COMS40C4

4 AI + 12 DI + 4 DO
DIN-Rail Mount, MODBUS over Serial
18~32 VDC Operated

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

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Analog Inputs

Input Registers (Read-Only Parameters)

Parameter	MODBUS Address	Values
Process Value (Signed 16 Bit Integer)	1561 (AI-1) to 1564 (AI-4)	The following constant counts indicate PV Errors.
Process Value (Single Precision 32 Bit Float)	2001 (AI-1) to 2008 (AI-4)	

Value	PV Error Type
-32768	Under Range
+32752	Over Range
+32767	Sensor Open

Alarm Status as Bit-Mapped Input Register

Alarm-1 Status	1577	Bit 15 . . . . . Bit 3 Bit 2 Bit 1 Bit 0 **(n = 1, 2, 3, 4)**
Alarm-2 Status	1578	Ignore Bit-4 to Bit-15
Alarm-3 Status	1579	Alarm-n Status for AI-1 / AI-2 / AI-3 / AI-4
Alarm-4 Status	1580	

Bit Value	Status
0	Alarm OFF
1	Alarm ON

Alarm Status as Discrete Inputs / Coils

Alarm-1 Status *Function Code (0x01 & 0x02)*	417 (AI-1) to 420 (AI-4)	
Alarm-2 Status *Function Code (0x01 & 0x02)*	433 (AI-1) to 436 (AI-4)	
Alarm-3 Status *Function Code (0x01 & 0x02)*	449 (AI-1) to 452 (AI-4)	
Alarm-4 Status *Function Code (0x01 & 0x02)*	465 (AI-1) to 468 (AI-4)	

Coil Value	Status
0	Alarm OFF
1	Alarm ON

Digital Filter	1612 (AI-1) to 1615 (AI-4)	0 to 90% (Default : 0%)
Ambient Temperature	82	Signed integer values from -30000 to +30000 representing the measured Ambient Temperature through the semi-conductor sensor mounted on the Module. The measured value is always in °C with 0.1 resolution. For example, 30.0°C is represented as 300.

Holding Registers (Read / Write Parameters)

Parameter	MODBUS Address	Settings (Default Value)
Input Type	83 (AI-1) to 86 (AI-4)	

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	Type E Thermocouple
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

(Default : 0 to 10 V)

Temperature Units	99 (AI-1) to 102 (AI-4)	**Conditional Parameter**

Value	Unit
0	°C
1	°F

(Default : °C)

Parameter	MODBUS Address	Settings (Default Value)
DC Resolution	115 (AI-1) to 118 (AI-4)	**Conditional Parameter**

Value	Resolution
0	1
1	0.1
2	0.01
3	0.001
4	0.0001

(Default : 1 Unit for DC Linear input & 0.1 for Thermocouple & RTD)

Signal Low	501 (AI-1) to 504 (AI-4)	**Conditional Parameter**

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

Signal High	517 (AI-1) to 520 (AI-4)	**Conditional Parameter**

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

Range Low	131 (AI-1) to 134 (AI-4)	**Conditional Parameter** -30000 to 30000 (Default : 0)
Range High	147 (AI-1) to 150 (AI-4)	**Conditional Parameter** -30000 to 30000 (Default : 1000)
Offset for PV	163 (AI-1) to 166 (AI-4)	-30000 to 30000 (Default : 0)
Alarm-1 Type	179 (AI-1) to 182 (AI-4)	
Alarm-2 Type	243 (AI-1) to 246 (AI-4)	
Alarm-3 Type	307 (AI-1) to 310 (AI-4)	
Alarm-4 Type	371 (AI-1) to 374 (AI-4)	

Value	Type
0	None
1	Process Low
2	Process High

(Default : None)

Alarm-1 Set-point	195 (AI-1) to 198 (AI-4)	Min. to Max. Range specified for the selected Input Type Refer Table 1
Alarm-2 Set-point	259 (AI-1) to 262 (AI-4)	(Default : Min or Max Range depending on the Alarm type)
Alarm-3 Set-point	323 (AI-1) to 326 (AI-4)	
Alarm-4 Set-point	387 (AI-1) to 390 (AI-4)	
Alarm-1 Hysteresis	211 (AI-1) to 214 (AI-4)	1 to 30000 (Default : 20)
Alarm-2 Hysteresis	275 (AI-1) to 278 (AI-4)	
Alarm-3 Hysteresis	339 (AI-1) to 342 (AI-4)	
Alarm-4 Hysteresis	403 (AI-1) to 406 (AI-4)	

Parameter	MODBUS Address	Settings (Default Value)
Alarm-1 Inhibit	227 (AI-1) to 230 (AI-4)	
Alarm-2 Inhibit	291 (AI-1) to 294(AI-4)	
Alarm-3 Inhibit	355 (AI-1) to 358 (AI-4)	
Alarm-4 Inhibit	419 (AI-1) to 422 (AI-4)	

Value	Inhibit
0	Disable
1	Enable

(Default : Disable)

Enable Bottom Cliping	435 (AI-1) to 438 (AI-4)	

Value	Enable
0	No
1	Yes

(Default : No)

Bottom Clip Value	451(AI-1) to 454 (AI-4)	-30000 to 30000 (Default : 0)
Enable Top Cliping	467 (AI-1) to 470 (AI-4)	

Value	Enable
0	No
1	Yes

(Default : No)

Top Clip Value	483 (AI-1) to 486 (AI-4)	-30000 to 30000 (Default : 1000)

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 +3318.0°F	
Type N Thermocouple	0 to +1314.0°C / +32.0 to +2397.0°F	
Type E Thermocouple	-200 to +1000.0°C / -328.0 to +1832.0°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 0.1 0.01 0.001 0.0001 Units
4 to 20mA DC current		
0 to 80mV DC voltage		
0 to 1.25V DC voltage		
0 to 5.0V DC voltage		
0 to 10.0V DC voltage		
1 to 5.0V DC voltage		

Digital Inputs

Modbus Data Type	MODBUS Address	Values
1. Select Digital Input Type *Configuration Parameter (Stored in Non-Volatile memory)*		
Holding Register Function Code (0x06 & 0x10)	2033	

Value	DI Type
0	Dry (Potential-Free) Open / Close Contact **or** Open Drain / Collector (Sink)
1	Wet Open / Close Contact **or** Voltage Level

Default : Dry (Potential-Free) Open / Close Contact **or** Open Drain / Collector (Sink)

2. Instantaneous Digital Input Status (Read-Only Parameters) *Run Time Parameter (Read Only)*		
Bit-Mapped Input or Holding Register *Function Code (0x03 or 0x04)*	38	Bit 15 . . Bit 11 . . Bit 1 Bit 0 → DI-1 Status, DI-2 Status, DI-12 Status. Bits 12 to 15 are unused - ignore

Bit Value	DI Status
0	Contact Open / Logic Low
1	Contact Close / Logic High

Discrete Input (Coils) *Function Code (0x01 & 0x02)*	1 (DI-1) to 12 (DI-12)	

Coil Value	DI Status
0	Contact Open / Logic Low
1	Contact Close / Logic High

Modbus Data Type	MODBUS Address	Values
3 (a). Low-to-High Latched Digital Input Status (Read-Only Parameters) *Run Time Parameter (Read Only)*		
Bit-Mapped Input or Holding Register *Function Code (0x03 or 0x04)*	40	Bit 15 . . Bit 11 . . Bit 1 Bit 0 → DI-1 Low-to-High Latched Status, DI-2 Low-to-High Latched Status, DI-12 Low-to-High Latched Status. Bits 12 to 15 are unused - ignore

Bit Value	DI Status
0	No 'Low-to-High' Transition
1	'Low-to-High' Transition Detected

Discrete Input (Coils) *Function Code (0x01 & 0x02)*	33 (DI-1) to 44 (DI-12)	

Coil Value	DI Status
0	No 'Low-to-High' Transition
1	'Low-to-High' Transition Detected

3 (b). Low-to-High Acknowledge Command *Run Time Parameter (Not Stored in non-volatile memory)*		
Bit-Mapped Holding Register Function Code (0x06 & 0x10)	2101	Bit 15 . . Bit 11 . . Bit 1 Bit 0 → DI-1 Low-to-High Acknowledge, DI-2 Low-to-High Acknowledge, DI-12 Low-to-High Acknowledge. Bits 12 to 15 are unused - ignore

Bit Value	DI Status
0	No Effect
1	'Low-to-High' Status Cleared

Coils Function Code (0x05 & 0x0F)	101 (DI-1) to 112 (DI-12)	

Coil Value	DI Status
0	No Effect
1	'Low-to-High' Status Cleared

4 (a). High-to-Low Latched Digital Input Status (Read-Only Parameters) *Run Time Parameter (Read Only)*		
Bit-Mapped Input or Holding Register *Function Code (0x03 or 0x04)*	42	Bit 15 . . Bit 11 . . Bit 1 Bit 0 → DI-1 High-to-Low Latched Status, DI-2 High-to-Low Latched Status, DI-12 High-to-Low Latched Status. Bits 12 to 15 are unused - ignore

Bit Value	DI Status
0	No 'High-to-Low' Transition
1	'High-to-Low' Transition Detected

Discrete Input (Coils) *Function Code (0x01 & 0x02)*	65 (DI-1) to 76 (DI-12)	

Coil Value	DI Status
0	No 'High-to-Low' Transition
1	'High-to-Low' Transition Detected

4 (b). High-to-Low Acknowledge Command *Run Time Parameter (Not Stored in non-volatile memory)*		
Bit-Mapped Holding Register Function Code (0x06 & 0x10)	2103	Bit 15 . . Bit 11 . . Bit 1 Bit 0 → DI-1 High-to-Low Acknowledge, DI-2 High-to-Low Acknowledge, DI-12 High-to-Low Acknowledge. Bits 12 to 15 are unused - ignore

Bit Value	DI Status
0	No Effect
1	'High-to-Low' Status Cleared

Coils Function Code (0x05 & 0x0F)	133 (DI-1) to 144 (DI-12)	

Coil Value	DI Status
0	No Effect
1	'High-to-Low' Status Cleared

5. Digital Filter *Configuration Parameter (Stored in Non-Volatile memory)*		
Holding Register Function Code (0x06 & 0x10)	2035 (DI-1) to 2046 (DI-12)	1 to 30000 mSec (Default : 10 mSec)

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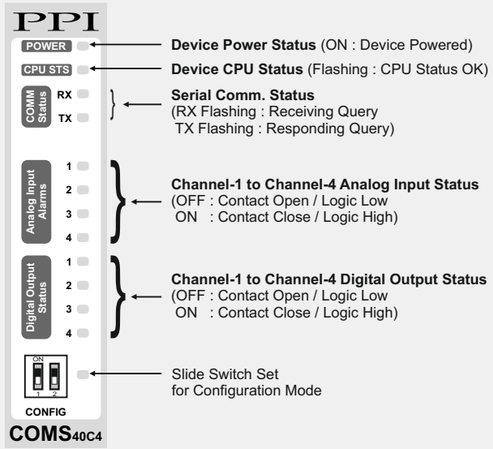
Digital Outputs

Modbus Data Type	MODBUS Address	Values
1. Digital Output Function Modes & Associated Parameters		
Output Status Command Register *Run Time Parameter* Bit-Mapped Holding Register *Function Code (0x06 & 0x10)*	3001	Bit 15 . . Bit 3 Bit 2 Bit 1 Bit 0 → DO-1 Command → DO-2 Command → DO-3 Command → DO-4 Command Bits 4 to 15 are unused - ignore Write Operation (Bit Positions 0 to 3) Bit Value / Mode / DO Status: 1 – On-Off – Output ON 1 – Single Pulse – Start a new pulse or re-trigger a running pulse 1 – Pulse Train – Start / Keep running a Pulse-Train 0 – On-Off – Output OFF 0 – Single Pulse – No effect 0 – Pulse Train – Stop Pulse-Train
Output Status Command Coils Function Code (0x05 & 0x0F)	301 (DO-1) to 304 (DO-4)	Write Operation (Coil Address 301 to 304) Coil Value / Mode / DO Status: 1 – On-Off – Output ON 1 – Single Pulse – Start a new pulse or re-trigger a running pulse 1 – Pulse Train – Start / Keep running a Pulse-Train 0 – On-Off – Output OFF 0 – Single Pulse – No effect 0 – Pulse Train – Stop Pulse-Train
Output Function Mode *Configuration Parameter (Stored in Non-Volatile memory)* Holding Register *Function Code (0x06 & 0x10)*	3008 (DO-1) to 3011 (DO-4)	Value / Function Mode: 0 – ON-OFF 1 – Single Pulse 2 – Pulse Train (Default : ON-OFF Mode)
Pulse-ON Time *Run-Time / Configuration Parameter (Refer Parameter : 'Save Pulse-ON & Pulse-OFF Times to Non-Volatile Memory')* Holding Register *Function Code (0x06 & 0x10)*	3040 (DO-1) to 3043 (DO-4)	**Applicable for 'Single Pulse' & 'Pulse-Train' Mode Only** 0 to 30000 Counts (0.01 to 300 Seconds) ***1 count = 10 milli-Seconds*** (Default : 10 Counts)
Pulse-OFF Time *Run-Time / Configuration Parameter (Refer Parameter : 'Save Pulse-ON & Pulse-OFF Times to Non-Volatile Memory')* Holding Register *Function Code (0x06 & 0x10)*	3072 (DO-1) to 3075 (DO-4)	**Applicable for 'Pulse-Train' Mode Only** 0 to 30000 Counts (0.01 to 300 Seconds) ***1 count = 10 milli-Seconds*** (Default : 10 Counts)
Save Pulse-ON & Pulse-OFF Times to Non-Volatile Memory Holding Register *Function Code (0x06 & 0x10)*	3104	**Applicable for 'Single Pulse' & 'Pulse-Train' Mode Only** Value / Save to Memory: 0 – No 1 – Yes
2. Output Fail-Safe Status		
'Fail-Safe Enable' Register *Configuration Parameter (Stored in Non-Volatile memory)* Bit-Mapped Holding Register *Function Code (0x06 & 0x10)*	3003	Bit 15 . . Bit 3 Bit 2 Bit 1 Bit 0 → DO-1 Fail-Safe Enable / Disable → DO-2 Fail-Safe Enable / Disable → DO-3 Fail-Safe Enable / Disable → DO-4 Fail-Safe Enable / Disable Bits 4 to 15 are unused - ignore Bit Value / Enable / Disable: 0 – Fail-Safe Disable 1 – Fail-Safe Enable (Default : Disable)
'Fail-Safe Enable' Coils Function Code (0x05 & 0x0F)	333 (DO-1) to 336 (DO-4)	Coil Value / Enable / Disable: 0 – Fail-Safe Disable 1 – Fail-Safe Enable (Default : Disable)

Modbus Data Type	MODBUS Address	Values
'Fail-Safe Status' Register (This parameter is applicable only if 'Fail-Safe' is enabled) *Configuration Parameter (Stored in Non-Volatile memory)* Bit-Mapped Holding Register *Function Code (0x06 & 0x10)*	3005	Bit 15 . . Bit 3 Bit 2 Bit 1 Bit 0 → DO-1 Fail-Safe Output Status → DO-2 Fail-Safe Output Status → DO-3 Fail-Safe Output Status → DO-4 Fail-Safe Output Status Bits 4 to 15 are unused - ignore Bit Value / Output Status: 0 – OFF 1 – ON (Default : OFF)
'Fail-Safe Status' Coils Function Code (0x05 & 0x0F)	365 (DO-1) to 368 (DO-4)	Coil Value / Output Status: 0 – OFF 1 – ON (Default : OFF)
'Fail-Safe Time Period' Register (This parameter is applicable only if 'Fail-Safe' is enabled) *Configuration Parameter (Stored in Non-Volatile memory)* Holding Register *Function Code (0x06 & 0x10)*	3007	1 to 300 Seconds (Default : 10 Seconds)

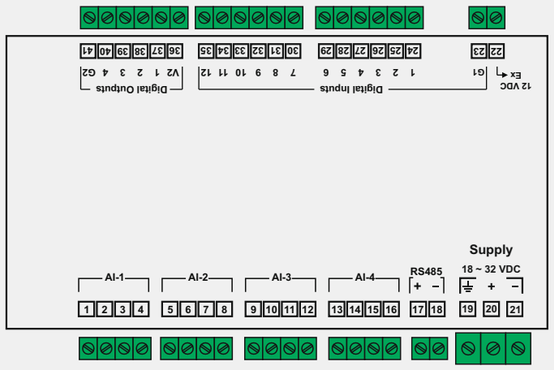
FRONT PANEL & CONFIGURATION MODE



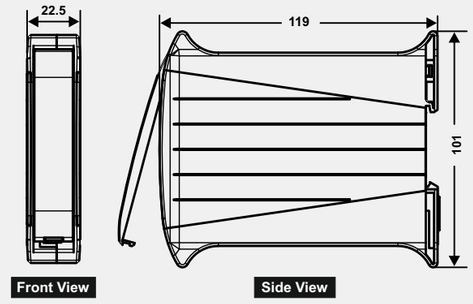
Configuration Mode

Switch Position	ON 1 2 Down	ON 1 2 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 : None*

ELECTRICAL CONNECTIONS



OVERALL DIMENSION

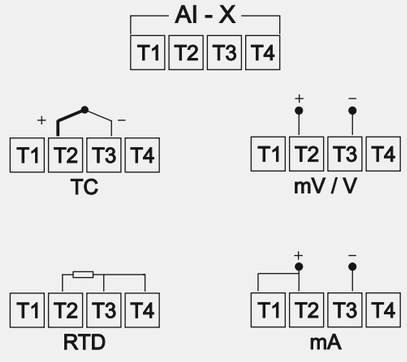


All Dimensions are in mm

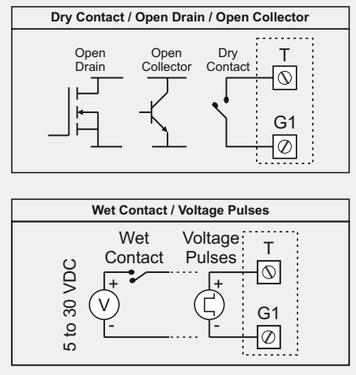
Width (W) : 22.5 mm, Height (H) : 101.0 mm, Depth (D) : 119.0 mm

AI + DI + DO CHANNELS

Analog Input



Digital Input



T = 1, 2, ...11, 12

Digital Output