

AIMS-4/8X

4 / 8 Channel DIN-Rail Analog Input Modules
 MODBUS over RS485 Serial Interface
 (Single-Ended & Differential Input Versions)

Operation Manual

This brief manual is primarily meant for quick reference to wiring connections and parameter searching. For more details on operation and application; please log on to www.ppiindia.net



Input Registers (Read-Only Parameters)														
Parameter	MODBUS Address	Values												
Process Value	1561 to 1564 (4 Channels)	<table border="1"> <tr><th>Value</th><th>PV Error Type</th></tr> <tr><td>-32768</td><td>Under Range</td></tr> <tr><td>+32752</td><td>Over Range</td></tr> <tr><td>+32767</td><td>Sensor Open</td></tr> </table>	Value	PV Error Type	-32768	Under Range	+32752	Over Range	+32767	Sensor Open				
	Value	PV Error Type												
-32768	Under Range													
+32752	Over Range													
+32767	Sensor Open													
	1561 to 1568 (8 Channels)													
Alarm-1 Status	1577	<table border="1"> <tr><th>Bit 15</th><th>Bit 14</th><th>Bit 13</th><th>Bit 12</th><th>Bit 11</th><th>Bit 10</th></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> <p>(X = 1, 2, 3, 4) Alarm-X Status for Channel-1 Alarm-X Status for Channel-2 Alarm-X Status for Channel-8</p>	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10						
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10									
Alarm-2 Status	1578													
Alarm-3 Status	1579													
Alarm-4 Status	1580													
Ambient Temperature	82	<p>Signed integer values from -30000 to +30000 representing the measured Ambient Temperature through the semi-conductor sensor mounted on the Module.</p> <p>The measured value is always in °C with 0.1 resolution. For example, 30.0°C is represented as 300.</p>												

Holding Registers (Read / Write Parameters)																																						
Parameter	MODBUS Address	Settings (Default Value)																																				
Input Type	83 to 86 (4 Channels)	<p>Applicable for Input Type TC / RTD Pt100 / V / mV / mA</p> <table border="1"> <tr><th>Value</th><th>Type</th></tr> <tr><td>0</td><td>Type J Thermocouple</td></tr> <tr><td>1</td><td>Type K Thermocouple</td></tr> <tr><td>2</td><td>Type T Thermocouple</td></tr> <tr><td>3</td><td>Type R Thermocouple</td></tr> <tr><td>4</td><td>Type S Thermocouple</td></tr> <tr><td>5</td><td>Type B Thermocouple</td></tr> <tr><td>6</td><td>Type N Thermocouple</td></tr> <tr><td>7</td><td>Reserved TC (Default: Type J)</td></tr> <tr><td>8</td><td>RTD Pt100, 3-wire</td></tr> <tr><td>9</td><td>0 to 20 mA</td></tr> <tr><td>10</td><td>4 to 20 mA</td></tr> <tr><td>11</td><td>0 to 80 mV</td></tr> <tr><td>12</td><td>Reserved (Default: 0 to 80 mV)</td></tr> <tr><td>13</td><td>0 to 1.25 V</td></tr> <tr><td>14</td><td>0 to 5 V</td></tr> <tr><td>15</td><td>0 to 10 V</td></tr> <tr><td>16</td><td>1 to 5 V</td></tr> </table> <p>(Default : Type K)</p>	Value	Type	0	Type J Thermocouple	1	Type K Thermocouple	2	Type T Thermocouple	3	Type R Thermocouple	4	Type S Thermocouple	5	Type B Thermocouple	6	Type N Thermocouple	7	Reserved TC (Default: Type J)	8	RTD Pt100, 3-wire	9	0 to 20 mA	10	4 to 20 mA	11	0 to 80 mV	12	Reserved (Default: 0 to 80 mV)	13	0 to 1.25 V	14	0 to 5 V	15	0 to 10 V	16	1 to 5 V
	Value	Type																																				
0	Type J Thermocouple																																					
1	Type K Thermocouple																																					
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13	0 to 1.25 V																																					
14	0 to 5 V																																					
15	0 to 10 V																																					
16	1 to 5 V																																					
	83 to 90 (8 Channels)																																					
		<p>Applicable for Input Type RTD Pt100</p> <table border="1"> <tr><th>Value</th><th>Type</th></tr> <tr><td>0</td><td>RTD Pt100, 3-wire (This is a Read Only parameter)</td></tr> </table>	Value	Type	0	RTD Pt100, 3-wire (This is a Read Only parameter)																																
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0	RTD Pt100, 3-wire (This is a Read Only parameter)																																					
		<p>Applicable for Input Type TC / mV</p> <table border="1"> <tr><th>Value</th><th>Type</th></tr> <tr><td>0</td><td>Type J Thermocouple</td></tr> <tr><td>1</td><td>Type K Thermocouple</td></tr> <tr><td>2</td><td>Type T Thermocouple</td></tr> <tr><td>3</td><td>Type R Thermocouple</td></tr> <tr><td>4</td><td>Type S Thermocouple</td></tr> <tr><td>5</td><td>Type B Thermocouple</td></tr> <tr><td>6</td><td>Type N Thermocouple</td></tr> <tr><td>7</td><td>Reserved TC (Default: Type J)</td></tr> <tr><td>8</td><td>0 to 80 mV</td></tr> </table> <p>(Default : Type K)</p>	Value	Type	0	Type J Thermocouple	1	Type K Thermocouple	2	Type T Thermocouple	3	Type R Thermocouple	4	Type S Thermocouple	5	Type B Thermocouple	6	Type N Thermocouple	7	Reserved TC (Default: Type J)	8	0 to 80 mV																
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7	Reserved TC (Default: Type J)																																					
8	0 to 80 mV																																					

Parameter	MODBUS Address	Settings (Default Value)																								
Input Type	83 to 86 (4 Channels)	<p>Applicable for Input Type V / mA</p> <table border="1"> <tr><th>Value</th><th>Type</th></tr> <tr><td>0</td><td>0 to 20 mA</td></tr> <tr><td>1</td><td>4 to 20 mA</td></tr> <tr><td>2</td><td>0 to 1.25 V</td></tr> <tr><td>3</td><td>0 to 5 V</td></tr> <tr><td>4</td><td>0 to 10 V</td></tr> <tr><td>5</td><td>1 to 5 V</td></tr> </table> <p>(Default : 4 to 20 mA)</p>	Value	Type	0	0 to 20 mA	1	4 to 20 mA	2	0 to 1.25 V	3	0 to 5 V	4	0 to 10 V	5	1 to 5 V										
	Value	Type																								
0	0 to 20 mA																									
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3	0 to 5 V																									
4	0 to 10 V																									
5	1 to 5 V																									
	83 to 90 (8 Channels)																									
Temperature Units	99 to 102 (4 Channels) 99 to 106 (8 Channels)	<p>Conditional Parameter ^(Note 2)</p> <table border="1"> <tr><th>Value</th><th>Unit</th></tr> <tr><td>0</td><td>°C</td></tr> <tr><td>1</td><td>°F</td></tr> </table> <p>(Default : °C)</p>	Value	Unit	0	°C	1	°F																		
Value	Unit																									
0	°C																									
1	°F																									
DC Resolution ^(Note 1)	115 to 118 (4 Channels) 115 to 122 (8 Channels)	<p>Conditional Parameter ^(Note 2)</p> <table border="1"> <tr><th>Value</th><th>Resolution</th></tr> <tr><td>0</td><td>1</td></tr> <tr><td>1</td><td>0.1</td></tr> <tr><td>2</td><td>0.01</td></tr> <tr><td>3</td><td>0.001</td></tr> <tr><td>4</td><td>0.0001</td></tr> </table> <p>(Default : 1 Unit)</p>	Value	Resolution	0	1	1	0.1	2	0.01	3	0.001	4	0.0001												
Value	Resolution																									
0	1																									
1	0.1																									
2	0.01																									
3	0.001																									
4	0.0001																									
Signal Low	501 to 504 (4 Channels)	<p>Conditional Parameter ^(Note 2)</p> <table border="1"> <tr><th>Input Type</th><th>Settings</th><th>Default</th></tr> <tr><td>0 to 20 mA</td><td>0.00 to Signal High</td><td>0.00</td></tr> <tr><td>4 to 20 mA</td><td>4.00 to Signal High</td><td>4.00</td></tr> <tr><td>0 to 80 mV</td><td>0.00 to Signal High</td><td>0.00</td></tr> <tr><td>0 to 1.25 V</td><td>0.000 to Signal High</td><td>0.000</td></tr> <tr><td>0 to 5 V</td><td>0.000 to Signal High</td><td>0.000</td></tr> <tr><td>0 to 10 V</td><td>0.00 to Signal High</td><td>0.00</td></tr> <tr><td>1 to 5 V</td><td>1.000 to Signal High</td><td>1.000</td></tr> </table>	Input Type	Settings	Default	0 to 20 mA	0.00 to Signal High	0.00	4 to 20 mA	4.00 to Signal High	4.00	0 to 80 mV	0.00 to Signal High	0.00	0 to 1.25 V	0.000 to Signal High	0.000	0 to 5 V	0.000 to Signal High	0.000	0 to 10 V	0.00 to Signal High	0.00	1 to 5 V	1.000 to Signal High	1.000
	Input Type	Settings	Default																							
0 to 20 mA	0.00 to Signal High	0.00																								
4 to 20 mA	4.00 to Signal High	4.00																								
0 to 80 mV	0.00 to Signal High	0.00																								
0 to 1.25 V	0.000 to Signal High	0.000																								
0 to 5 V	0.000 to Signal High	0.000																								
0 to 10 V	0.00 to Signal High	0.00																								
1 to 5 V	1.000 to Signal High	1.000																								
	501 to 508 (8 Channels)																									
Signal High	517 to 520 (4 Channels)	<p>Conditional Parameter ^(Note 2)</p> <table border="1"> <tr><th>Input Type</th><th>Settings</th><th>Default</th></tr> <tr><td>0 to 20 mA</td><td>Signal Low to 20.00</td><td>20.00</td></tr> <tr><td>4 to 20 mA</td><td>Signal Low to 20.00</td><td>20.00</td></tr> <tr><td>0 to 80 mV</td><td>Signal Low to 80.00</td><td>80.00</td></tr> <tr><td>0 to 1.25 V</td><td>Signal Low to 1.250</td><td>1.250</td></tr> <tr><td>0 to 5 V</td><td>Signal Low to 5.000</td><td>5.000</td></tr> <tr><td>0 to 10 V</td><td>Signal Low to 10.00</td><td>10.00</td></tr> <tr><td>1 to 5 V</td><td>Signal Low to 5.000</td><td>5.000</td></tr> </table>	Input Type	Settings	Default	0 to 20 mA	Signal Low to 20.00	20.00	4 to 20 mA	Signal Low to 20.00	20.00	0 to 80 mV	Signal Low to 80.00	80.00	0 to 1.25 V	Signal Low to 1.250	1.250	0 to 5 V	Signal Low to 5.000	5.000	0 to 10 V	Signal Low to 10.00	10.00	1 to 5 V	Signal Low to 5.000	5.000
	Input Type	Settings	Default																							
0 to 20 mA	Signal Low to 20.00	20.00																								
4 to 20 mA	Signal Low to 20.00	20.00																								
0 to 80 mV	Signal Low to 80.00	80.00																								
0 to 1.25 V	Signal Low to 1.250	1.250																								
0 to 5 V	Signal Low to 5.000	5.000																								
0 to 10 V	Signal Low to 10.00	10.00																								
1 to 5 V	Signal Low to 5.000	5.000																								
	517 to 524 (8 Channels)																									
Range Low	131 to 134 (4 Channels) 131 to 138 (8 Channels)	<p>Conditional Parameter ^(Note 2)</p> <p>-30000 to 30000 (Default : 0)</p>																								
Range High	147 to 150 (4 Channels) 147 to 154 (8 Channels)	<p>Conditional Parameter ^(Note 2)</p> <p>-30000 to 30000 (Default : 1000)</p>																								
Offset for PV ^(Note 1)	163 to 166 (4 Channels) 163 to 170 (8 Channels)	<p>-30000 to 30000 (Default : 0)</p>																								
Alarm-1 Type	179 to 182 (4 Channels) 179 to 186 (8 Channels)																									
Alarm-2 Type	243 to 246 (4 Channels)	<table border="1"> <tr><th>Value</th><th>Type</th></tr> <tr><td>0</td><td>None</td></tr> <tr><td>1</td><td>Process Low</td></tr> <tr><td>2</td><td>Process High</td></tr> </table> <p>(Default : None)</p>	Value	Type	0	None	1	Process Low	2	Process High																
	Value	Type																								
0	None																									
1	Process Low																									
2	Process High																									
	243 to 250 (8 Channels)																									
Alarm-3 Type	307 to 310 (4 Channels)																									
	307 to 314 (8 Channels)																									
Alarm-4 Type	371 to 374 (4 Channels)																									
	371 to 378 (8 Channels)																									

Parameter	MODBUS Address	Settings (Default Value)																
Alarm-1 Set-point ^(Note 1)	195 to 198 (4 Channels) 195 to 202 (8 Channels)	<p>Min. to Max. Range specified for the selected Input Type Refer Table 1</p> <p>(Default : Min or Max Range depending on the Alarm type)</p>																
Alarm-2 Set-point ^(Note 1)	259 to 262 (4 Channels) 259 to 266 (8 Channels)																	
Alarm-3 Set-point ^(Note 1)	323 to 326 (4 Channels) 323 to 330 (8 Channels)																	
Alarm-4 Set-point ^(Note 1)	387 to 390 (4 Channels) 387 to 394 (8 Channels)																	
Alarm-1 Hysteresis ^(Note 1)	211 to 214 (4 Channels) 211 to 218 (8 Channels)	<p>1 to 30000 (Default : 20)</p>																
Alarm-2 Hysteresis ^(Note 1)	275 to 278 (4 Channels) 275 to 282 (8 Channels)																	
Alarm-3 Hysteresis ^(Note 1)	339 to 342 (4 Channels) 339 to 346 (8 Channels)																	
Alarm-4 Hysteresis ^(Note 1)	403 to 406 (4 Channels) 403 to 410 (8 Channels)																	
Alarm-1 Inhibit	227 to 230 (4 Channels) 227 to 234 (8 Channels)	<table border="1"> <tr><th>Value</th><th>Inhibit</th></tr> <tr><td>0</td><td>Disable</td></tr> <tr><td>1</td><td>Enable</td></tr> </table> <p>(Default : Disable)</p>	Value	Inhibit	0	Disable	1	Enable										
Value	Inhibit																	
0	Disable																	
1	Enable																	
Alarm-2 Inhibit	291 to 294 (4 Channels) 291 to 298 (8 Channels)																	
Alarm-3 Inhibit	355 to 358 (4 Channels) 355 to 362 (8 Channels)																	
Alarm-4 Inhibit	419 to 422 (4 Channels) 419 to 426 (8 Channels)																	
Enable Bottom Clipping	435 to 438 (4 Channels) 435 to 442 (8 Channels)	<table border="1"> <tr><th>Value</th><th>Enable</th></tr> <tr><td>0</td><td>No</td></tr> <tr><td>1</td><td>Yes</td></tr> </table> <p>(Default : No)</p>	Value	Enable	0	No	1	Yes										
Value	Enable																	
0	No																	
1	Yes																	
Bottom Clip Value	451 to 454 (4 Channels) 451 to 458 (8 Channels)	-30000 to 30000 (Default : 0)																
Enable Top Clipping	467 to 470 (4 Channels) 467 to 474 (8 Channels)	<table border="1"> <tr><th>Value</th><th>Enable</th></tr> <tr><td>0</td><td>No</td></tr> <tr><td>1</td><td>Yes</td></tr> </table> <p>(Default : No)</p>	Value	Enable	0	No	1	Yes										
Value	Enable																	
0	No																	
1	Yes																	
Top Clip Value	483 to 486 (4 Channels) 483 to 490 (8 Channels)	-30000 to 30000 (Default : 1000)																
CONFIGURING COMMUNICATION PARAMETERS																		
Parameter	MODBUS Address	Settings (Default Value)																
Modbus Slave ID	1	1 to 247 (Default : 1)																
Baud Rate	2	<table border="1"> <tr><th>Value</th><th>Baud Rate</th></tr> <tr><td>0</td><td>2400 bps</td></tr> <tr><td>1</td><td>4800 bps</td></tr> <tr><td>2</td><td>9600 bps</td></tr> <tr><td>3</td><td>19200 bps</td></tr> <tr><td>4</td><td>38400 bps</td></tr> <tr><td>5</td><td>57600 bps</td></tr> <tr><td>6</td><td>115200 bps</td></tr> </table> <p>(Default : 9600 bps)</p>	Value	Baud Rate	0	2400 bps	1	4800 bps	2	9600 bps	3	19200 bps	4	38400 bps	5	57600 bps	6	115200 bps
		Value	Baud Rate															
0	2400 bps																	
1	4800 bps																	
2	9600 bps																	
3	19200 bps																	
4	38400 bps																	
5	57600 bps																	
6	115200 bps																	
Parity	3	<table border="1"> <tr><th>Value</th><th>Parity</th></tr> <tr><td>0</td><td>None</td></tr> <tr><td>1</td><td>Even</td></tr> <tr><td>2</td><td>Odd</td></tr> </table> <p>(Default : Even)</p>	Value	Parity	0	None	1	Even	2	Odd								
		Value	Parity															
0	None																	
1	Even																	
2	Odd																	

Note 1

Thermocouples (J, K, T, R, S, B, N) and RTD Pt100 (3-wire) Inputs

The process value is always measured in 0.1°C/°F resolution. That is, for example, the value 300 means 30.0°C / °F.

The same should be followed while setting the values for the parameters that are resolution based (like Zero Offset, Alarm Set-point, Alarm Hysteresis, etc.). That is for example, set 300 counts for 30.0°C / °F.

DC mA / mV / V Inputs

(Also Refer Appendix A : DC Linear Signal Interface)

The measured PV is a Resolution-less Scaled Value derived using the values for the parameters : Signal Low, Signal High, Range Low and Range High. The parameter 'DC Resolution' holds the desired resolution that can be used to insert *appropriate Decimal Place* in the scaled PV. For example, if the DC Resolution value is 2 (0.01) then the scaled value of 3000 can be read as 30.00.

Similarly the corresponding parameters like Zero Offset, Alarm Set-point, Alarm Hysteresis, etc., are also resolution less and, if desired, the parameter value for 'DC Resolution' should be used for *appropriate Decimal Place*.

Note 2

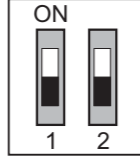
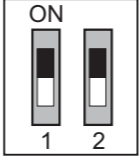
Conditional Parameters are those whose usage depend upon the values set for some other parameters. For example; the parameters 'Signal Low' & 'Signal High' for a selected channel are used only if the input type for the selected channel is DC Input (mV / V / mA). The access to the conditional parameters for Read / Write operation, however, is not restricted.

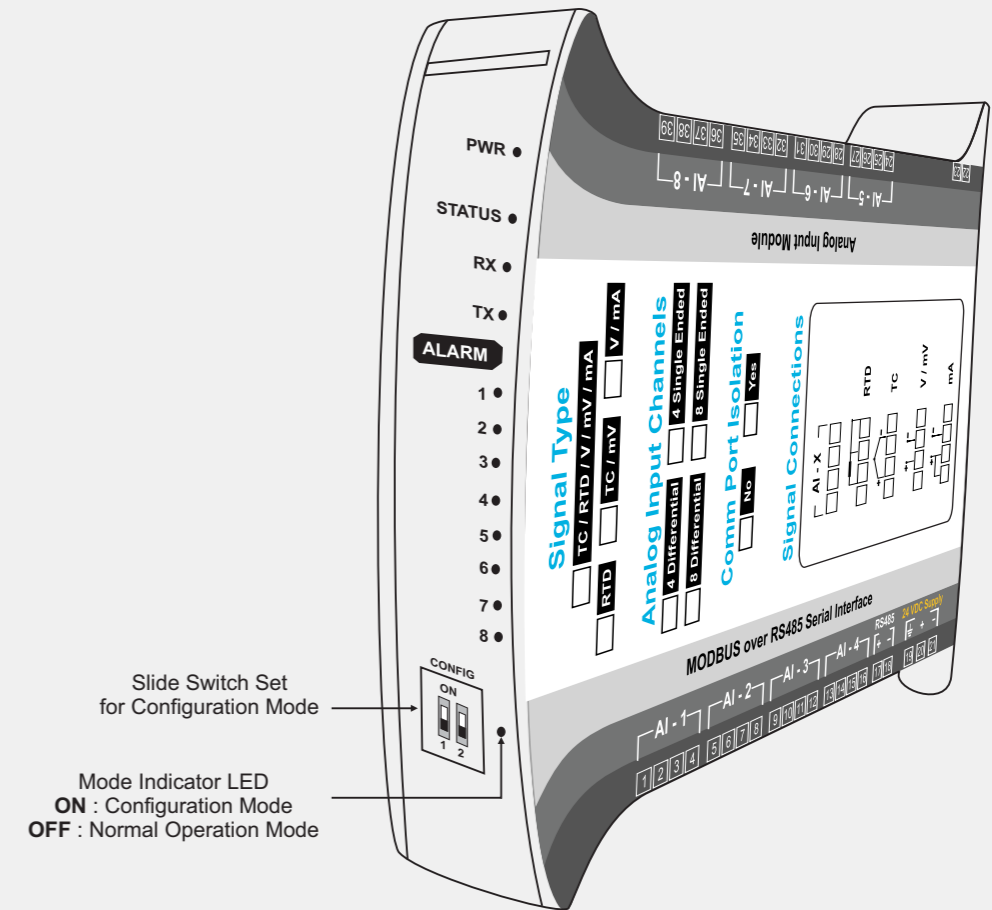
Table 1			
Input Type	Range (Min. to Max.)	Resolution	
Type J Thermocouple	0 to +960.0°C / +32.0 to +1760.0°F	0.1 °C / °F	
Type K Thermocouple	-200.0 to +1376.0°C / -328.0 to +2508.0°F		
Type T Thermocouple	-200.0 to +387.0°C / -328.0 to +728.0°F		
Type R Thermocouple	0 to +1771.0°C / +32.0 to +3219.0°F		
Type S Thermocouple	0 to +1768.0°C / +32.0 to +3214.0°F		
Type B Thermocouple	0 to +1826.0°C / +32.0 to +3218.0°F		
Type N Thermocouple	0 to +1314.0°C / +32.0 to +2397.0°F		
3-wire, RTD Pt100	-199.0 to +600.0°C / -328.0 to +1112.0°F		
0 to 20mA DC current	-30000 to 30000 units		1
4 to 20mA DC current			0.1
0 to 80mV DC voltage		0.01	
0 to 1.25V DC voltage		0.001	
0 to 5.0V DC voltage		0.0001	
0 to 10.0V DC voltage		Units	
1 to 5.0V DC voltage			

PPI

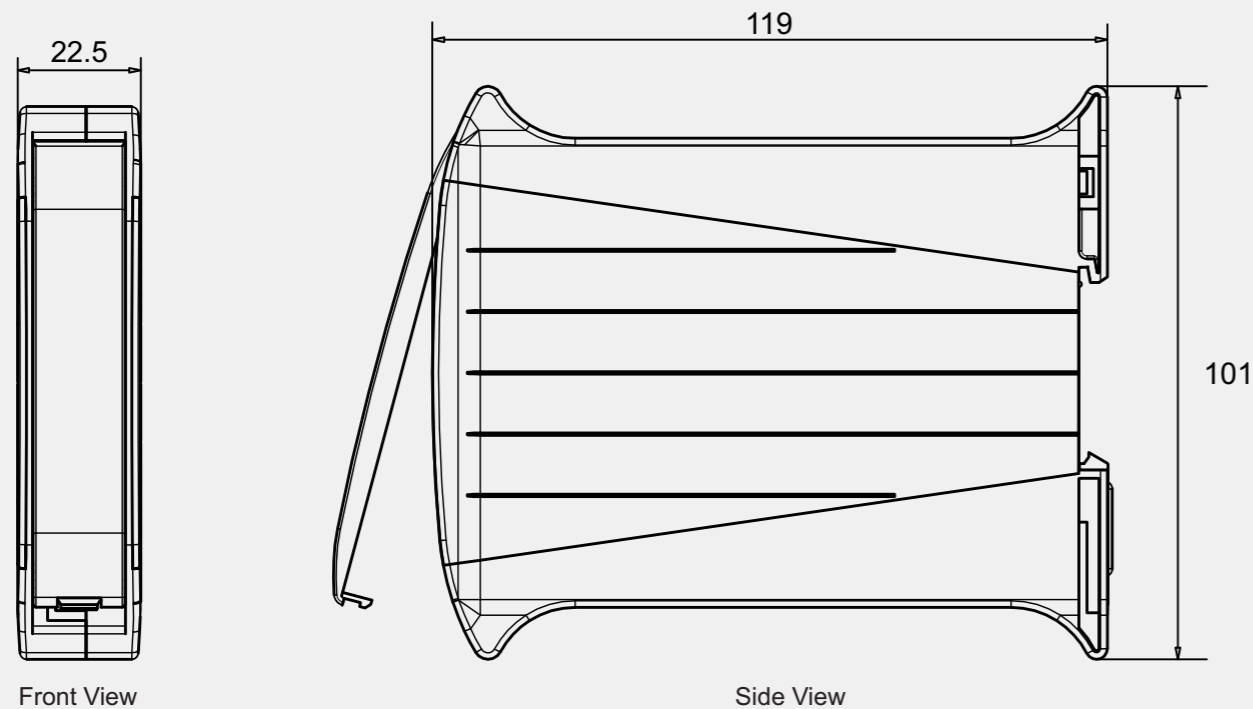
101, Diamond Industrial Estate, Navghar,
 Vasai Road (E), Dist. Palghar - 401 210.
 T: 0250 - 2391722/33/37/42
 M: 07498799226
 09321985369
 E: sales@ppiindia.net,
support@ppiindia.net

CONFIGURING COMMUNICATION

Switch Position	 Down	 Up
Mode Indicator	OFF	ON
Operation Mode	Normal	Configuration
Communication Parameter Values	User Set values for Module Slave ID, Baud Rate & Parity	Module Slave ID : 1 Baud Rate : 9600 Parity : Even



OVERALL DIMENSION

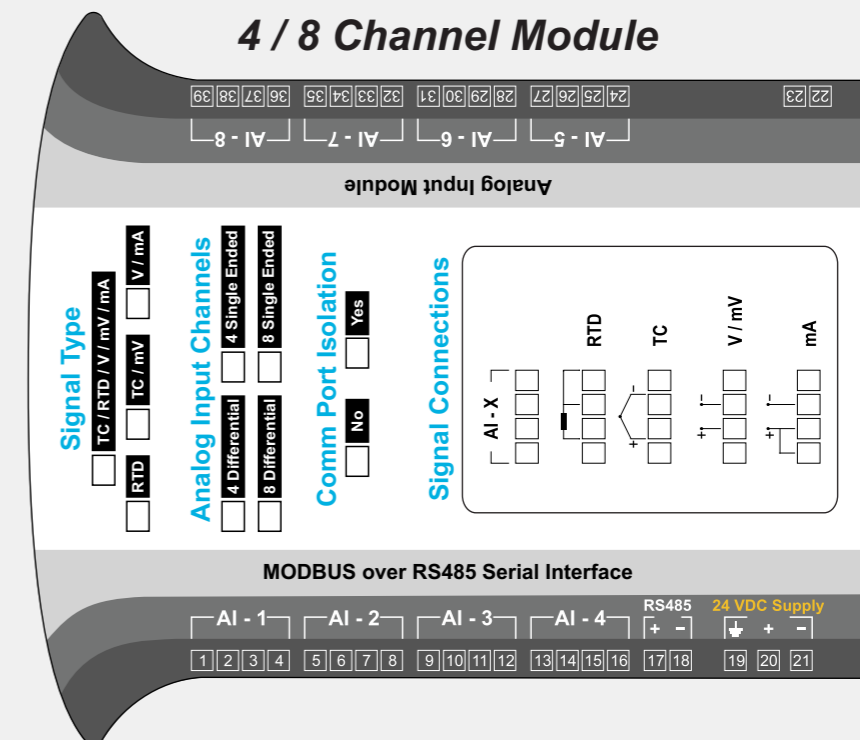


Width (W) : 22.5 mm

Height (H) : 101.0 mm

Depth (D) : 119.0 mm

ELECTRICAL CONNECTIONS



Note : For 4 Channel Version the connectors for AI-5 to AI-8 are not fitted.