

PI-M Programmable Isolating Maths Function Transmitter.

Programmable Isolating Maths Function Input to DC Current or DC Voltage Output Transmitter.

Features.

- Field Programmable Input and Output Ranges.
- 29 Predefined Math Functions.
- 12 Bit Resolution. (0.025%)
- Input to Output Isolation 1.6kV.
- High Accuracy 0.1%.
- Universal AC/DC Power Supply.
- Compact DIN Rail Mount Enclosure.
- 120 Point User Definable Curve Fitting.



Ordering Information.

PI-M-X Standard Calibration: Input 4~20mA; X+Y; Output 4~20mA High Voltage Power Supply.

PI-M - ☐ - ☐ - ☐ - ☐ -Special Range Special Range Calibration.
IR MF OR PS

PI-RAC RS-232 Hardware Interface for Programming the PI-M-T.

Other PI- models include:
PI-B Bridge / Strain gauge;
PI-D DC; mA, mV, V.
PI-F Frequency;
PI-K Resistance;
PI-M Maths Computing;
PI-N RTD Differential Pt100;
PI-P Potentiometer;
PI-R RTD Pt100;
PI-S Relay Dual Setpoint;
PI-T Thermocouple.

INPUT RANGES		MATHS FUNCTION				OUTPUT RANGES			
Input	IR	Maths Funct. (Output =)	MF	Maths Funct. (Output =)	MF	Voltage	OR	Current	OR
0~5V	A	X + Y	1	Sample and Hold	26	0~500mV	A	0~1mA	1
0~10V	B	X + Y + Z	2	Tare	27	0~1V	B	0~2mA	2
1~5V	C	X - Y	3		28	0~2V	C	0~5mA	3
2~10V	D	X - Y + Z	4	%RH, X=Dry, Y=Wet	29	0~3V	D	0~10mA	4
0~20mA	E	X x Y	5	User Defined Curve	30	0~4V	E	0~16mA	5
4~20mA	F	X x Y x Z	6	Program User Defined Curve	31	0~5V	F	0~20mA	6
		X / Y	7	Pressure Comp. Steam Flow	32	0~6V	G	1~5mA	7
		(X / Y) x Z	8	Program PCSF Values	33	0~8V	H	2~10mA	8
		X ^(1/2) {Square root X}	9	Hi Select of X or Y	34	0~10V	I	4~20mA	9
		X ^(1/3) {Cube root X}	10	Lo Select of X or Y	35	0~12V	J	-1~1mA	10
		X ^(3/2)	11		36	1~5V	K	-2~2mA	11
		X ²	12		37	2~10V	L	-5~5mA	12
		X ³	13		38	-1~1V	M	-10~10mA	13
		ln X {Natural log X}	14		39	-2~2V	N	-20~20mA	14
		log X {Base 10 log X}	15		40	-5~5V	O		
		(X ² + Y ²) ^(1/2)	16		41	-10~10V	P		
		(X + Y) / 2	17		42	-12~12V	Q		
		(X + Y + Z) / 3	18		43				
		X ^{1.569} {Parshall Flume}	19		44				
		X ^(5/2) {V Notch Weir}	20		45				
		X {ie Xin=Xout}	21		46				
		Inverse of X {ie.(100-X)%}	22		47				
Sample & Hold X=4~20mA Y=24Vdc	Y	X / (X + Y)	23		48				
		Antilog X	24		49				
		(X - Y) x Z	25		50				
Special Input	Z					Special Output Range			Z

Note: Hi Select and Lo Select available from S/No. 9844000 onwards.

POWER SUPPLY		PS
High Voltage Power Supply: 85~264Vac/dc		H
Mid Voltage Power Supply: 22~85Vac/dc		M
Low Voltage Power Supply: 10~28Vac/dc		L

Note: Power supply H is field selectable for M, and M for H. Power supply L must be ordered separately.

Ordering Examples.

- 1/ PI-M-A-3-9-L 0~5V Input; X-Y; 4~20mA Output; Low Voltage Power Supply.
- 2/ PI-M-Z-7-P-H-0/4V 0~4V Input; X/Y; -10~10V Output; High Voltage Power Supply.

Quality Assurance Programme.

The modern technology and strict procedures of the ISO9001 Quality Assurance Programme applied during design, development, production and final inspection grant the long term reliability of the instrument.

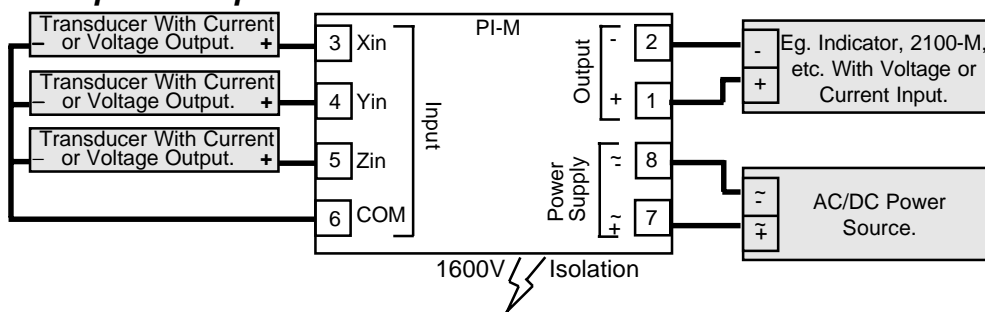
PI-M Rev2 Specifications.

Input	-Voltage	Field Programmable 0~5Vdc / 0~10Vdc / 1~5Vdc / 2~10Vdc. Minimum Input Resistance = 180kΩ. Maximum Over-range = 24Vdc Continuous.
	-Current	Field Programmable 0~20mAdc / 4~20mAdc. Input Resistance = 250Ω. Maximum Over-range = 50mAdc Continuous.
	-Maths Functions	29 Field Selectable, Predefined, Maths Functions. RS-232 Interface for Calibration and Testing. (Using a PI-RAC.)
	-User Defined Curve	Up to 120 Point Look-up Table, Linear Interpolation Between Points. RS-232 Interface for Programming of User Curves. (Using a PI-RAC.)
IMPORTANT: The RS-232 communications port is NOT ISOLATED from the PI-M inputs.		
Power	-H	85~264Vac/dc; 50/60Hz; 5VA.
	-M	22~85Vac/dc; 50/60Hz; 5VA.
	-L	10~28Vac/dc; 50/60Hz; 5VA.
	-Circuit Sensitivity	<±0.001%/V FSO Typical.
Resolution	-Input	12 Bit.
	-Output	12 Bit.
Accurate to		<±0.1% FSO Typical.
Linearity & Repeatability		<±0.1% FSO Typical.
Ambient Drift		<±0.01%/C FSO Typical.
Noise Immunity		125dB CMRR Average. (1600Vdc Limit.)
Response Time		200msec Typical. (10 to 90% 100msec Typical.)
		Note. The %RH Function has Software Dampening of 2sec Typical.
EMC Compliances		Emissions EN 55022-A. Immunity EN 50082-1, <1% Effect FSO Typical.
Safety Compliance		EN 60950
Mains Isolation		250Vac.
Isolation Test Voltages		Mains to Input/Output 3kVac 50Hz for 1min; Input to Output 1.6kVdc for 1min.
Operating Temperature & Humidity		0~60C. (Storage Temp. -20~80C.) 5~85% RH Max. Non-Condensing.
Dimensions and Mounting		L=80, W=50, H=120mm. Mounts on 35mm Symetrical Mounting Rail.
Relative Humidity	-Input	0~100C for Input Range.
	-Range	0~100%RH Over 0~100C Input.
	-Accurate to	<±1% FSO Typical.

Product Liability. This information describes our products. It does not constitute guaranteed properties and is not intended to affirm the suitability of a product for a particular application. Due to ongoing research and development, designs, specifications, and documentation are subject to change without notification. Regrettably, omissions and exceptions cannot be completely ruled out. No liability will be accepted for errors, omissions or amendments to this specification. Technical data are always specified by their average values and are based on Standard Calibration Units at 25C, unless otherwise specified. Each product is subject to the 'Conditions of Sale'.

Warning: These products are not designed for use in, and should not be used for patient connected applications. In any critical installation an independant fail-safe back-up system must always be implemented.

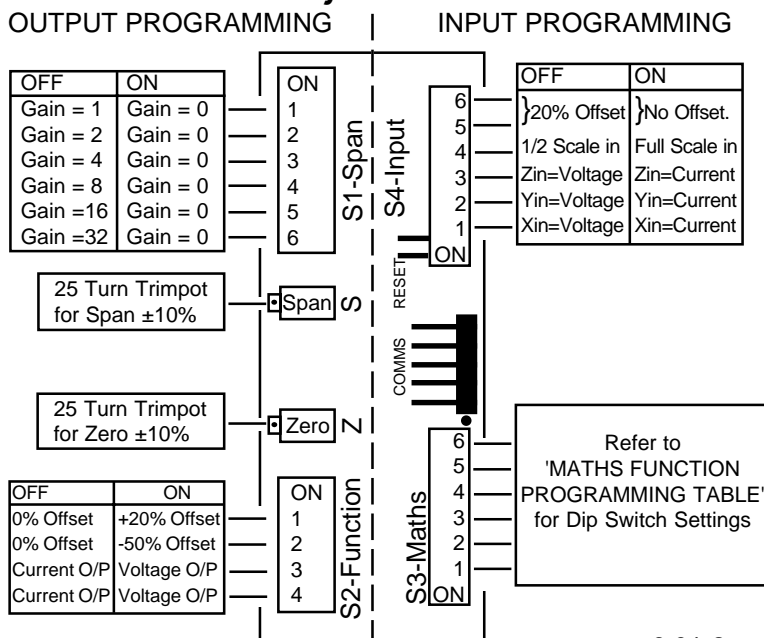
Examples of Input Connection.



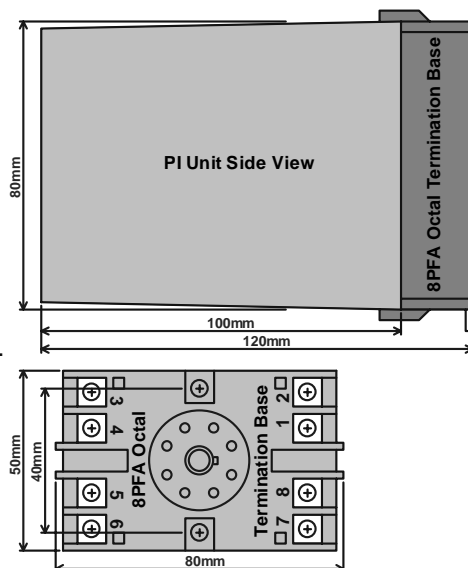
Terminations.

Output	1	+Ve
	2	-Ve
Input	3	Xin
	4	Yin
	5	Zin
	6	COM
P/S	7	Neutral/+DC
	8	Phase/-DC

Plan View of PI-M Adjustments.



PI-M Dimensions and Mounting.



PI-M Input Range Programming Table.

Always set **OUTPUT range first**, then INPUT range.

DIP switches and Pots are accessed by removing the small rectangular lid on the top of the PI-M enclosure.

- Notes:**
- 1/ Switch status 1 = ON, 0 = OFF, X = DON'T CARE.
 - 2/ All inputs must be of the same signal type.
 - 3/ If using voltage inputs, short unused inputs to 'COM' (terminal 6).

		INPUT RANGE	S4-1	S4-2	S4-3	S4-4	S4-5	S4-6
Vin		0~5V	0	0	0	0	1	1
		0~10V	0	0	0	1	1	1
		1~5V	0	0	0	0	0	0
		2~10V	0	0	0	1	0	0
lin		0~20mA	1	1	1	0	1	1
		4~20mA	1	1	1	0	0	0

How to Use the Maths Function Formulae.

X, Y, and Z are taken as 0 to 1.0000, representing the full input range.

eg.	4.000mA	=	0.0000
	8.000mA	=	0.2500
	12.000mA	=	0.5000
	16.000mA	=	0.7500
	20.000mA	=	1.0000

The selected calculation is then performed on the inputs. The output is then *SCALED* so the resultant range is between 0 and 1.000. (The scaling factor is the factor the largest output must be scaled by to get the result = 1.) This 0 to 1.000 range represents the full output range, as set by the output DIP switches.

Examples of Using the Maths Function Formulae.

NOTE: For these examples inputs and outputs are configured as 4~20mA.

Examples	Inputs (mA)			Converted Value			Resultant Value	Scaling Factor	Output Signal (mA)
	X	Y	Z	X	Y	Z			
X + Y	4	4	-	0.0	0.0	-	0	.5	4.00
	12	12	-	0.5	0.5	-	1		12.00
	20	20	-	1.0	1.0	-	2		20.00
X x Y x Z	4	4	4	0.0	0.0	0.0	0	1	4.00
	12	12	12	0.5	0.5	0.5	0.0156		4.25
	16	16	16	0.75	0.75	0.75	0.4219		10.75
	20	20	20	1.0	1.0	1.0	1		20.00
X^(1/2)	4	-	-	0.0	-	-	0	1	4.00
	8	-	-	0.25	-	-	0.5		12.00
	12	-	-	0.5	-	-	0.7071		15.31
	16	-	-	0.75	-	-	0.8660		17.86
	20	-	-	1.0	-	-	1		20.00
X ²	4	-	-	0.0	-	-	0	1	4.00
	8	-	-	0.25	-	-	0.0625		5.00
	12	-	-	0.5	-	-	0.25		8.00
	16	-	-	0.75	-	-	0.5625		13.00
	20	-	-	1.0	-	-	1		20.00

PI-M Maths Function Programming Table.

NOTE: '*' Beside functions indicates the function must be set up using a PI-RAC and a computer terminal.

Function Number	Maths Function	Conditions	lsb	S3-Maths				msb
			1	2	3	4	5	6
0	Test and Calibration		0	0	0	0	0	0
1	X + Y		1	0	0	0	0	0
2	X + Y + Z		0	1	0	0	0	0
3	X - Y	X >= Y	1	1	0	0	0	0
4	(X - Y) + Z	X >= (Y - Z)	0	0	1	0	0	0
5	X x Y		1	0	1	0	0	0
6	X x Y x Z		0	1	1	0	0	0
7	X / Y	X <= Y	1	1	1	0	0	0
8	(X / Y) x Z	X <= (Y / Z)	0	0	0	1	0	0
9	X^(1/2) {Square root X}		1	0	0	1	0	0
10	X^(1/3) {Cube root X}		0	1	0	1	0	0
11	X^(3/2)		1	1	0	1	0	0
12	X ²		0	0	1	1	0	0
13	X ³		1	0	1	1	0	0
14	In X {Natural log X}		0	1	1	1	0	0
15	log X { Base 10 log X}		1	1	1	1	0	0
16	(X ² + Y ²)^(1/2)		0	0	0	0	1	0
17	(X + Y) / 2		1	0	0	0	1	0
18	(X + Y + Z) / 3		0	1	0	0	1	0
19	X^1.569 {Parshall Flume}		1	1	0	0	1	0
20	X^(5/2) {V Notch Weir}		0	0	1	0	1	0
21	X {ie. Xin=Xout}		1	0	1	0	1	0
22	Inverse of X {ie.(100 - X)%}		0	1	1	0	1	0
23	X / (X + Y)	If X=0, output=0	1	1	1	0	1	0
24	Antilog X	If X=0, output=0	0	0	0	1	1	0
25	(X - Y) x Z (Energy Flow)		1	0	0	1	1	0
26	Sample and Hold X=Input, Y=Hold	If Y<40%, Output=X If Y>60%, Output Hold Also refer example on page 5.	0	1	0	1	1	0
27	TARE X=Input, Y=TARE Control	To Tare X take Y input above 60% and back below 40%	1	1	0	1	1	0
28			0	0	1	1	1	0
29	%RH, X=Dry, Y=Wet		1	0	1	1	1	0
30 *	User Defined Curve	} Refer to programming instructions on page 5 & 6.	0	1	1	1	1	0
31 *	Program User Curve		1	1	1	1	1	0
32 *	Pressure Comp. Steam Flow. X=Steam Flow Y=Steam Pressure	} Refer to programming instructions on page 7.	0	0	0	0	0	1
33 *	Program PCSF		1	0	0	0	0	1
34	HI Select of X or Y	Output = Highest of X or Y	0	1	0	0	0	1
35	Lo Select of X or Y	Output = Lowest of X or Y	1	1	0	0	0	1
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Sample and Hold Example. (Function 26; Input Ordering Code = Y)

X = 4~20mA; Y = 24Vdc Max.

If Y < 2.6V, Output = X;

If Y > 3.4V, Output = Hold.

Set S4 Input Range Dip Switches as follows:

S4-1	S4-2	S4-3	S4-4	S4-5	S4-6
1	0	0	0	0	0

PI-M Programming Instructions - User Defined Curve.

The PI-M allows a user to linearise specific curves, using the x input. and by programming pairs of (x input,output). co-ordinates. The values are stored in a non-volatile EEPROM, and are entered using a computer terminal, with a basic text editor, and an RS-232 communications port. Up to 120 pairs of co-ordinates can be stored, and the PI-M uses linear interpolation to calculate intermediate values. The PI-M has 12-bit resolution on the input and output, uses 16 bits to store curve data, and uses floating point arithmetic for the interpolation.

Requirements.

PI-M	-Isolated transmitter with correct power supply.
PI-RAC	-PI-M to RS-232 interface.
PC Computer	-With spare RS-232 port.
Windows	-Installed on the PC.

IMPORTANT: The RS-232 port is not isolated from the PI-M.

Computer Setup.

Important: The power to the PI-M must be turned OFF before connecting the COMMS lead.

Connect the 10 pin (5 X 2) header socket to the PI-RAC, with the RED stripe on the cable aligning with the large dot on the PI-M PCB. Connect the other end of the PI-RAC to an unused RS-232 COMMS port on the computer. (Usually COM2.)

Entering User Defined Data.

1. Turn the PC on, and run *WINDOWS*.
2. Run *NOTEPAD*.
3. The format for the curve points is:

output = f(x input) ie. The 'x input' value is the input, and the output value is the corresponding output.

The curves must have a minimum of 2 points, and a maximum of 120. The curve data is entered as:

x input value <comma> output value <enter>

```
0,output<Enter>
input x2,output<Enter>
input x3,output<Enter>
:
:
input xn-1,output n-1<Enter>
100,output n<Enter>
```

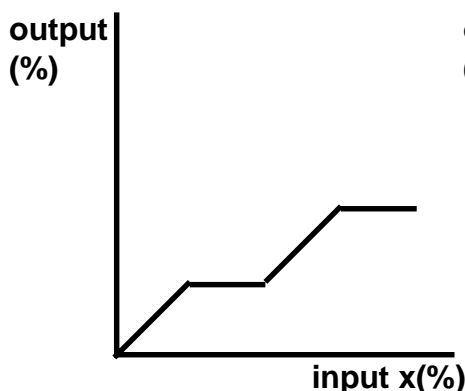
Important: x input, and output values, are to be entered as percentages, between 0 and 100%

The first x input value must be 0% and the last must be 100%.

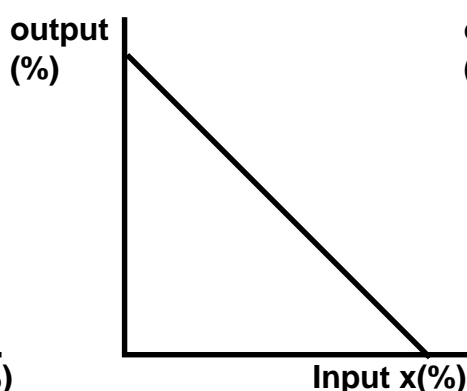
The x input values must increment from smallest to largest..

Once all the points have been entered, save the file as a **.txt** file.

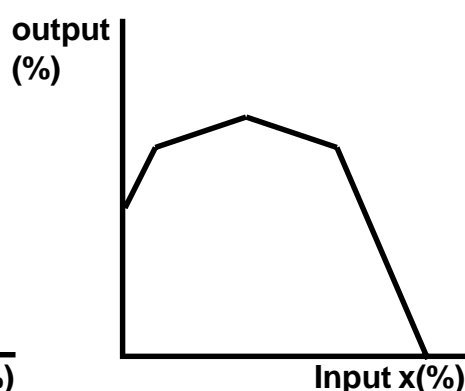
Examples of User Defined Data Files.



data file examples {
0,0
25,25
50,25
75,50
100,50



0,100
100,0



0,50
10,70
40,80
70,70
100,0

Windows 95/98/2000/XP COMMS Port Configuration.

Before loading data into the PI-M the appropriate RS-232 COMMS port must be configured.

From *WINDOWS* click *START, PROGRAMS, ACCESSORIES, HYPERTERMINAL*.

If *Hyperterminal* is not visible on the *Accessories* menu, it will have to be added using *Add/Remove Software* in the *Control Panel*.

Double click on *Hyperterminal*. The *new connection* dialog box appears.

In 'Name:' enter: '"PIM on COMx" where 'x' is the ports the PI-M is connected to. Click '**OK**'.

The *Phone Number* dialog box appears. In 'Connection Using:' select "*Direct to Com x*". Click '**OK**'.

The *COM x Properties* dialog box appears.

Set the following parameters:

<u>B</u> its per second	9600
<u>D</u> ata Bits	8
<u>P</u> arity	None
<u>S</u> top Bits	1
<u>F</u> low Control	Xon/Xoff

Click '**OK**'.

Connect the PI-M to the selected port, apply the power, and the PI-M menu should appear in the *Hyperterminal* window.

When you close *Hyperterminal*, save the session when prompted. You can connect the PI-M again by double clicking "PIM on COMx" in the *Hyperterminal* folder.

Downloading User Defined Data File to the PI-M.

Note: Downloading data to the PI-M will clear all previous user defined data from the PI-M EEPROM.

Select Maths Function 31 (*Program User Curve*) ie. Set the **S3-MATHS** dip switch on the PI-M to **111110** (0=off, 1-on).

Power the PI-M. The following menu will appear in the *TERMINAL* window.

Select **1=Download User Table (Computer -> PI-M)**

The *TERMINAL* window will display:

Initiating EEPROM. Please wait...

Wait for the LED to turn **ON** and the following menu to appear.

Download Table Now...

Press Escape When The PI-Ms LED Stops Flashing.

IMPORTANT: DO NOT press <Esc> until the following instructions have been completed.

From the *TERMINAL* Window Menu Bar:

Select	<u>T</u> ransfers
Select	<u>S</u> end Text File...

Select the user defined data table as previously saved in *NOTEPAD*.

The LED in the PI-M will flash while data is being transferred. When it stops flashing press the **<Esc>** key. Press any key to return to the Configuration Menu.

To verify the table has been loaded correctly:

Select **2=Upload User Table (PI-M -> Computer)**

The (x input,output) co-ordinates in the EEPROM will scroll in the *TERMINAL* window. (Note: Some of the values scrolled will have up to a 0.002% offset due to rounding.) The table will be followed by some extra pairs of 0,0 co-ordinates, signifying the end of the table.

If the co-ordinates differ more than a 0.002% from the **.txt** file downloaded, recheck the following, and download the **.txt** file again.

- The COMMS port configuration.
- The PI-RAC is connected to the PI-M correctly.
- The PI-RAC is connected to the PC correctly.
- The **.txt** file was selected correctly.

Running the PI-M With the User Curve.

Select Maths Function **30** (*User Defined Curve*) ie Set **S3-MATHS** dip switch on the PI-M to **011110** (0=off, 1=on). Reset the PI-M by shorting the two header pins behind the **S4-INPUT** dip switch. The *TERMINAL* window will display:

PI-M REV.....

Mode 30 (User Function)

The LED will flash, signifying the PI-M is running. Turn the PI-M off, and disconnect the PI-RAC and the PC. Install the PI-M as set out on the following page.

PI-M Programming Instructions - Pressure Compensated Steam Flow.

The PI-M allows a user to linearise outputs for PCSFs, by being able to enter the following parameters:

The 100% input value,

The design pressure,

Linearisation.

Requirements.

PI-M	Isolated transmitter with correct power supply.
PI-RAC	PI-M to RS-232 interface.
PC Computer	With spare RS-232 port.
Windows	Installed on the PC.

IMPORTANT: The RS-232 port is NOT isolated from the PI-M.
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Computer Setup.

Important: The power to the PI-M must be turned OFF before connecting the COMMS lead.

Connect the 10 pin (5 X 2) header socket to the PI-RAC, with the RED stripe on the cable aligning with the large dot on the PI-M PCB. Connect the other end of the PI-RAC to an unused RS-232 communications port on the computer. (Usually COM2.)

Programming PCSF Values.

Note: If the PI-M was previously set up with a *User Defined Curve*, the (X,Y) values will be over written when PCSF values are entered.

X Input = Steam Flow.

Y Input = Steam Pressure

Select Maths Function 33 (*PCSF*) ie. Set the **S3-MATHS** dip switch on the PI-M to **100001** (0=off, 1-on). Power the PI-M. The PCSF menu will appear in the *TERMINAL* window, with the current settings displayed.

To change the design pressure value *Select '1'*, type in the new value, and press <Enter>.

To change the 100% input pressure value *Select '2'*, type in the new 100% value, and press <Enter>.

To linearise *Select '3'*, type in 'Y' to select linearisation. (Linearisation = Square Root Extraction.)

Note: All pressure values are to be entered as kPa units.

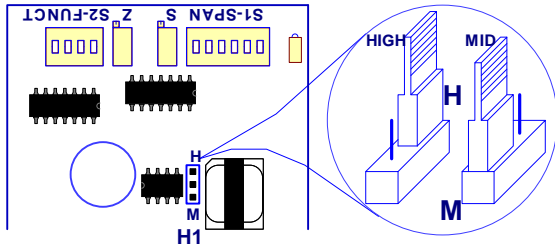
Running the PI-M With the PCSF Values.

Select Maths Function **32** (*PCSF*) ie Set **S3-MATHS** dip switch on the PI-M to **000001** (0=off, 1=on). Reset the PI-M by shorting the two header pins behind the **S4-INPUT** dip switch. The PC will display the current settings.

PI-M H1 Power Supply Jumper Settings.



WARNING: High Voltages Maybe Present.
Only adjust jumper with power disconnected.



Power Supply Jumper Settings	
H1	Power Supply Voltage Range
H	Link for High: 85~264Vac/dc
M	Link for Mid: 22~85Vac/dc

Notes:

- 1/ H1 is approx 4cm (1½") behind the 'S' trimpot.
- 2/ Exceeding voltage ranges may damage the unit.
- 3/ Ensure the enclosure label is correctly labelled for the jumper position.
- 4/ Adjust H1 jumper with a pair of needle nose pliers.
- 5/ Low Voltage Power Supply version is fixed, and has no jumper.
This must be ordered separately.

Output Range Programming Table.

Notes: 1/ Switch status 1 = ON 0 = OFF
2/ Output ranges with '*' beside them reverse the polarity of the output connections.

Output Range (V)	S1-SPAN						S2-Function				Output Range (I)	S1-SPAN						S2-Function			
	1	2	3	4	5	6	1	2	3	4		1	2	3	4	5	6	1	2	3	4
0~500mV	0	1	1	1	1	1	0	0	1	1	0~1mA	0	1	1	1	1	1	0	0	0	0
0~1V	1	0	1	1	1	1	0	0	1	1	0~2mA	1	0	1	1	1	1	0	0	0	0
0~2V	1	1	0	1	1	1	0	0	1	1	0~5mA	0	1	0	1	1	1	0	0	0	0
0~3V	1	0	0	1	1	1	0	0	1	1	0~10mA	1	0	1	0	1	1	0	0	0	0
0~4V	1	1	1	0	1	1	0	0	1	1	0~16mA	1	1	1	1	0	1	0	0	0	0
0~5V	1	0	1	0	1	1	0	0	1	1	0~20mA	1	1	0	1	0	1	0	0	0	0
0~6V	1	1	0	0	1	1	0	0	1	1	1~5mA	1	1	0	1	1	1	1	0	0	0
0~8V	1	1	1	1	0	1	0	0	1	1	2~10mA	1	1	1	0	1	1	1	0	0	0
0~10V	1	1	0	1	0	1	0	0	1	1	4~20mA	1	1	1	1	0	1	1	0	0	0
0~12V	1	1	1	0	0	1	0	0	1	1	-1~1mA	1	0	1	1	1	1	0	1	0	0
1~5V	1	1	1	0	1	1	1	0	1	1	-2~2mA	1	1	0	1	1	1	0	1	0	0
2~10V	1	1	1	1	0	1	1	0	1	1	-5~5mA	1	0	1	0	1	1	0	1	0	0
-1~1V	1	1	0	1	1	1	0	1	1	1	-10~10mA	1	1	0	1	0	1	0	1	0	0
-2~2V	1	1	1	0	1	1	0	1	1	1	-20~20mA	1	1	1	0	1	0	0	1	0	0
-5~5V	1	1	0	1	0	1	0	1	1	1	0~-10mA *	1	0	1	0	1	1	0	0	0	0
-10~10V	1	1	1	0	1	0	0	1	1	1	0~-20mA *	1	1	0	1	0	1	0	0	0	0
-12~12V	1	1	1	1	0	0	0	1	1	1											
0~-5V *	1	0	1	0	1	1	0	0	1	1											
0~-10V *	1	1	0	1	0	1	0	0	1	1											

The Proper Installation & Maintenance of PI-M.

Note. All power and signals must be de-energised before connecting any wiring, altering any jumpers or DIP switches, or inserting or removing the PI unit from it's base.

MOUNTING.

- (1) Mount in a clean environment in an electrical cabinet on 35mm, symmetrical, mousing rail.
- (2) Draft holes must have minimum free air space of 20mm. Foreign matter must not enter or block draft holes.
- (3) Do not subject to vibration or excess temperature or humidity variations.
- (4) Avoid mounting in cabinets with power control equipment.
- (5) To maintain compliance with the EMC Directives the PI-M is to be mounted in a fully enclosed steel cabinet. The cabinet must be properly earthed, with appropriate input / output entry points and cabling.

WIRING.

- (1) A readily accessible disconnect device and a 1A, 250Vac overcurrent device, must be in the power supply wiring.
- (2) All cables should be good quality overall screened INSTRUMENTATION CABLE with the screen earthed at one end only.
- (3) Signal Cables should be laid a minimum distance of 300mm from any power cables.
- (4) For 2 wire current loops and 2 wire voltage signals or 2 wire current signals, Austral Standard Cables B5102ES is recommended. For 3 wire transmitters Austral Standard Cables B5103ES is recommended.
- (5) It is recommended that you do not ground current loops and use power supplies with ungrounded outputs.
- (6) Lightning arrestors should be used when there is a danger from this source.
- (7) Refer to diagrams for connection information.

COMMISSIONING.

- (1) Once all the above conditions have been carried out and the wiring checked apply power to the PI-M and allow five minutes for it to stabilize.
- (2) Take a low (approx 10%) and high (approx 90%) reading of the variable being measured by the transducer supplying the signal to the PI-M, and ensure that this agrees with the level being indicated by the PLC or indicator, etc, that the PI-M is connected into. Adjust for any difference using the Zero and Span Pots in the top of the PI-M enclosure with a small screwdriver until the two levels agree. (Clockwise to increase the output reading and anti-clockwise to decrease the output reading.)

MAINTENANCE.

- (1) Repeat (2) of Commissioning.
- (2) Do it regularly - at least once every 12 months.

Intech INSTRUMENTS LTD
www.intech.co.nz
 Christchurch Ph: +64 3 343 0646
 Auckland Ph: 09 827 1930
 Email: sales@intech.co.nz