

P2M Node 24 DO

P2M2HBVM12400



USER MANUAL



**Important !**

Before carrying out any service work, ensure that the valve and manifold have been vented. Remove the primary supply air hose to ensure total disconnection of the air supply before dismantling valves or blank connection blocks.

**NB !**

All technical data in this catalogue is typical only. The air quality is decisive for the valve life: see ISO 8573.

**WARNING**

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P2M2HBVM12400

User Manual

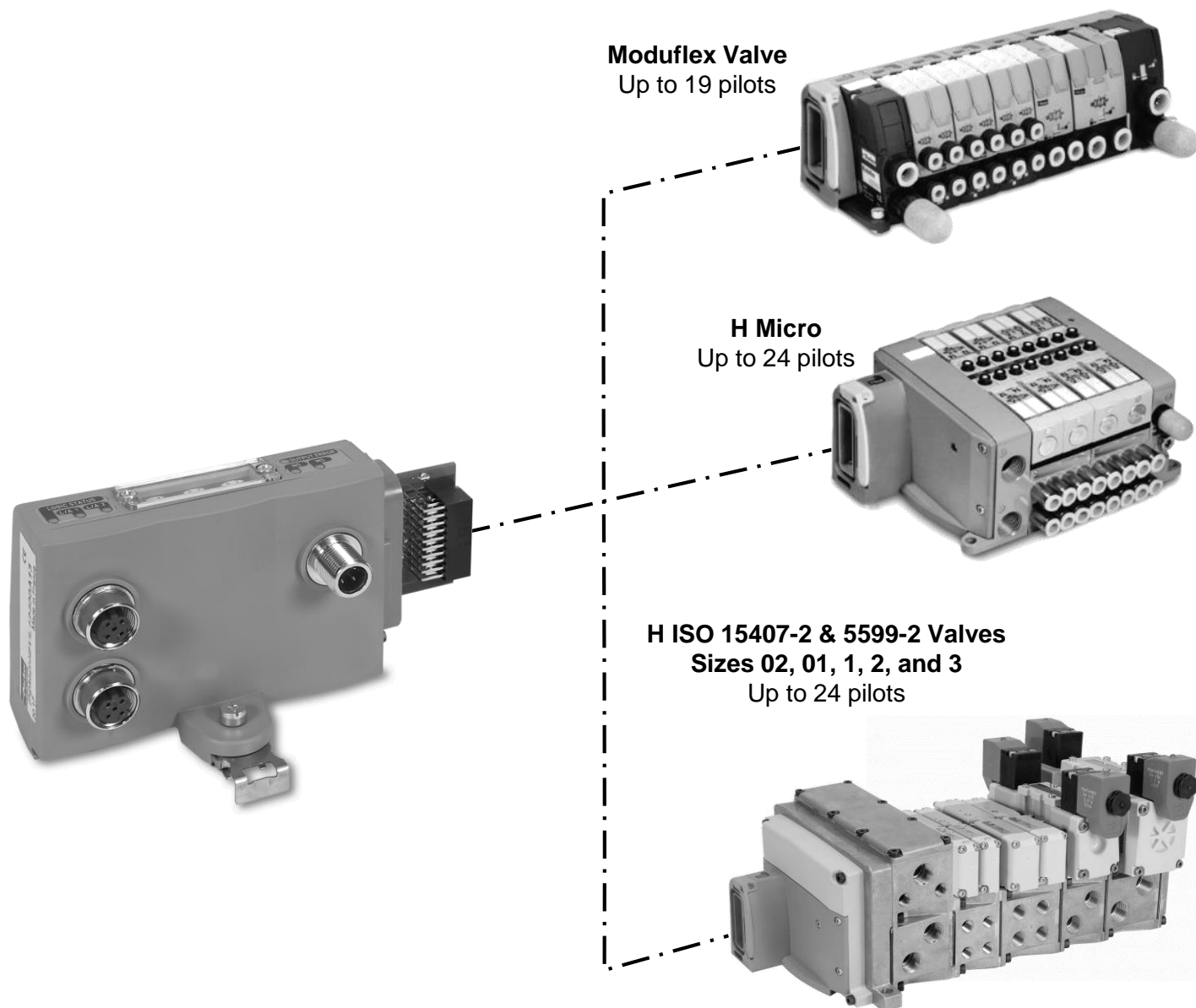


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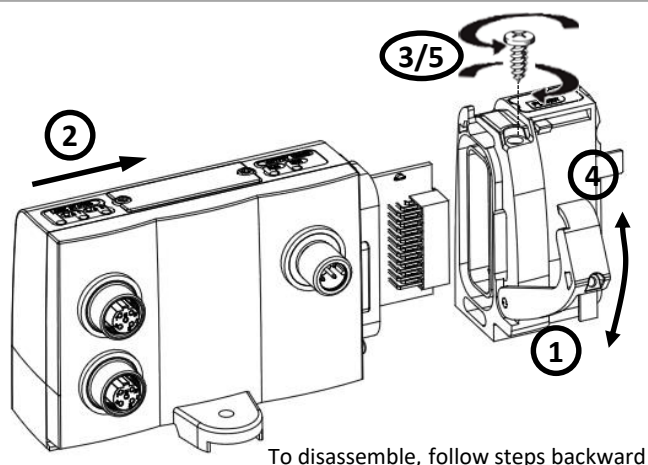
Product general overview

Purpose of the P2M Node 24 DO

The P2M Node 24DO can be used with either the Moduflex Valve System, H Micro or H ISO 15407-2 and 5599-2 Valves Series. Depending on the valve series the module is connected to, it can control up to 24 pilot solenoid valves, as shown on the illustration below:



Module assembly / disassembly



For details on appropriate valve adaptor to use, please refer to the respective valve series technical catalogue and instruction sheets.

Technical Data

P2M Node 24DO electrical specifications

Description	Value
Network power supply	24 Vdc +/- 10%
Speed communication	According to ModBus TCP standard
Auxiliary power supply	Voltage 20,4 Vdc to 26,4 Vdc
	Current limit per channel 150 mA
	Max. current limit 2 A
Polarity inversion protection	YES
Short circuit protection	YES
Operating temperature	0°C to +55°C
Storage temperature	-25°C to +70°C
Shock	According to IEC 60068-2-27:2008
Vibration	According to IEC 60068-2-6:2007
EMC	According to EN 55011 & EN 61000-4-2 up to -4-6

Auxiliary power consumption calculation

Depending on the valve range the module is connected to, the pilot solenoids differ in power consumption. In order to determine the minimum required power to supply, the table below may be used:

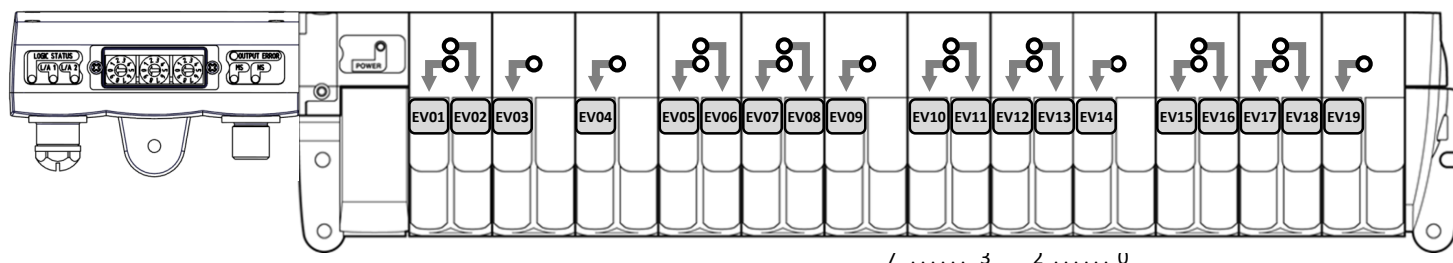
Valve Range	Number of Pilots simultaneously powered	Power	Total
Moduflex Valve System		x 40 mA	mA
H Micro		x 40 mA	mA
H ISO - 15407-2 - Sizes 02 & 01		x 40 mA	mA
H ISO - 5599 - Sizes 1, 2 & 3 (Energy Efficiency Coils)		x 54 mA	mA
H ISO - 5599-2 - Sizes 1, 2 & 3 (Standard Coils)		x 133 mA	mA
Total :			mA

NOTE: it is recommended that the total outputs current consumption does not exceed 2A

Solenoid Pilots addressing and Process Data mapping

P2M Node 24DO addressing used with Moduflex Valve System

The P2M Node 24DO used with Moduflex Valve System can handle up to 19 pilot solenoid valves. Addressing is as shown below:



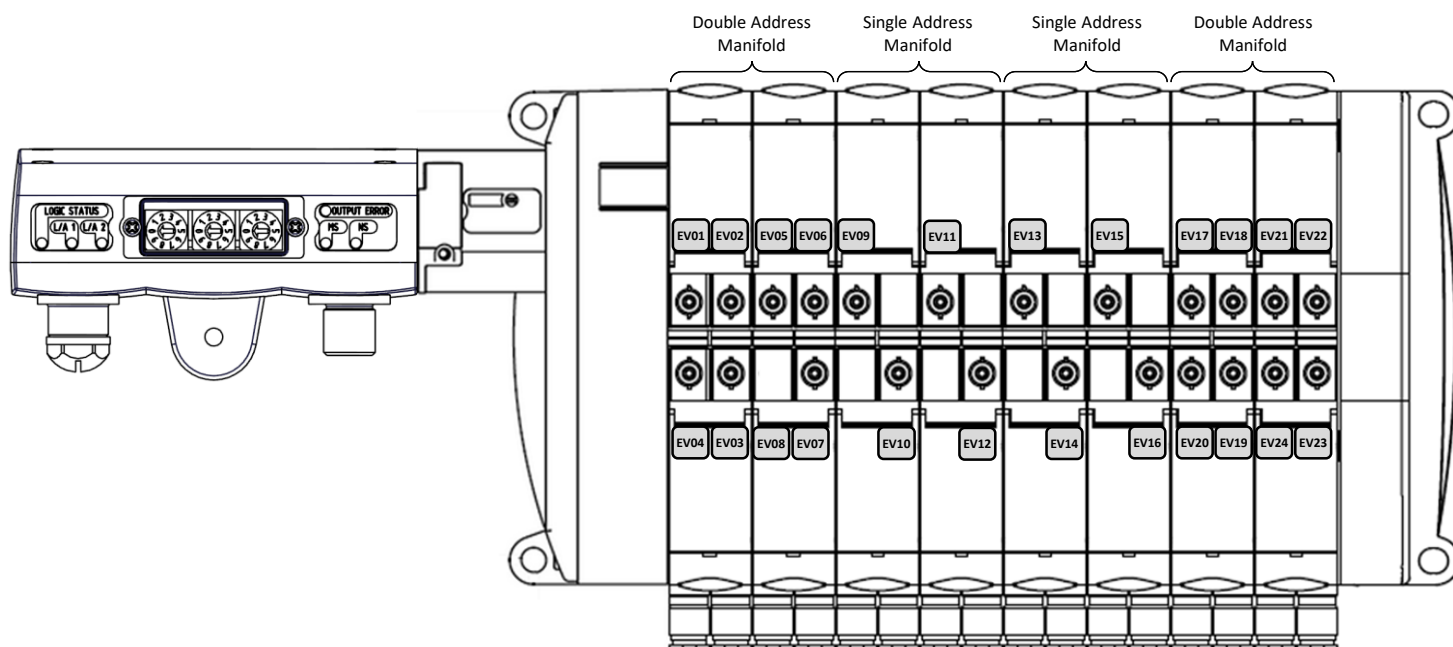
PLC Process outputs data mapping

Byte 1	EV08 EV01
Byte 2	EV16 EV09
Byte 3*	EV24 EV20 EV19 ... EV17

* Byte 3 / Bits 3 to 7 are not connected to valves with Moduflex Valve Range

P2M Node 24DO addressing used with H Micro Valve Series

The P2M Node 24DO used with H Micro Valve Series can handle up to 24 pilot solenoid valves. Addressing is as shown below:

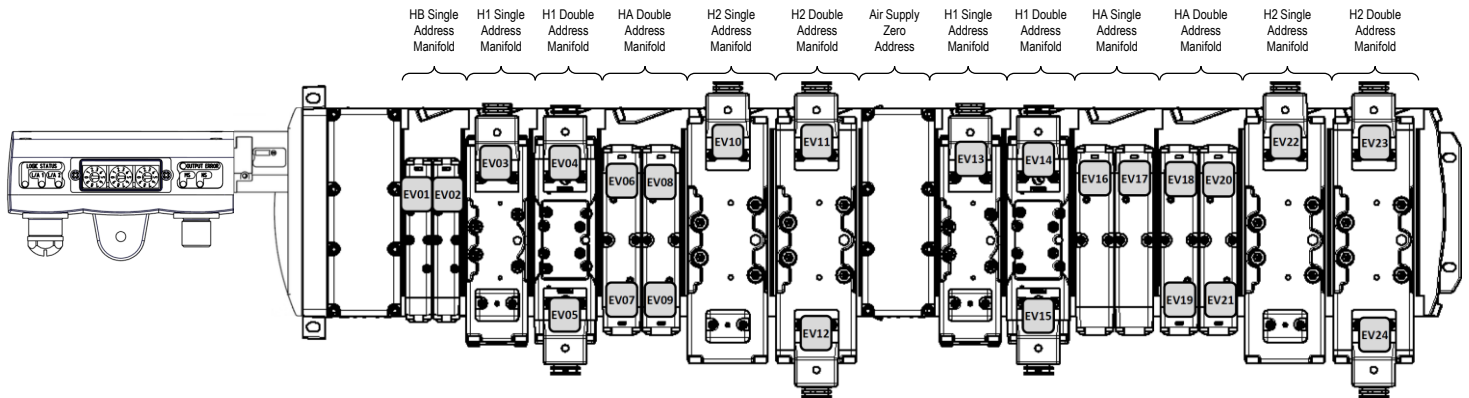


PLC Process outputs data mapping

Byte 1	EV08 EV01
Byte 2	EV16 EV09
Byte 3	EV24 EV17

P2M Node 24DO addressing used with H Universal ISO Series – 15407-2 & 5599-2

The P2M Node 24DO used with H ISO Series – 15407-2 – sizes 02 & 01 and 5599-2 – sizes 1, 2 & 3 – can handle up to 24 pilot solenoid valves. Addressing is as shown below (on H Universal manifold):



PLC Process outputs data mapping

	7	.....	0
Byte 1	EV08	.....	EV01
Byte 2	EV16	.....	EV09
Byte 3	EV24	.....	EV17

P2M Node 24DO Electrical Connections

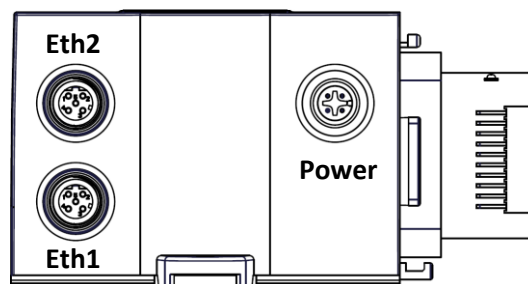
Network Communication and Auxiliary power connection

Network Communication: Standard Female M12 D-Coded connectors – 4 pins

Auxiliary Power Supply: Standard Male M12 A-Coded connector – 4 pins

Use of standard manufactured cables available from usual electrical supplier is recommended.

Network In & Out M12 D-Coded		
	PIN #	Description
	1	TxData +
	2	RxData +
	3	TxData -
	4	RxData -



Auxiliary Power M12 A-Coded		
	PIN #	Description
	1	Logic Power +
	2	AUX Power -
	3	Logic Power -
	4	AUX Power +



P2M Node 24DO connected to SAFE power supply for Auxiliary Power

The P2M Node 24DO Auxiliary Power for valves can be supplied from a SAFE 24Vdc auxiliary source in PP or PM mode, as well as from Output Switching Signals Device Failsafe Digital Outputs (OSSD FDO).

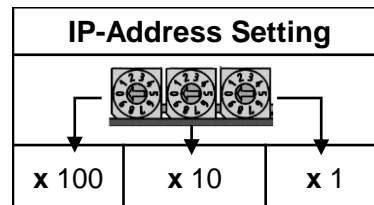
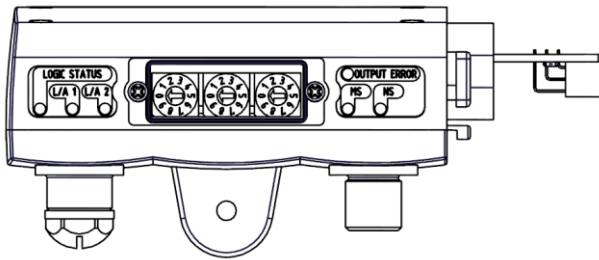
Note : Please check max. power available from the source. Refer to the “Auxiliary power consumption calculation” section

IP-Address Setting

The IP-Address of the device can be assigned via:

- Rotary Switches, DHCP , Web page, Ipconfig Tool (HICP protocol).


At power-up the P2M Node 24DO reads the values of the rotary switches and determines how the device obtains its IP-Address. Please refer to the table below for further details. The device comes from the factory with assigned **192.168.1.2**.



IP Switch Setting	Description
000	IP-Address setting is stored into the NV-memory of the P2M node
001 – 254	IP-Address setting is determined by the 3 rotary Switches: <ul style="list-style-type: none"> • IP Address: 192.168.1.xxx • Subnet Mask: 255.255.255.0 • Default Gateway for 001: 192.168.1.2 • Default Gateway for 002 - 254: 192.168.1.1
888	The device obtains its address via DHCP
999	Reset to Factory Status
All others	Invalid. The Module will not start (see Local Visual Diagnostic section for details)

Reset to Factory Status

The “Reset to Factory” restores all the parameters, counters, password and configurations to their default values.

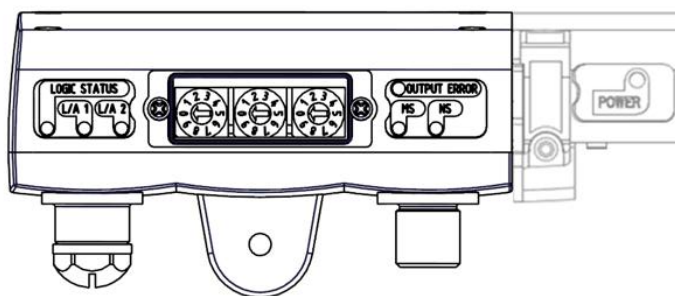
The “Reset to Factory” can be performed either via web page through the button  accessible via the “Parameter” tab on the webserver, or via hardware through the rotary switches setting “999”.

If the reset is performed via hardware, a valid IP-Address must be set and a power cycle is required to restart to normal operations. Once the reset is completed and all the values are restored to default values, the module signals the completed operation by quickly flashing red/green the “Logic Status” LED.

Local Visual Diagnostic

The P2M Node 24DO module offers local diagnostics through 6 LED's status with interpretation described in the table below:

LOGIC STATUS Green / Red LED			L/A 1 L/A 2 Green / Yellow LEDs			MS Green / Red LED			NS Green / Red LED		
LED Status	Description	Troubleshooting	LED Status	Description	Troubleshooting	LED Status	Description	Troubleshooting	LED Status	Description	Troubleshooting
OFF ○	Logic lines not powered	Check power supply (pin's 1 & 3 on Power M-12)	OFF ○	Not link, no activity	Check connection to the Network	OFF ○	No Power	Check power supply	OFF ○	No IP-Address or in EXCEPTION state	Check IP address setting and connection to the network
ON GREEN ○	Logic power OK	N/A	ON GREEN ○	Link 100Mbit/s established	N/A	ON GREEN ○	Normal operations	N/A	ON GREEN ○	At least one Modbus message received	N/A
ON RED ●	Presence of any fault requiring acknowledgment	N/A	Blinking GREEN ✱	Ongoing activity 100Mbit/s	N/A	ON RED ●	Major Fault. FATAL ERROR	Power cycle the module. If error persists exchange the module	Blinking GREEN ✱	Waiting for first Modbus message	Check module configuration into engineering environment
Blinking RED ✱	Invalid rotary switch setting	Check rotary switch setting	ON YELLOW ○	Link 10Mbit/s established	N/A	Blinking RED ✱	Minor Fault	Check diagnostic log	ON RED ●	IP-Address conflict detected. The module will not start	Check IP-Addresses onto the network and look for duplicates.
Blinking G/R ✱	Firmware version error or Completed "Reset to Factory"	If switches setting different from "999" and no "Reset to Factory" performed via webpage, then contact technical support	Blinking YELLOW ✱	Ongoing activity 10 Mbit/s	N/A	Blinking G/R ✱	Firmware update from file system in progress	Await the completion of the update then restart the module	Blinking RED ✱	Connection timeout. No Modbus message has been received within the configured "process active time out" time	Check connection to the network. Restart the module



OUTPUT ERROR Red LED		
LED Status	Description	Troubleshooting
OFF ○	Standard mode (No error active)	N/A
ON RED ●	One (or more) active "outputs stage failure"	Check diagnostic message through the Network and relative troubleshooting

Diagnostic through network via Object #9 – "Module Error Input"

The P2M Node 24DO module offers diagnostic data transmitted to the PLC as Process Data Input or via the Object #9:

Object	Name	Data Type	Access
#9	Module Error Input	UINT16	Read

Byte 0	Diag 7 Diag 0
Byte 1	Reserved

Bit #	Error Name	Error Description
Diag 0	Ack-Required	Set if any major fault active. Outputs are switched OFF and acknowledge is required to restart the module to normal operation
Diag 1	Auxiliary Voltage Warning	Set if Auxiliary Voltage in Warning range. Module keeps normal operation
Diag 2	Auxiliary Voltage Failure	Auxiliary Voltage in Error range. Outputs are switched OFF and acknowledge is required to restart the module to normal operation
Diag 3	Temperature Warning	Set if a temperature increase above warning levels is detected by the output drivers
Diag 4	Output Driver Channel Error	Set if a major fault is detected at the output stage – solenoid short circuit. Outputs are switched OFF and acknowledge is required to restart the module to normal operation
Diag 5	Module Error	Set if an internal communication error is active. Depending on the fault the module might require acknowledgment.
Diag 6	Outputs Stage Not Available	Set if auxiliary power is missing. No acknowledge is required
Diag 7-15	Reserved	These bits will be always set as 0

NOTE: Errors caused by solenoid(s) must be fixed first and then the error must be acknowledged by either one of the following actions::

- switching OFF/ON Auxiliary power supply (once error is fixed)
- sending the "Acknowledge Error" command ****SEE Object#8**

Supported Modbus Function- and Exception Codes

Function Codes:

#	Function
1	Read Coils
2	Read Discrete Inputs
3	Read Holding Registers
4	Read Input Register
5	Write Single Coil
6	Write Single Register
15	Write Multiple Coils
16	Write Multiple Register
23	Read/Write Multiple Register
43/14	Read Device Identification

Exception Codes:

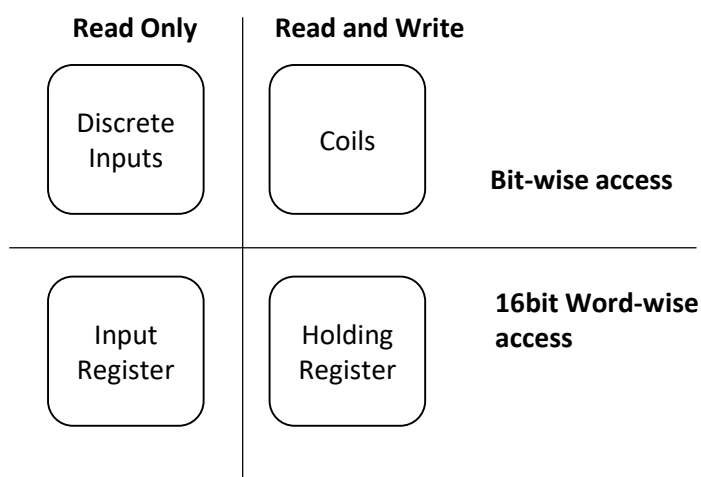
Code	Name	Description
0x01	Illegal Function	The function code in the query is not supported
0x02	Illegal Data Address	The data address received in the query is outside the initialized memory area
0x03	Illegal Data Value	The data in the request is illegal

Modbus Register Implementation

Modbus organizes its data in four register tables: Holding Registers (4x), Input Registers (3x), Discrete Inputs (1x) and Coils (0x). The tables vary in read/write access permissions and data-width as illustrated in the picture below.

The Modbus register layout is automatically generated based on the object configured in the P2M Node 24DO software. The Object / Modbus register ratio has been configured as: one Object maps to 64 successive Modbus registers. The resulting P2M Node 24 DO specific Modbus address layout is detailed in the next sections.

NOTE: some information is accessible in more than one register tables and/or at multiple register address locations.



Modbus Register Implementation

Holding Registers (4x)

The 16-bit word registers detailed in the table below are read/write access. Please refer to the specific Object sub-chapter for the bit-layout details.

Address	Type	Byte	Name
0x0000	UINT8		System Commands – Object #8
0x0001	UINT8[3]	0	Solenoids (Bit 0 to 7) – Object #1
		1	Solenoids (Bit 8 to 15) – Object #1
		2	Solenoids (Bit 16 to 23) – Object #1
0x0002 ... 0x07FF	Reserved		
0x0800	UINT16	0	Module Error Input (Bit 0 to 7) – Object #9
		1	Module Error Input (Bit 8 to 15) – Object #9
0x0801	UINT8[3]	0	Channel Error (Bit 0 to 7) – Object #6
		1	Channel Error (Bit 8 to 15) – Object #6
0x0802		2	Channel Error (Bit 16 to 23) – Object #6
0x0803	UINT16	0	Module Info Flags (Bit 0 to 7) – Object #7
		1	Module Info Flags (Bit 8 to 15) – Object #7
0x0804 ... 1002	Reserved		
0x1003	UINT16	0	“Process Active Timeout” in milliseconds, LSB
		1	“Process Active Timeout” in milliseconds, MSB
0x1004	UINT16	0	“Enter/Exit Idle Mode” (0: Not Idle, >0: Idle), LSB
		1	”Enter/Exit Idle Mode”, MSB
0x1005 ... 0x100F	Reserved		
0x1010	UINT8[3]	0	Solenoids (Bit 0 to 7) – Object #1
		1	Solenoids (Bit 8 to 15) – Object #1
		2	Solenoids (Bit 16 to 23) – Object #1
0x1011	Reserved		
0x1012 ... 0x104F	Reserved		
0x1050	UINT32[24]	0	Switching Cycles (Output 0, Bit 0 to 7) – Object #2
		1	Switching Cycles (Output 0, Bit 8 to 15) – Object #2
		2	Switching Cycles (Output 0, Bit 16 to 23) – Object #2
		3	Switching Cycles (Output 0, Bit 25 to 31) – Object #2
		4	Switching Cycles (Output 1, Bit 0 to 7) – Object #2
		5	Switching Cycles (Output 1, Bit 8 to 15) – Object #2
		6	Switching Cycles (Output 1, Bit 16 to 23) – Object #2
		7	Switching Cycles (Output 1, Bit 25 to 31) – Object #2

Modbus Register Implementation

Holding Registers (4x) - Continued

Address	Type	Byte	Name
0x1054 ... 0x107F		8 ... 23	(And so on...) Switching Cycles (Output 2, Bit 0 to 7) – Object #2
0x1082 ... 0x108F	Reserved		
0x1090	UINT8[3]	0	Clear Switching Cycles (Output 0 to 7) – Object #3
		1	Clear Switching Cycles (Output 8 to 15) – Object #3
		2	Clear Switching Cycles (Output 16 to 23) – Object #3
0x1091	Reserved		
0x1092 ... 0x10CF			
0x10D0	UINT16	0	AUX Voltage (LSB) – Object #4
		1	AUX Voltage (MSB) – Object #4
0x10D1 ... 0x114F	Reserved		
0x1150	UINT8[3]	0	Channel Error (Output 0 to 7) – Object #6
		1	Channel Error (Output 8 to 15) – Object #6
		2	Channel Error (Output 16 to 23) – Object #6
0x1151	Reserved		
0x1152 ... 0x118F			
0x1190	UINT16	0	Module Info Flags (Bit 0 to 7) – Object #7
		1	Module Info Flags (Bit 8 to 15) – Object #7
0x1191 ... 0x11CF	Reserved		
0x11D0	UINT8		System Commands – Object #8
	Reserved		
0x11D1 ... 0x120F			
0x1210	UINT16	0	Module Error Input (Bit 0 to 7) – Object #9
		1	Module Error Input (Bit 8 to 15) – Object #9
0x1211 ... 0x128F	Reserved		
0x1290	UINT16	0	AUX Voltage Warning Low Limit (LSB) – Object #11
		1	AUX Voltage Warning Low Limit (MSB) – Object #11
0x1291 ... 0x12CF	Reserved		
0x12D0	UINT16	0	AUX Voltage Warning High Limit (LSB) – Object #11
		1	AUX Voltage Warning High Limit (MSB) – Object #11
0x12D1 ... 0x130F	Reserved		
0x1310	UINT8		Output State Behavior – Object #13
	Reserved		
0x1311 ... 0x134F			
0x1350 ... 0xFFFF	(Illegal Data Address)		

Modbus Register Implementation

Input Registers (3x)

The 16-bit word registers detailed in the table below are read-only access. Please refer to the specific Object sub-chapter for the bit-layout details.

Address	Type	Byte	Name	
0x0000	UINT16	0	Module Error Input (Bit 0 to 7) – Object #9	
		1	Module Error Input (Bit 8 to 15) – Object #9	
0x0001	UINT8[3]	0	Channel Error (Bit 0 to 7) – Object #6	
		1	Channel Error (Bit 8 to 15) – Object #6	
2		Channel Error (Bit 16 to 23) – Object #6		
0x0002	UINT16	0	Module Info Flags (Bit 0 to 7) – Object #7	
0x0003		1	Module Info Flags (Bit 8 to 15) – Object #7	
0x0004 ... 0x07FF	Reserved			
0x0800	UINT16		Diagnostic Event Counter	NOT USED
0x0801	UINT8[2]	0	Diagnostic Event #1, Low Byte: Event Code	
		1	Diagnostic Event #1, High Byte: Severity	
0x0802	UINT8[2]	0	Diagnostic Event #2, Low Byte: Event Code	
		1	Diagnostic Event #2, High Byte: Severity	
0x0803 ... 0x0806	UINT8[2]		(And so on...) Diagnostic Event #3...#6	
0x0807 ... 0xFFFF	(Illegal Data Address)			

Note: The Diagnostic Events Registers are not used by this implementation.

Discrete Inputs (1x)

The registers detailed in the table below are read-only. Each address accesses one single bit.

Address	Content
0x0000	Module Error Input (Object #9), Bit 0: Acknowledge Required
0x0001	Module Error Input (Object #9), Bit 1: AUX Voltage Warning
0x0002	Module Error Input (Object #9), Bit 2: AUX Voltage Error
0x0003	Module Error Input (Object #9), Bit 3: Temperature Warning
0x0004	Module Error Input (Object #9), Bit 4: Output Driver Channel Error
0x0005	Module Error Input (Object #9), Bit 5: Module Error
0x0006	Module Error Input (Object #9), Bit 6: Output State Not Available
0x0007 ... 0x000F	Reserved
0x0010	Channel Error (Object #6), Channel 0
0x0011	Channel Error (Object #6), Channel 1

Modbus Register Implementation

Discrete Inputs (1x) - Continued

The registers detailed in the table below are read-only. Each address accesses one single bit.

Address	Content
0x0012 ... 0x0027	<i>(And so on...)</i> Channel Error (Object #6), Channel 2 to 23
0x0028	Module Info Flag (Object #7), Bit 0: Watchdog Valve Microcontroller
0x0029	Module Info Flag (Object #7), Bit 1: EEPROM error
0x002A ... 0x002F	<i>Reserved</i>
0x0030	Module Info Flag (Object #7), Bit 8: Watchdog COM Microcontroller
0x0031	Module Info Flag (Object #7), Bit 9: Heartbeat not toggling
0x0032	Module Info Flag (Object #7), Bit 10: Heartbeat state
0x0033	Module Info Flag (Object #7), Bit 11: SPI_COM_ERROR
0x0034	Module Info Flag (Object #7), Bit 12: SPI_COM_LOST
0x0035	Module Info Flag (Object #7), Bit 13: SPI_B40_ERROR
0x0036	Module Info Flag (Object #7), Bit 14: B40_Version_Error
0x0037	<i>Reserved</i>
0x0038 ... 0xFFFF	<i>(Illegal Data Address)</i>

Coils (0x)

The registers detailed in the table below are read/write accessible. Each address accesses one single bit.

Address	Content
0x0000...0x0007	System Commands (Bit 0 to 7) – Object #8
0x0008	Solenoids (Bit 0) – Object #1
0x0009	Solenoids (Bit 1) – Object #1
0x000A ... 0x001F	<i>(And so on...)</i> Solenoids (Bit 2...23) – Object #1
0x0020 ... 0xFFFF	<i>(Illegal Data Address)</i>

Process Data Outputs

Object #1 – “Solenoids”

The Manufacturing Specific Object “Solenoids” contains the process output data for controlling the valves. A value of 1 assigned to a bit in the Object data, indicates that the associated solenoid shall be energized, whereas zero indicates that the power at the solenoid shall be off.

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#1	Array of UINT8	0x00 to 0x02	Read / Write	Solenoids	0	0xFF 0xFF 0xFF	0

Process Data Outputs

The 24 solenoids are represented by one bit each and they are grouped in 3 Bytes. The LSB (Least Significant Bit) is associated with Solenoid-1 and the MSB (Most Significant Bit) is associated with Solenoid-24.

Byte	3 (Address 0x2001 | Byte 0x03)				2	1 (Address 0x2001 | Byte 0x01)			
Bit #	23 (MSB)	22	21	...	...	...	2	1	0 (LSB)
Example Output Data	1	0	1	...	...	...	0	1	0
Controlled Output	Out_23 HIGH	Out_22 LOW	Out_21 HIGH	...	...	...	Out_2 LOW	Out_1 HIGH	Out_0 LOW
Solenoid Energized	Solenoid_24 ON	Solenoid_23 OFF	Solenoid_22 ON	...	...	...	Solenoid_3 OFF	Solenoid_2 ON	Solenoid_1 OFF

Object #8 – “System Command”

The Manufacturing Specific Object “System Command” is used for specific functions, such as: “Leave Failsafe / Error Acknowledgment” and “Store Switching Cycles Counters”, as detailed in the table below. In order to execute the desired function the specific value associated with the command has to be written in the Object.

Address	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#8	UINT8	0x00	Read / Write	System Command	0	0xFF	0

The System Command Byte supports the commands as defined in the table below.

Command Value	Command Name	Description
0x01	Leave Failsafe State (Acknowledge Error)	<p>This command allows the module to leave failsafe state* (acknowledge error). Meaning that, if no error is pending at the time the Leave Failsafe State command is executed, then the device returns to normal operation and the outputs are set according to process data.</p> <p>* If Failsafe state is reached, then it is not automatically left if the error conditions are no longer existent.</p>
0x02	Store Switching Cycle Counters	<p>When this command is executed, the current values of the switching cycle counters are stored into EEPROM. This command is intended to be used before powering off the device.</p>

Status / Diagnostic Data and Parameters

Object #2 – “Switching Cycles”

The Manufacturing Specific Object “Switching Cycles” contains the 24 switching cycle counters for the valves. The counters values are automatically stored by the module every 30 minutes.

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#2	Array of UINT32	0x01 to 0x18	Read	Switching Cycles	0	*	0

* Max value for each counter is circa 4,3 billion (UDINT max representable value). Once that the max value is reached, this is held in memory and additional cycles are not recorded.

Status / Diagnostic Data and Parameters

Object #3 – “Clear Switching Cycles”

The Manufacturing Specific Object “Clear Switching Cycles” allows the switching cycle counter for the solenoids to be reset to zero. The counter for each solenoid can be reset individually by setting the associated bit on the object – i.e.: for each bit set to 1 in the object, the associated counter is set to zero.

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#3	Array of UINT8	0x00 to 0x02	Read / Write	Clear Switching Cycles	0	0xFF 0xFF 0xFF	0

* The Read service for this Object always returns all zeros.

Object #4 – “AUX Voltage”

The Manufacturing Specific Object “AUX Voltage” contains the measured value of the Auxiliary Voltage
Values shown in mV

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#4	UINT16	0x00	Read	AUX Voltage	0	36300	N/A

Object #11 – “AUX Voltage Warning Low Limit”

This Manufacturing Specific Object contains the value for the AUX Voltage Warning Low Limit, in millivolts – i.e.: the (low) AUX Voltage value that will trigger the AUX Voltage Warning diagnostic

Values shown in mV

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#11	UINT16	0x00	Read/Write	AUX Voltage Warning Low Limit	18000	24000	20000

Object #12 – “AUX Voltage Warning High Limit”

This Manufacturing Specific Object contains the value for the AUX Voltage Warning High Limit, in millivolts – i.e.: the (high) AUX Voltage value that will trigger the AUX Voltage Warning diagnostic

Values shown in mV

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#12	UINT16	0x00	Read/Write	AUX Voltage Warning High Limit	24000	28500	26400

Object #6 – “Channel Error”

In case an error occurs in the outputs stage (e.g.: short circuit or over-temperature), the Manufacturing Specific Object “Channel Error” provides information about which channel caused the error. The bits corresponding to the outputs that caused the fault are set to 1 in the Manufacturing Specific Object.

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#6	Array of UINT8	0x00 to 0x02	Read	Channel Error	0x00 0x00 0x00	0xFF 0xFF 0xFF	0x00 0x00 0x00

Status / Diagnostic Data and Parameters

Object #7 – “Module Info Flag”

The Manufacturing Specific Object “Module Info Flag” contains information about possible module states and faults / errors that might affect the module. The faults identified in the module error flag are not recoverable; therefore a power cycle is required to clear them. If the faults are still present following a power cycle the module has to be replaced. The message headers and flag definitions associated with each bit in the Manufacturing Specific Object are detailed in the table below.

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#7	UINT16	0x00 to 0x01	Read	Module Info Flags	0	0xFF 0xFF	0

Bit #	Module Error Header	Fault Description
0	Watchdog Valve μ C	Set if the watchdog caused the last reset of the output stage
1	EEPROM Error	Set if any of the (expected) data stored in the EEPROM has been detected as not-valid
2-7	Reserved	
8	Watchdog COM μ C	Set if the watchdog caused the last reset of the communication stage
9	Heartbeat Not Toggling	Heartbeat is currently not toggling whilst it should
10	Heartbeat State	Used to troubleshoot the cause of the “Heartbeat Not Toggling” error
11-15	Reserved	

Object #13 – “Output State Behaviour”

The Manufacturing Specific Object “Output State Behavior” applies in case of communication lost (between Controller and P2M Node) and determines the outputs behavior in case of loss of communication, as follow:

Object Value = 0 → Outputs are set to “0”

Object Value = 1 → Outputs are hold to last valid state

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#13	UINT8	0x00	Read/Write	Output State Behavior	0	1	0

Status / Diagnostic Data and Parameters

Object #9 – “Module Error Input”

The Manufacturing Specific Object “Module Error Input” contains user-friendly diagnostics (in case of errors or faults) provided as Process Data Input.

Object	Data Type	Byte	Access	Name	Min Value	Max Value	Default
#9	UINT16	0x00 to 0x01	Read	Module Error Input	0	0xFF 0xFF	0

Bit #	Module Error Header	Fault Description
0	Ack Required	Set if a major fault requiring acknowledgment is detected. All outputs are set to 0. If this bit is set, then a “Leave Failsafe Command” is required to restart the module.
1	AUX Voltage Warning	Set if the Auxiliary Voltage is outside Normal range and within Warning range.
2	AUX Voltage Error	Set if the Auxiliary Voltage is outside Warning and within Error range. The outputs are switched off and an acknowledge is required to restart the module.
3	Temperature Warning	Set if a temperature warning (in one of the output driver chips) is detected. Outputs are switched off and an acknowledge is required to restart the module.
4	Output Driver Channel Error	Set if an over current / short-circuit error has occurred. Outputs are switched off and an acknowledge is required to restart the module.
5	Module Error	Depending on the source of the fault, this error either requires acknowledge or is unrecoverable.
6	Output Stage Not Available	Set if no Auxiliary Power is available. No acknowledge is required
7-15		Reserved

Additional Modbus TCP Specific Information

Modbus TCP Connections

An established Modbus-TCP connection will be closed after 60 seconds, if idle

P2M Node 24DO Specific Modbus fields

The two registers detailed below are accessible via the Holding register and the Input register table – please refer to previous chapters for additional details – and allow to control the P2M state machine.

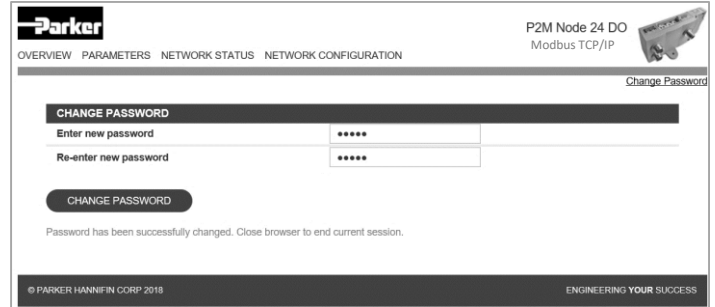
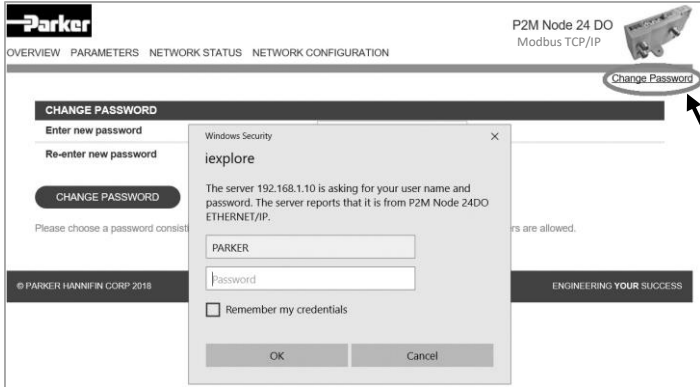
- **Process Active Timeout:** the value in the register defines the settings for the Process active timeout in milliseconds. It specifies how long the module shall stay in the ‘PROCESS_ACTIVE’ state after receiving a Modbus-TCP request. Changes will have immediate effect. This setting is disabled by default (value 0).
- **Enter/Exit Idle Mode:** this register allows the IDLE state to be entered/exited. The value 0 is interpreted as “Not Idle” any other value as “Idle”.

Web Server

Change Password

It is possible to modify the password via a dedicated button on the top right corner of all the tabs of the web server. The web server will require the user to enter the current password (left image below) before entering the new value for the field (right image below).

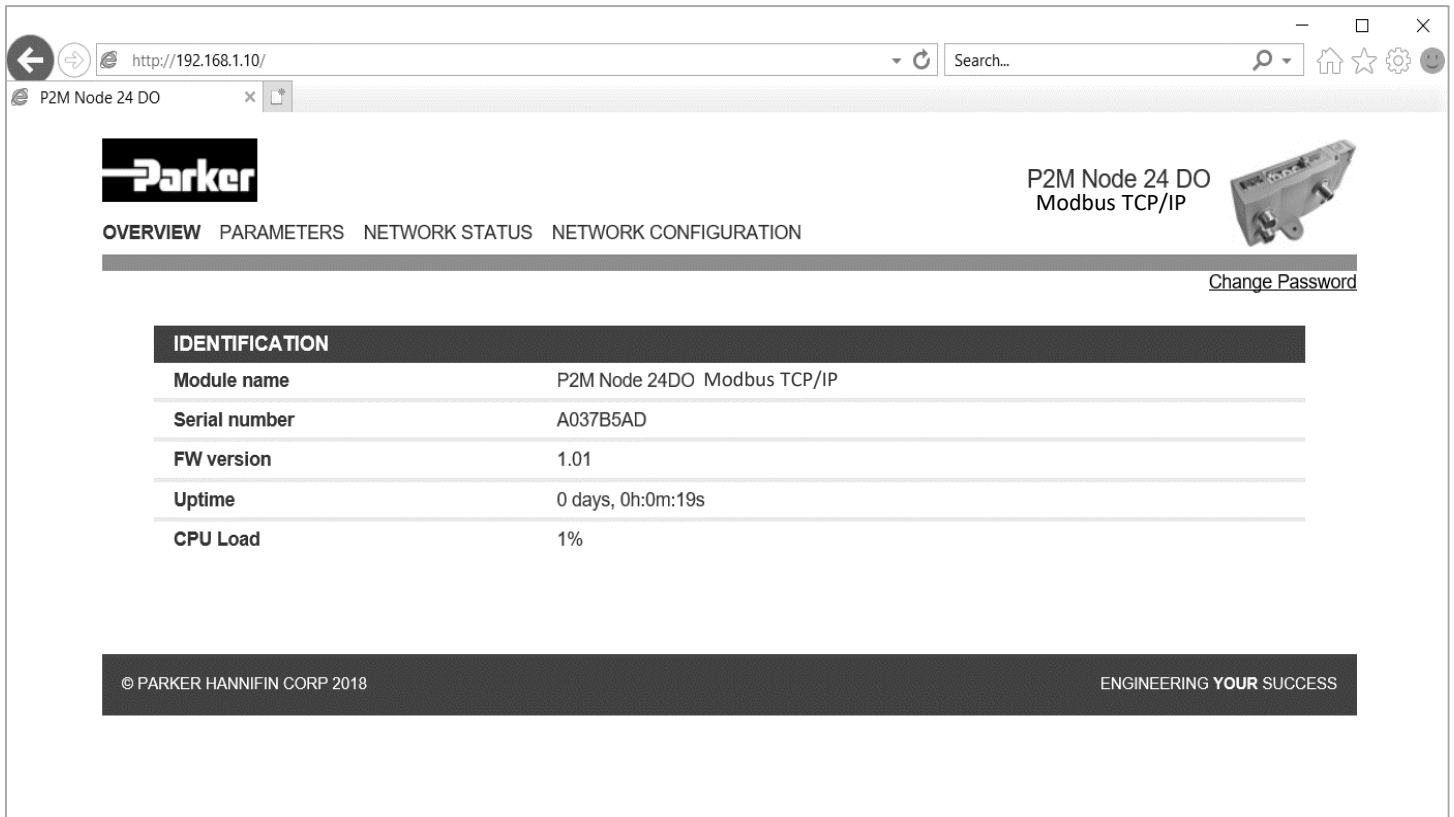
The password can be restored to default values (PARKER) with a “Reset to Factory”.



The Web-server has four tabs:


- **Overview:** Main product information is available via this page
- **Parameters:** Objects (Read and Write) are accessible via this page
- **Network Status:** Information about current network status is available via this page
- **Network Configuration:** the module’s network configuration can be displayed and set via this page


Overview Page



Web Server

Parameters Page



P2M Node 24 DO
Modbus TCP/IP


OVERVIEW **PARAMETERS** NETWORK STATUS NETWORK CONFIGURATION

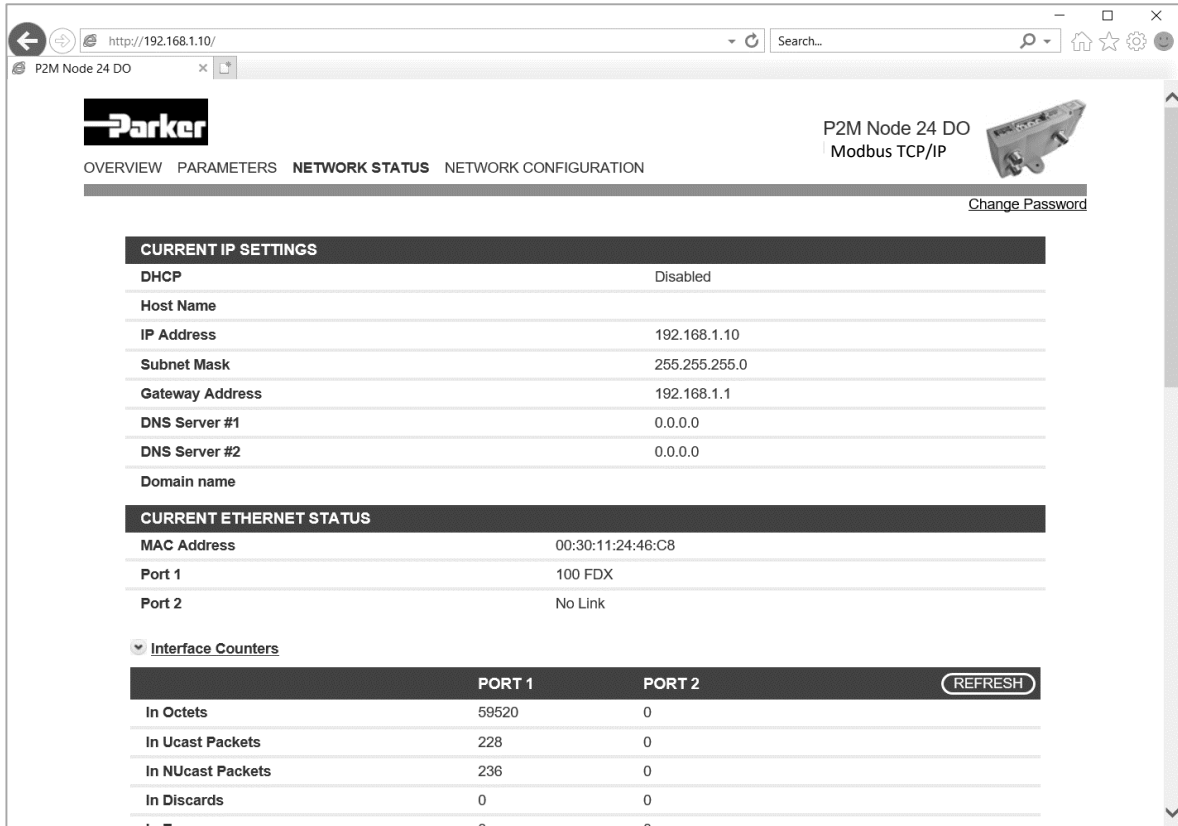
[Change Password](#)

NAME	VALUE	REFRESH
Output state at loss of communication	Set outputs to 0	Set
Solenoid	#1 to #8 0	Set
	#9 to #16 0	Set
	#17 to #24 0	Set
Solenoids Cycles Counters	#1 0	Clear Clear All
	#2 0	Clear
	#3 0	Clear
	#4 0	Clear
	#5 0	Clear
	#6 0	Clear
	#7 0	Clear
	#8 0	Clear
	#9 0	Clear
	#10 0	Clear
	#11 0	Clear
	#12 0	Clear
	#13 0	Clear
	#14 0	Clear
	#15 0	Clear
	#16 0	Clear
	#17 0	Clear
	#18 0	Clear
	#19 0	Clear
	#20 0	Clear
	#21 0	Clear
	#22 0	Clear
	#23 0	Clear
	#24 0	Clear Clear All
Channel Error	#1 to #8 0	
	#9 to #16 0	
	#17 to #24 0	
Module Info Flag	0	
Module Error Input	0	
AUX Voltage	(V) 23.617	
AUX Voltage Warning Level	(V) low: 20 Set high: 26.4 Set	
System Commands	Leave Fail-Safe Store Counters Reset to Factory Default	

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Web Server

Network Status Page



P2M Node 24 DO
Modbus TCP/IP

[Change Password](#)

CURRENT IP SETTINGS

DHCP	Disabled
Host Name	
IP Address	192.168.1.10
Subnet Mask	255.255.255.0
Gateway Address	192.168.1.1
DNS Server #1	0.0.0.0
DNS Server #2	0.0.0.0
Domain name	

CURRENT ETHERNET STATUS

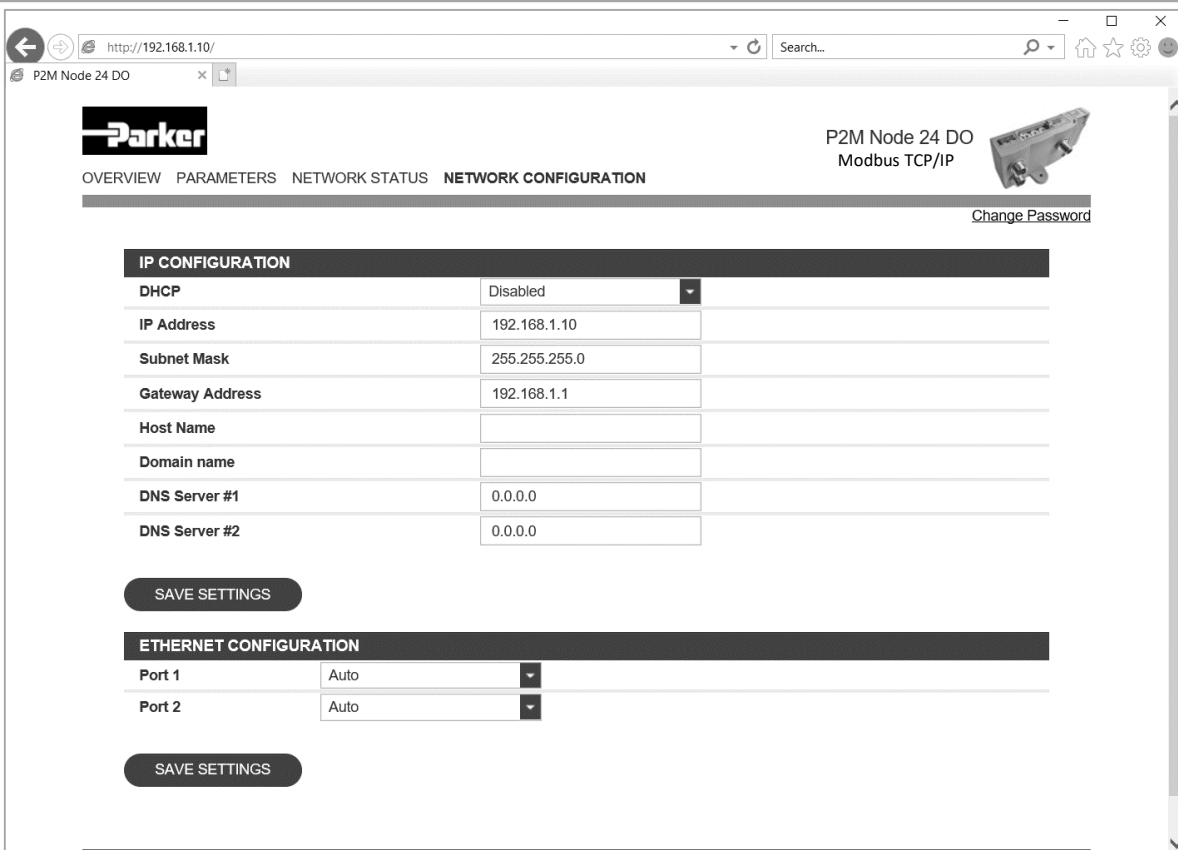
MAC Address	00:30:11:24:46:C8
Port 1	100 FDX
Port 2	No Link

☒ **Interface Counters**

	PORT 1	PORT 2
In Octets	59520	0
In Ucast Packets	228	0
In NUcast Packets	236	0
In Discards	0	0

[REFRESH](#)

Network Configuration Page



P2M Node 24 DO
Modbus TCP/IP

[Change Password](#)

IP CONFIGURATION

DHCP	Disabled
IP Address	192.168.1.10
Subnet Mask	255.255.255.0
Gateway Address	192.168.1.1
Host Name	
Domain name	
DNS Server #1	0.0.0.0
DNS Server #2	0.0.0.0

[SAVE SETTINGS](#)

ETHERNET CONFIGURATION

Port 1	Auto
Port 2	Auto

[SAVE SETTINGS](#)

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P2M Node 24DO  Modbus TCP

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