm/ $^{\circ}$ C of full scale maximum.
Non-linearity	$\pm 0.003$ % 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

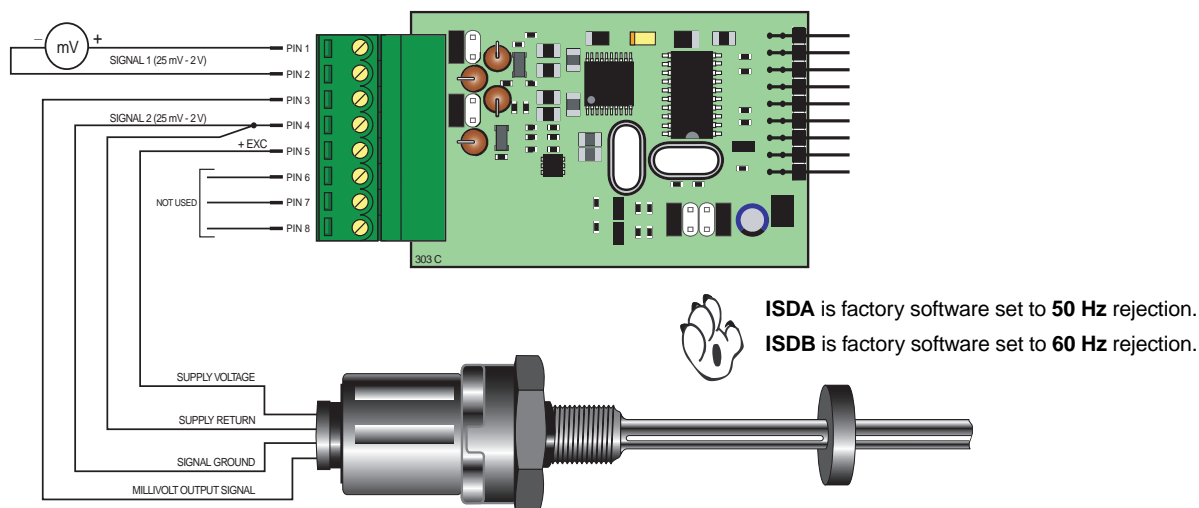
Output Rates	Choice of 4 average response outputs, 1-20 Hz.
Gain Select	Choice of 7 voltage ranges from $\pm 25$ mV to $\pm 2$ V.
Frequency Select	50/60 Hz noise rejection (Software selectable).

### 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.



## Connector Pinouts

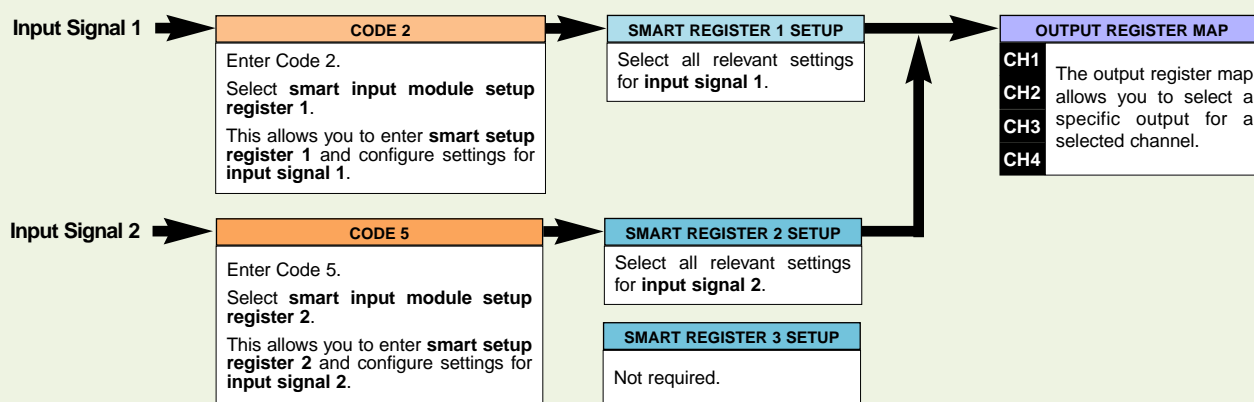


## Smart Setup Registers

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.

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 Signal 1
1 Averaged Signal 2
2 -
3 -
4 -
5 -
6 -
7 Smart input module register 1 code setup



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

- 3 Press the **P** button.  
This enters **smart register 1** code setup menu.

57761 000

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



**Note:**

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

For signals up to 10 V select the  $\pm 100$  mV range for best resolution.

For signals larger than 10 V select  $\pm 1$  V range.

FIRST DIGIT
REFERENCE VOLTAGE
0 -
1 60 Hz rejection (ISDB default setting)
2 -
3 50Hz rejection (ISDA default setting)

SECOND DIGIT
SIGNAL 1 VOLTAGE RANGE
0 $\pm 2$ V
1 $\pm 1$ V
2 $\pm 500$ mV
3 $\pm 250$ mV
4 $\pm 100$ mV
5 $\pm 50$ mV
6 $\pm 25$ mV
7 -

THIRD DIGIT
OUTPUT RATE
0 1 Hz averaged
1 5 Hz averaged
2 10 Hz averaged
3 20 Hz averaged
4 -
5 -
6 -
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
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].

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
OUTPUT REGISTER MAP
0 Averaged Signal 1
1 Averaged Signal 2
2 -
3 -
4 -
5 -
6 -
7 Smart input module register 2 code setup

- 8 Press the **P** button.  
This setting enters the **smart register 2** code setup menu.

57762 000

FIRST DIGIT
Not Relevant

SECOND DIGIT
Not Relevant

THIRD DIGIT
SIGNAL 2 VOLTAGE RANGE
0 $\pm 2$ V
1 $\pm 1$ V
2 $\pm 500$ mV
3 $\pm 250$ mV
4 $\pm 100$ mV
5 $\pm 50$ mV
6 $\pm 25$ mV
7 -

- 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

- 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.

CH1 Cod\_2 X7X

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

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 Signal 1
1 Averaged Signal 2
2 -
3 -
4 -
5 -
6 -
7 Smart input module register 1 code setup



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

- 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
<b>0 Voltage, Current</b>
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
<b>0 Channel 2 Disabled</b>
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 smart register 1 map (3rd digit):

2nd Digit	Output Register Map
4 selects	<b>0 Averaged Signal 1</b>
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
<b>0 Direct Display of Input (no processing)</b>
1 Square Root of Channel 3
2 Inverse of Channel 3
<b>3 Meters with 4 kB memory</b>
NO Linearization
<b>Meters with 32 kB memory</b>
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
<b>0 Averaged Signal 1</b>
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]

FIRST DIGIT
CH4 POST PROCESSING
<b>0 Direct Display of Input (no processing)</b>
1 Square Root of Channel 4
2 Inverse of Channel 4
<b>3 Meters with 4 kB memory</b>
NO Linearization
<b>Meters with 32 kB memory</b>
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.

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



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

## 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  $\pm 25$  mV for signal 1:

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

Display toggles between [SM1] [000]

Set [SM1] to [360]

- 2** Select  $\pm 1$  V voltage range for signal 2 output:

In [CODE 5] reset to [X77] then press **[P]** button.

Display toggles between [SM2] [000]

Set [SM2] 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  
[5] [7] [7] [E] [1]  
[5] [7] [7] [E] [2]

1st Digit 2nd Digit 3rd Digit  
**CH1** [Cod\_2] [ ] [7] [ ]  
1st Digit 2nd Digit 3rd Digit  
**CH2** [Cod\_4] [0] [ ] [0]

1st Digit 2nd Digit 3rd Digit  
**CH3** [Cod\_5] [ ] [7] [ ]  
1st Digit 2nd Digit 3rd Digit  
**CH4** [Cod\_6] [ ] [7] [ ]

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