ENGINEERING YOUR SUCCESS.

PCH NETWORK PORTAL (EtherCAT)

PCH1xTxxxx-Px

User Manual

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CHAPTER - 1 **General**

General

1.1 Trademark Information

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

TwinCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

1.1.1 Logo

1.2 About this Guide

This user guide is intended for those who are responsible for installing, configuring, and troubleshooting PCH Portal and its associated software and accessories.

1.3 Safety Information

Please read and follow all the safety information for the Parker Communication for H-Series (PCH) Portal, including the warning and caution statements in this guide, before installing or operating the system.

WARNING: The PCH Portal is used to control electrical and mechanical components of motion control systems in industrial environments. To avoid serious injury or damage to equipment, test the motion system for safety under all potential conditions.

WARNING: The PCH Portal is not intended for any use in systems, machines, or applications where failure or fault of the products could reasonably be seen to lead to death or serious bodily injury of any person, or to severe physical or environmental damage ("High-Risk Use"). You are not permitted to use, distribute, or sublicense the use of these products in High-Risk Use applications. High-Risk use is STRICTLY PROHIBITED.

WARNING: The PCH Portal contains no user-serviceable parts. To avoid personal injury or damage to the product, do not attempt to open the case or to replace any internal component of the PCH Portal, Modules, or Accessories.

WARNING: USER RESPONSIBILITY - Improper use of the products described herein or related items can cause death, personal injury and property damage.

CAUTION: Modification of endplate must always be done under the supervision of a Parker representative. If not, this may void any warranties.

1.4 Important User Information

This document and other information from Parker Hannifin Corporation, its subsidiaries or authorized distributors provides product or system options for further investigation by users having technical expertise.

The user, through their own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyse all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker, its subsidiaries, or authorized distributors.

To the extent that Parker, its subsidiaries, or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable for all applications and reasonably foreseeable uses of the components or systems.

1.5 Intended Use

The PCH Portal must be used as follows:

- As intended for industrial environments and conditions as compliant with the regulatory agencies of the region.
- In the original state without unauthorized modifications to the unit. The only permissible configurations and/or modifications allowed are mentioned in the documentation supplied with the product.
- In perfect technical condition.
- The PCH Portal has been developed and manufactured in accordance with the basic and proven safety principles of EN ISO 13849, LVD 2014/35/EU (low voltage directive) and EN61000-6-2 (Electromagnetic compatibility) and European Machinery Directive 2006/42/EC. The requirements of EN ISO 13849-1 and EN ISO 13849-2 must be taken into consideration to implement and operate the PCH Portal. When using this product in machines or systems subject to specific C standards, the requirements specified in these standards must be observed.
- This product is not CSA Certified. To conform to CSA C22.2 requirements please ensure the PCH Portal is connected to a class 2 power supply or equal as outlined in CSA Article 2.024 for low voltage equipment. The output of this power supply may not exceed 100 VA, with the operating voltage not more than 30 V rms, 42.4 V peak, or 60 V dc.

If standard accessories/components are connected (e.g., sensors, actuators, etc.) the specified limits of pressure, temperature, electrical data, torques, etc. must be complied with.

Even though care has been taken in the preparation and publication of the contents of this manual, we do not assume legal or other liability for any inaccuracy, mistake, misstatement, or any other error of whatsoever nature contained herein. The material in this manual is for information purposes only and is subject to change without notice.

1.6 Service Information

Consult the local Parker Service Agent if you have any technical problems or queries.

1.7 Assumptions of Technical Experience

Parker Hannifin Corporation assumes qualified personnel are involved in the servicing of industrial control systems and trained in recognizing hazards in products with hazardous energy levels. To install and troubleshoot the PCH Portal, the personnel must have a fundamental understanding of the following:

- Electronic concepts such as voltage, current, and switches
- Knowledge on the mechanical aspects of mounting the PCH Portal in the machine tool environment.
- Good understanding of Networking concepts and implementation of safety circuitry

1.8 Product Naming

This guide describes the following product:

- PCH Portal

NOTE: For ordering information/part number structure, refer to 8.3

1.9 Notes, Cautions and Warnings

This guide uses notes, cautions, and warnings throughout the text to draw attention to information that is especially important or useful.

WARNING: A warning provides information about a potential for property damage, personal injury, or death.

CAUTION: A caution provides information intended to help prevent improper use of the product or damage to the product hardware or software.

NOTE: A note provides information intended to make the best use of the product from Parker Hannifin Corporation.

CHAPTER - 2 **Overview**

2.1 Product Overview

The PCH Portal is a networked slave IO control device that supports multiple “Industrial Ethernet” communication protocols to communicate with other industrial controllers in the automation industry.

The PCH Portal is engineered to interface with a manifold containing up to 32 H ISO Universal valve channels as well as to offer a wide variety of discrete and IO-Link input/output arrangements for motion control, while withstanding the temperature ranges, vibrations, and electrical noise of industrial environments.

Figure 1 — PCH Portal

2.2 Module Overview

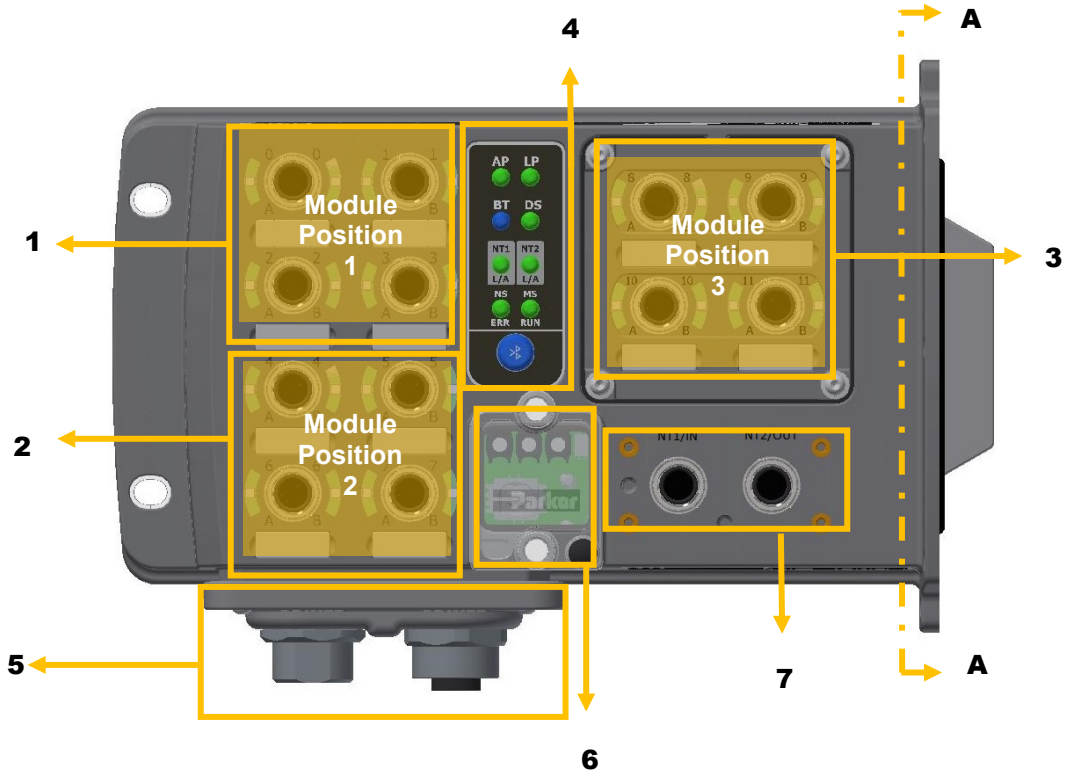


Figure 2 — Module Overview

Table 1 — Module Overview

Module Overview	
Item No	**Part Name**
1	Module Position 1 *
2	Module Position 2 *
3	Module Position 3 **
4	Status LEDs/Bluetooth enable button
5	Power Supply Connectors
6	Rotary Switches, USB connector (Type B)
7	Network Communication Ports (Link/Activity)
A	Connection to H Universal Air Supply

NOTE:
* Possible options: “A” Module, “B” Module, “C” Module.
** Possible options: “A” Module, “B” Module, “C” Module, Blank Plate.

2.3 Power Supply Connectors

The Aux and Logic power connectors supply the power to all modules of the PCH Portal, the mother board and other modules.

The following four types of power connectors are available based on the end user's requirement. Power consumption requirements must be considered when selecting a power connection. When using the power out connector to supply downstream power, the total power consumption available for downstream devices is equal to maximum capacity of connector pins (AUX_{PT} = 20A and LOG_{PT} = 20A) less the current draw of PCH. The PCH internal limits are as follows: AUX_{PCH} = 12A and LOG_{PCH} = 8A. The PCH internal limits include devices connected to any of the 3 IO/IO-Link modules, and total wattage of the valve coils. Care must be taken in knowing the downstream current draw in order not to overload the maximum current rating of the pins. User can select 4-pin or 5-pin connectors configurations. Zone 1-3 is 24Vdc ,3.84A and Zone 4 is 24V, 1.28A.

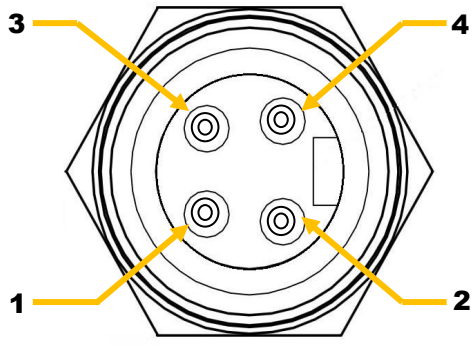
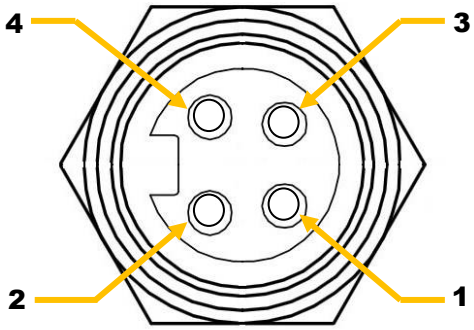
NOTE: 5 pin connectors utilize pin 3 for protective earth ground.

Table 2 — Types of Aux Power Connectors

Type of Aux Power Connectors	Connector Pin	Connector Configuration	Description
A and B	4 Pin	IN OUT	4 Pin - A - Power IN - Power OUT
	5 Pin	IN OUT	5 Pin - B - Power IN - Power OUT
C and D	4 Pin	IN IN	4 Pin - C - Power IN - Power IN
	5 Pin	IN IN	5 Pin - D - Power IN - Power IN

Type 1: 4 Pin "A" (Power IN-Power OUT)

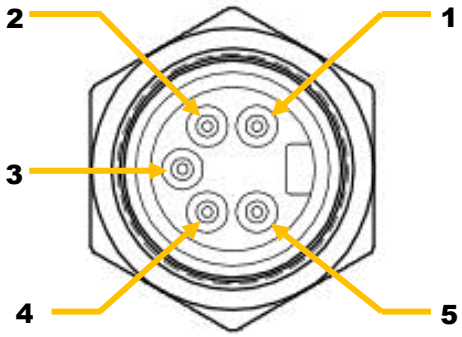
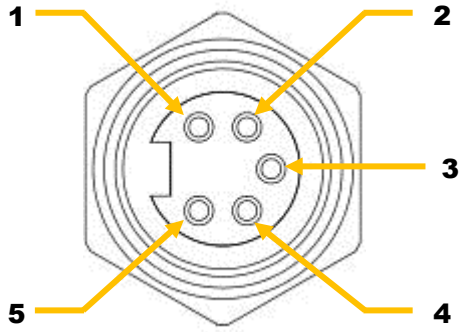
Table 3 — 4 Pin "A" (Power IN-Power OUT)

Power In (Male)	Power Out (Female)
	

Pin	Function	Description		Function	Description
1	+24 V	+24V V2 (VAUX)		+24 V	+24V V2 (VAUX)
2	+24 V	+24V V1 (VLOG)		+24 V	+24V V1 (VLOG)
3	0 V	GND V1 (VLOG)		0 V	GND V1 (VLOG)
4	0 V	GND V2 (VAUX)		0 V	GND V2 (VAUX)

Type 2: 5 Pin “B” (Power IN-Power OUT)

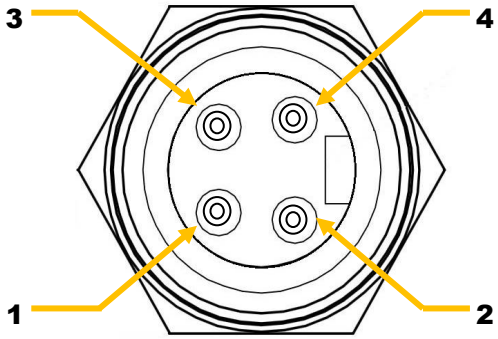
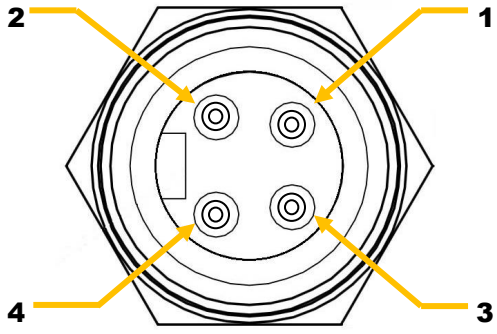
Table 4 — 5 Pin “B” (Power IN-Power OUT)

Power In (Male)	Power Out (Female)
	

Pin	Function	Description		Function	Description
1	0 V	GND V2 (VAUX)		0 V	GND V2 (VAUX)
2	0 V	GND V1 (VLOG)		0 V	GND V1 (VLOG)
3	Protective Earth	Protective Earth		Protective Earth	Protective Earth
4	+24 V	+24V V1 (VLOG)		+24 V	+24V V1 (VLOG)
5	+24 V	+24V V2 (VAUX)		+24 V	+24V V2 (VAUX)

Type 3: 4 Pin “C” (Power IN-Power IN)

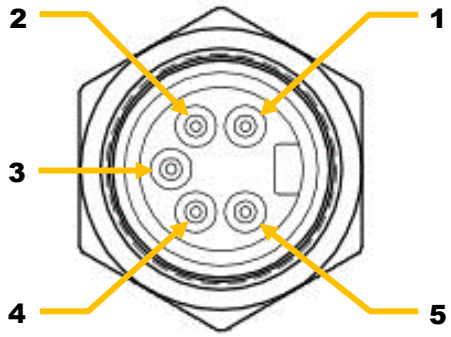
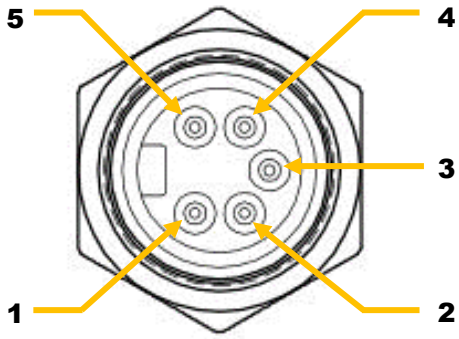
Table 5 — 4 Pin “C” (Power IN-Power IN)

Power In (Male)	Valve Power In (Male)
	

Pin	Function	Description		Function	Description
1	+24V	+24V V2 (VAUX)		+24V	+24V V2 (VAUX) 1-3
2	+24V	+24V V1 (VLOG)		+24V	+24V V2 (VAUX) 4
3	0V	GND V1 (VLOG)		0V	Safe GND 1-3
4	0V	GND V2 (VAUX)		0V	Safe GND 4

Type 4: 5 Pin “D” (Power IN-Power IN)

Table 6 — 5 Pin “D” (Power IN-Power IN)

Power In (Male)	Valve Power In (Male)
	

Pin	Function	Description		Function	Description
1	0V	GND V2 (VAUX)		+24V	+24V V2 (VAUX) 1-3
2	0V	GND V1 (VLOG)		+24V	+24V V2 (VAUX) 4
3	Protective Earth	Protective Earth		Protective Earth	Protective Earth
4	+24V	+24V V1 (VLOG)		0V	Safe GND 1-3
5	+24V	+24V V2 (VAUX)		0V	Safe GND 4

All four types of power connectors are capable of operating with SAFE pulsed power; however, it is recommended to use the 4 Pin C-type and 5 Pin D-type connector boards to connect SAFE 24Vdc auxiliary source in PP or PM mode for valve control as the grounds are isolated. The connection diagram is as shown below:

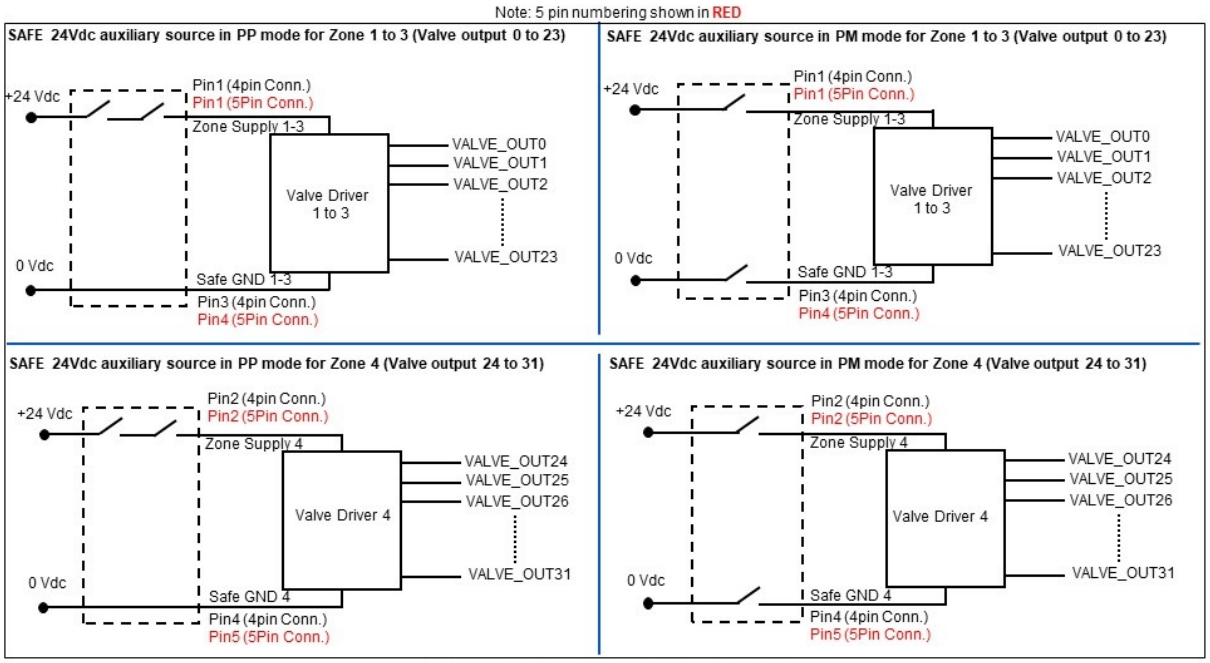


Figure 3 — C/D Board Wiring

NOTE:

The power back-up functionality (storing of cycle counts and error/warning/event log) of PCH Portal is not guaranteed to function if the PCH Portal is operated outside operating voltage range i.e., when the Logic voltage is <= 20.4V

If Aux voltage goes below the operating voltage range for the duration of 225 +/- 25 msec then the valve outputs and Aux voltage digital outputs are turned OFF for safety purpose. This behaviour is not applicable for “A” Module as outputs on this module operate on logic supply.

To avoid unwanted motion in field a hysteresis of 200 mV is maintained to turn ON/OFF outputs in case of Aux voltage error condition.

2.4 Grounding

The chassis ground is connected to the earth connection at the highlighted point below.

Figure 4 — Grounding Point

2.5 I/O and IO-Link

- **“A” Module (IO-Link Class A or configurable I/O):** This module has 4 M12 ports and is powered by Logic Power. Each port has the following configurations:
  i. 1 IO-Link class A master and pin 2 configurable as input or output
  OR
  ii. 2 inputs, 24VDC (PNP or NPN)
  OR
  iii. 2 outputs (Logic Power), 250mA @ 24VDC

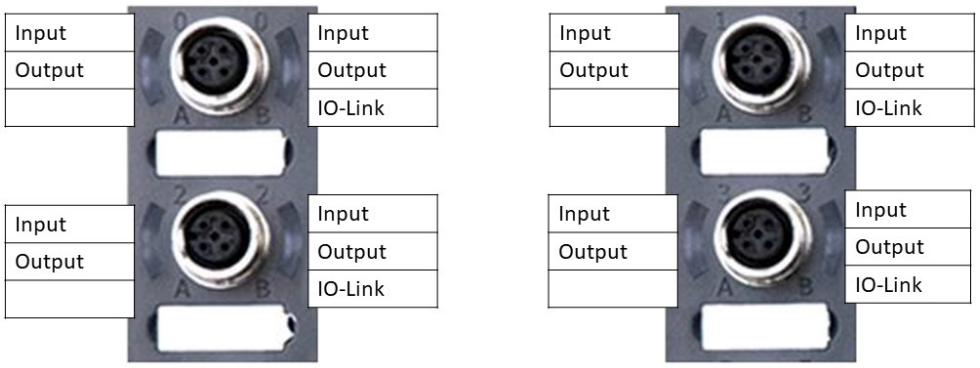
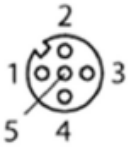


Figure 5 — “A” Module

Table 7 — “A” Module Port Details

Connector	Pin No.	Function
	1	+24V, 500mA VLOG (V1)
	2	Input (PNP or NPN)/Output +24V, 250 mA (V1)
	3	GND (V1)
	4	IO-Link/Input (PNP or NPN)/Output +24V, 250mA (V1)
	5	Not Connected

- **“B” Module (IO-Link Class B or configurable I/O):** This module has 4 M12 ports. Each port has the following configurations:
    i. IO-Link class B master
    OR
    ii. 1 input, 24VDC (PNP or NPN), PIN 4
    OR
    iii. 1 output (Logic Power), 250mA @ 24VDC, PIN 4

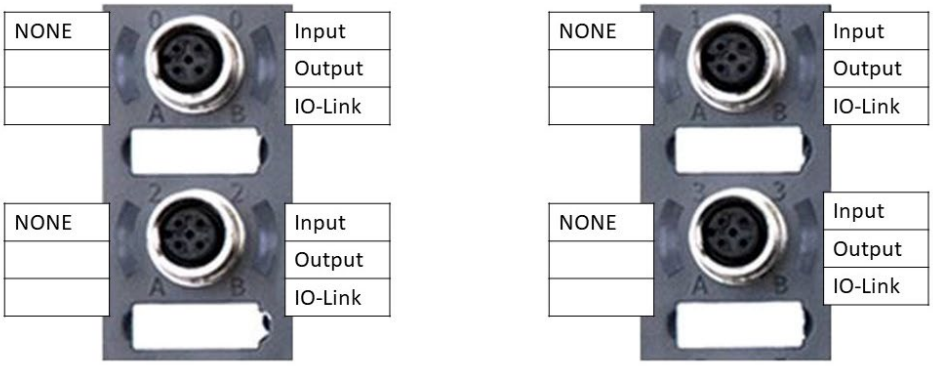
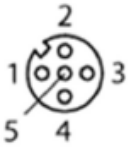


Figure 6 — “B” Module

Table 8 — “B” Module Port Details

Connector	Pin No.	Function
	1	+24V, 250mA VLOG (V1)
	2	+24V, 1.2A VAUX (V2)
	3	GND (V1)
	4	IO-Link/Input (PNP or NPN)/Output +24V, 250mA (V1)
	5	GND (V2)

- **<u>"C" Module (IO-Link Class B or configurable I/O with Aux Outputs):</u>** This module has 4 M12 ports. Each port has the following configurations:
    - i. 2 M12 ports with Digital Output.
        - a. 2 outputs (Aux Power), 500mA @ 24VDC
    - ii. 2 M12 ports with each port having the following configuration:
        - a. 1 IO-Link class B master
          OR
        - b. 1 input, 24VDC (PNP or NPN), PIN 4
          OR
        - c. 1 output (Logic Power), 250mA @ 24VDC, PIN 4

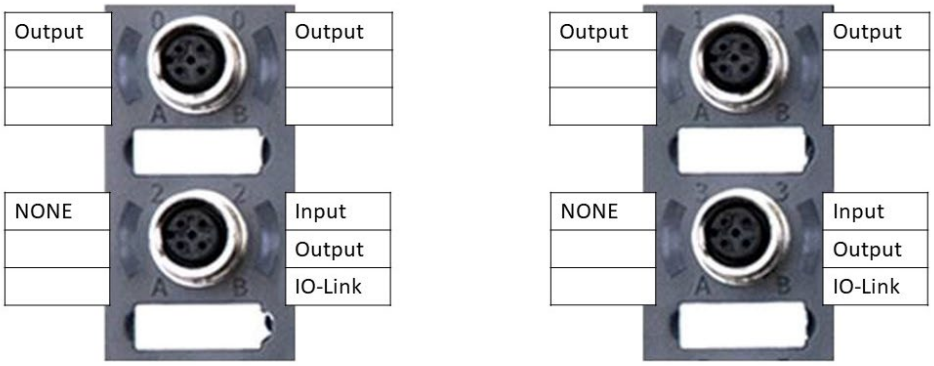


Figure 7 — "C" Module

Table 9 — "C" Module Aux Output Port Details (Ports 0 and 1 of this Module)

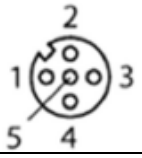
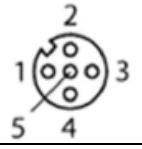
Connector	Pin No.	Function
	1	Not Connected
	2	Output +24VAUX (V2), 500mA
	3	GND (V2)
	4	Output +24VAUX (V2), 500mA
	5	Not Connected

Table 10 — "C" Module IO-Link Class B Port Details (Ports 2 and 3 of this Module)

Connector	Pin No.	Function
	1	+24V, 250mA VLOG (V1)
	2	+24V, 1.2A VAUX (V2)
	3	GND (V1)
	4	IO-Link/Input (PNP or NPN)/Output +24V, 250 mA (V1)
	5	GND (V2)

2.6 Status LEDs/Bluetooth Enable Button

Status LEDs: The LEDs are used to indicate the status of Aux Power (AP), Logic Power (LP), Bluetooth Module Status (BT), ERR Status, RUN Status, Device Status (DS), Link/Activity (L/A) and Link/Activity (L/A).

Bluetooth Enable Button: Press and hold this button for more than 3 seconds to enable/disable the Bluetooth functionality. The Bluetooth communication is used to connect to PCH Portal via Bluetooth mobile application and PC Configuration Tool (refer to CHAPTER - 5). To connect using PC Configuration Tool over Bluetooth, a low energy Bluetooth (BLE) USB Dongle must be connected to a USB port of Windows PC.

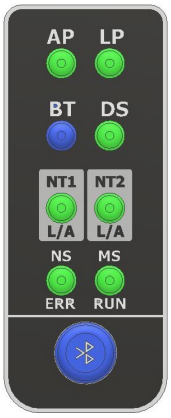


Figure 8 — Status LEDs/Bluetooth Enable button

The following table gives the status indication of the Aux Power, Logic Power, Bluetooth, Device and Network ports:

Table 11 — PCH Device LED Indication

LED Label	LED State	Indication	Description
RUN LED (RUN)	OFF	INIT State	EtherCAT device in 'INIT'-state (or no power)
	Green	Operational State	EtherCAT device in 'OPERATIONAL'-state
	Green Blinking	Preoperational State	EtherCAT device in 'PRE-OPERATIONAL'-state
	Green Single Flash	Safe Operational State	EtherCAT device in 'SAFE-OPERATIONAL'-state
	Flickering	Boot	EtherCAT device is in 'BOOT' state
	Red	Fatal Event	If RUN and ERR turn red, this indicates a fatal event, forcing the bus interface to a physically passive state.
Error LED (ERR)	OFF	No Error	No error (or no power)
	Red Blinking	Invalid Configuration	State change received from master is not possible due to invalid register or object settings.
	Red Single Flash	Unsolicited State Change	Slave device application has changed the EtherCAT state autonomously.
	Red	Network Failure	Exception state
	Flickering	Booting Error detected	Due to firmware download failure

LED Label	LED State	Indication	Description
Link Activity (L/A) LED for network port 1 and network port 2 (IN/OUT)	OFF	No link	Link not sensed (or no power)
	Solid Green	Link sensed; no activity	Link sensed; no traffic detected
	Solid Green	Link sensed; no activity	Link sensed; no traffic detected
	Flashing Green	Link sensed; activity	Link sensed; traffic detected
Bluetooth (BT)	OFF	NA	Bluetooth communication OFF
	Solid Blue	NA	Bluetooth module is communicating with PC Utility over Bluetooth Interface
	Flashing Blue	NA	Bluetooth module is ON and waiting to be paired or Bluetooth module firmware upgrade in progress if Device status (DS) LED is flashing yellow
Auxiliary Power (AP)	Solid Red	NA	Auxiliary Power below 19.4 V or above 29.4V
	Flashing Red	NA	Auxiliary Power between 19.4V to 20.3V or 28.9V to 29.4V
	Solid Green	NA	Auxiliary Power between 20.4 V to 28.8V
	Solid Magenta	NA	Auxiliary Current above 12 Amps
Logic Power (LP)	OFF	NA	Logic Power below 16V or above 29.4V
	Solid Red	NA	Logic Power below 19.3V
	Flashing Red	NA	Logic Power between 19.4V to 20.3V or 28.9V to 29.4V
	Solid Green	NA	Logic Power between 20.4V to 28.8V
	Flashing Magenta	NA	Logic current between 7.5 Amps to 8 Amps
	Solid Magenta	NA	Logic current above 8 Amps
Device Status (DS)	Solid Green	NA	Device in normal mode
	Flashing Green	NA	Valve short circuit during valve self-test
	Flashing Yellow	NA	Invalid Configuration from PLC
	Flashing Red	NA	Invalid product code/Valve short circuit
	Solid Red	NA	Internal error
	Solid Yellow	NA	Internal warning
	Solid Magenta	NA	Module Error
	Flashing Magenta	NA	Internal warning
	Flashing Cyan	NA	Temperature between 75 °C to 80 °C/Reset to default in progress
	Solid Cyan	NA	Temperature above 80 °C

2.7 USB connector and Rotary Switches

USB Connector: The USB 2.0 OTG, Type-B standard connector is used to interface with the configuration software. The configuration software is used to configure and monitor the PCH Portal product.

Rotary Switches: The PCH Portal contains 3 rotary switches. These are used to set the last octet of the IP Address (assigning a static IP address), factory default, Enable FTP and DHCP mode.

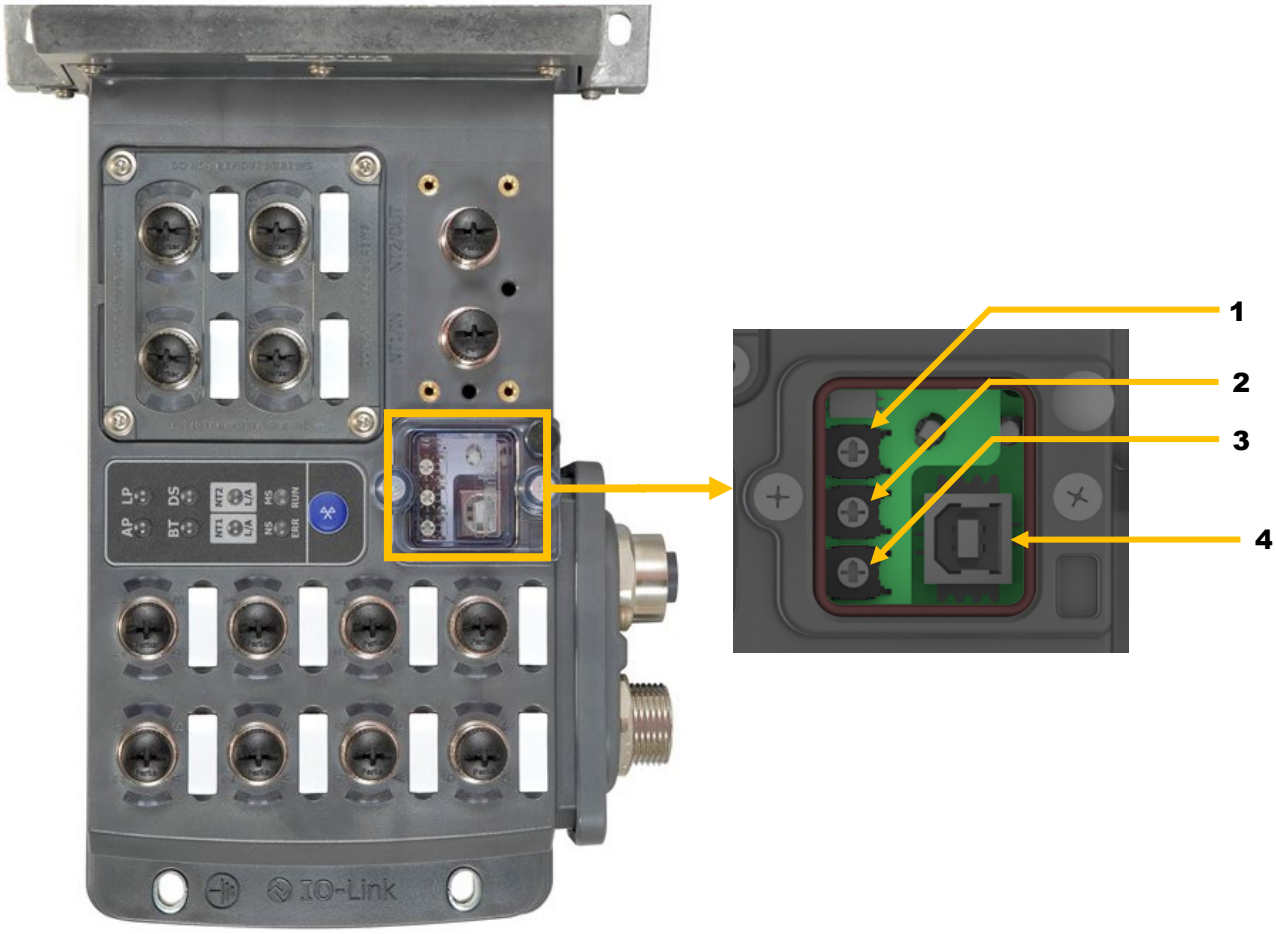


Figure 9 — USB Port and Rotary Switch Details

Table 12 — USB Port and Rotary Switch Details

Callout No.	Details
1	Rotary Switch x1
2	Rotary Switch x10
3	Rotary Switch x100
4	USB Port

The rotary switches are housed besides the USB port. The rotary switches are used to configure the PCH Portal product for the following functionalities based on the rotary switch settings shown in Table 13.

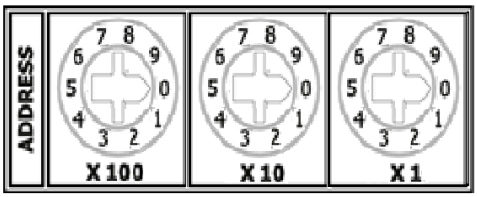


Figure 10 — Rotary Switch Configuration Details

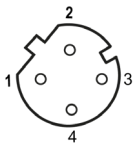
Table 13 — Rotary Switch Configuration Details

Rotary Switch Setting	Description
001 to 254	A setting of 001 to 254 on rotary switch and power cycle of PCH Portal enables the PCH device to use static IP address. The last octet of the IP address is as per the rotary switch setting and the first three octets is as configured in the config utility over USB and web interface. (Factory Default IP: 192.168.1.8)
333	A setting of 333 on the rotary switch and power cycle of the PCH Portal allows config utility over USB and web interface to configure all four octets of IP address of the PCH Portal. After IP address configuration through utility, power cycle of PCH Portal once again results in PCH Portal to boot-up with IP address configured using the config tool.
387	Enable FTP
888	A setting of 888 on the rotary switch and power cycle of the PCH Portal configures PCH Portal to use IP address assigned by DHCP server.
999	A setting of 999 on the rotary switch and power cycling the PCH Portal resets all the configuration data to the factory default. IP 192.168.1.8
Out of range	A setting on rotary switch other than 000 to 255, 333, 387, 888 and 999 results in the PCH Portal boot-up with last good IP address. The last good IP address is the IP address used by the PCH Portal before last reset.

2.8 Network Communication Ports NT1 and NT2

The Network Communication Ports are used to connect the PCH Portal to external devices in the automation system.

Table 14 — Network Interface

M12, D-coded, female	Pin No.	Function
	1	Tx+
	2	Rx+
	3	Tx-
	4	Rx-

2.9 Connection to H Universal Air Supply

There are 2 connectors (30 pin and 10 pin) for up to 32 valves. 24 valves can be connected to 30 pin connectors and 8 valves can be connected to 10-pin connector. Each valve output has a maximum of 160 mA at 24 V.

Valve Output Pinout:

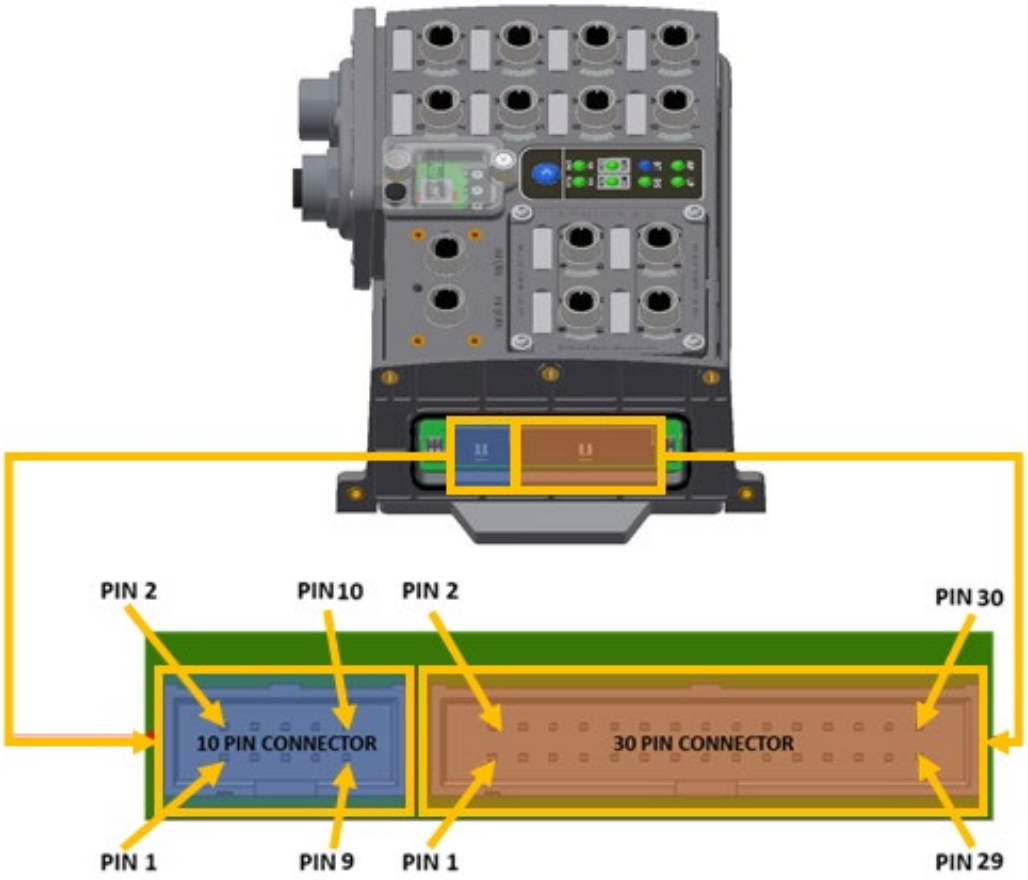


Figure 11 — Valve Output Pinout

Table 15 — Value Output Pinout Details

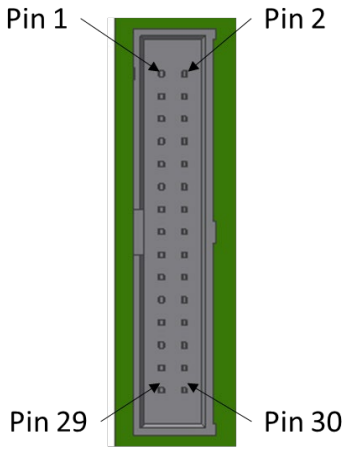
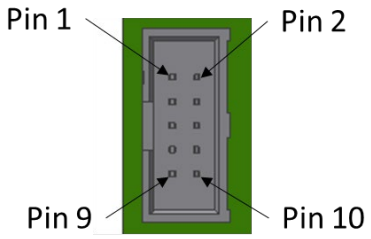
Connector	Pin Number	Function
	1	GND V2/Safe GND 1
	2	GND V2/Safe GND 1
	3	GND V2/Safe GND 1
	4	GND V2/Safe GND 1
	5	GND V2/Safe GND 1
	6	Protective Earth
	7	VALVE_OUT0
	8	VALVE_OUT1
	9	VALVE_OUT2
	10	VALVE_OUT3
	11	VALVE_OUT4
	12	VALVE_OUT5
	13	VALVE_OUT6
	14	VALVE_OUT7
	15	VALVE_OUT8
	16	VALVE_OUT9
	17	VALVE_OUT10
	18	VALVE_OUT11
	19	VALVE_OUT12
	20	VALVE_OUT13
	21	VALVE_OUT14
	22	VALVE_OUT15
	23	VALVE_OUT16
	24	VALVE_OUT17
	25	VALVE_OUT18
	26	VALVE_OUT19
	27	VALVE_OUT20
	28	VALVE_OUT21
	29	VALVE_OUT22
	30	VALVE_OUT23

Table 16 — Valve Output Pinout Details

Connector	Pin Number	Function
	1	GND V2/Safe GND 2
	2	GND V2/Safe GND 2
	3	VALVE_OUT24
	4	VALVE_OUT25
	5	VALVE_OUT26
	6	VALVE_OUT27
	7	VALVE_OUT28
	8	VALVE_OUT29
	9	VALVE_OUT30
	10	VALVE_OUT31

NOTE: The valve outputs operate on Aux voltage and have latching behavior. In case the Logic voltage drops below operating range (< 16 V or > 30V), the valve outputs remain latched to the state they were set to when the PCH Portal logic supply was in operating range.

CAUTION: To comply with the protection class IP65, seal the unused ports with the appropriate plugs or cover caps.

- The PCH Network Portal can used the following H ISO Universal Valves:
  - ISO 15407-2 – sizes 02 & 01
  - ISO 5599-2 – sizes 1, 2 & 3
- The PCH Network Portal can support up to 32 addresses as shown
- The data map and PCH Tool refers to each address with a Valve_X designator. Each Valve_X designator is as shown.
- Addresses 25-31 can be accessed using an Intermediate Air Supply with Electric Expansion
- Each address is one solenoid

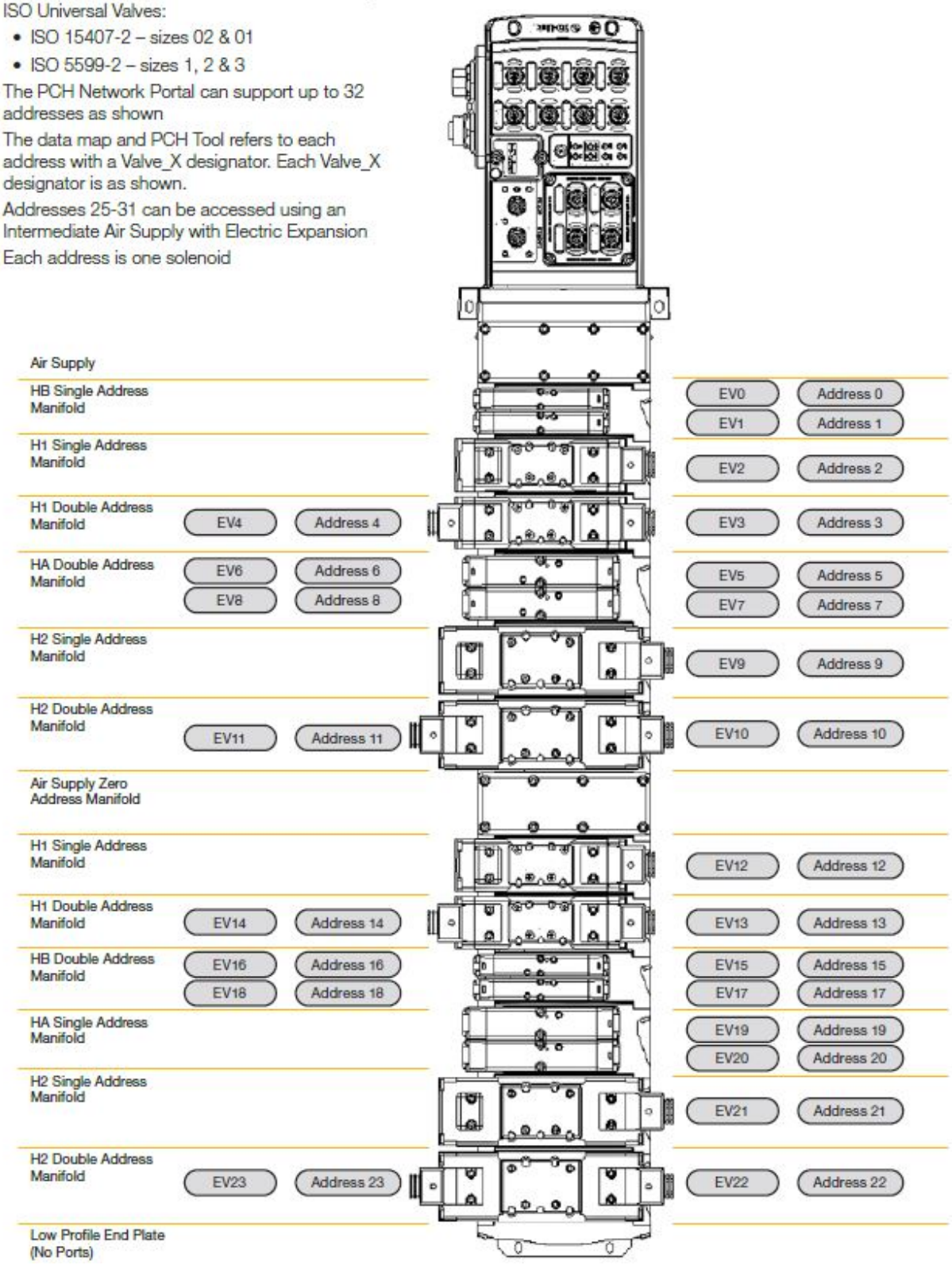


Figure 12 — Solenoid addressing

2.10 Port and Port LED Descriptions

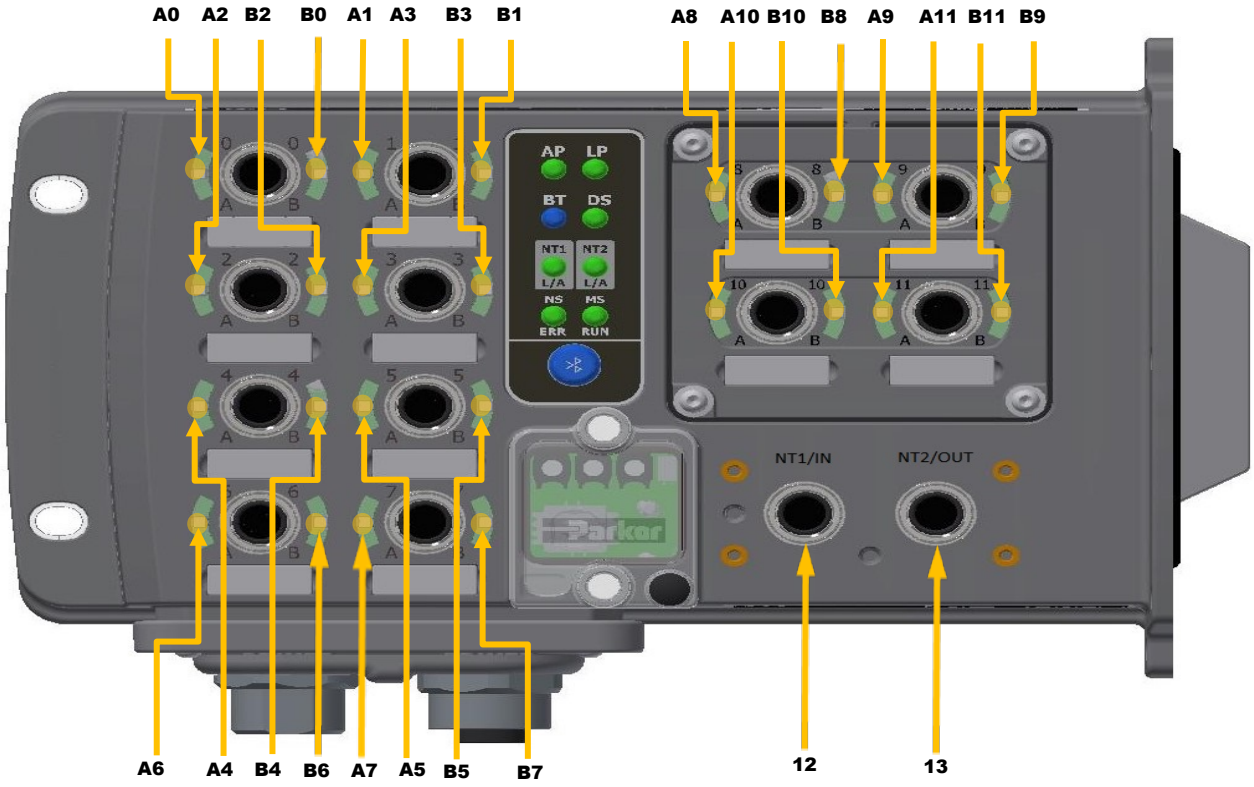


Figure 13 — Port Description

Table 17 — Port Description

Port Description			Port Description	
Callout No.	**Port Number**		**Callout No.**	**Port Number**
A0 (Channel 0)	Port 0/A (Pin 2)		B6 (Channel 13)	Port 6/B (Pin 4)
B0 (Channel 1)	Port 0/B (Pin 4)		A7 (Channel 14)	Port 7/A (Pin 2)
A1 (Channel 2)	Port 1/A (Pin 2)		B7 (Channel 15)	Port 7/B (Pin 4)
B1 (Channel 3)	Port 1/B (Pin 4)		A8 (Channel 16)	Port 8/A (Pin 2)
A2 (Channel 4)	Port 2/A (Pin 2)		B8 (Channel 17)	Port 8/B (Pin 4)
B2 (Channel 5)	Port 2/B (Pin 4)		A9 (Channel 18)	Port 9/A (Pin 2)
A3 (Channel 6)	Port 3/A (Pin 2)		B9 (Channel 19)	Port 9/B (Pin 4)
B3 (Channel 7)	Port 3/B (Pin 4)		A10 (Channel 20)	Port 10/A (Pin 2)
A4 (Channel 8)	Port 4/A (Pin 2)		B10 (Channel 21)	Port 10/B (Pin 4)
B4 (Channel 9)	Port 4/B (Pin 4)		A11 (Channel 22)	Port 11/A (Pin 2)
A5 (Channel 10)	Port 5/A (Pin 2)		B11 (Channel 23)	Port 11/B (Pin 4)
B5 (Channel 11)	Port 5/B (Pin 4)		12	Ethernet Port 1 (L/A)
A6 (Channel 12)	Port 6/A (Pin 2)		13	Ethernet Port 2 (L/A)

2.11 IO Port LED Indication

Each of the Ports have two LEDs to indicate the I/O-States that are configured.

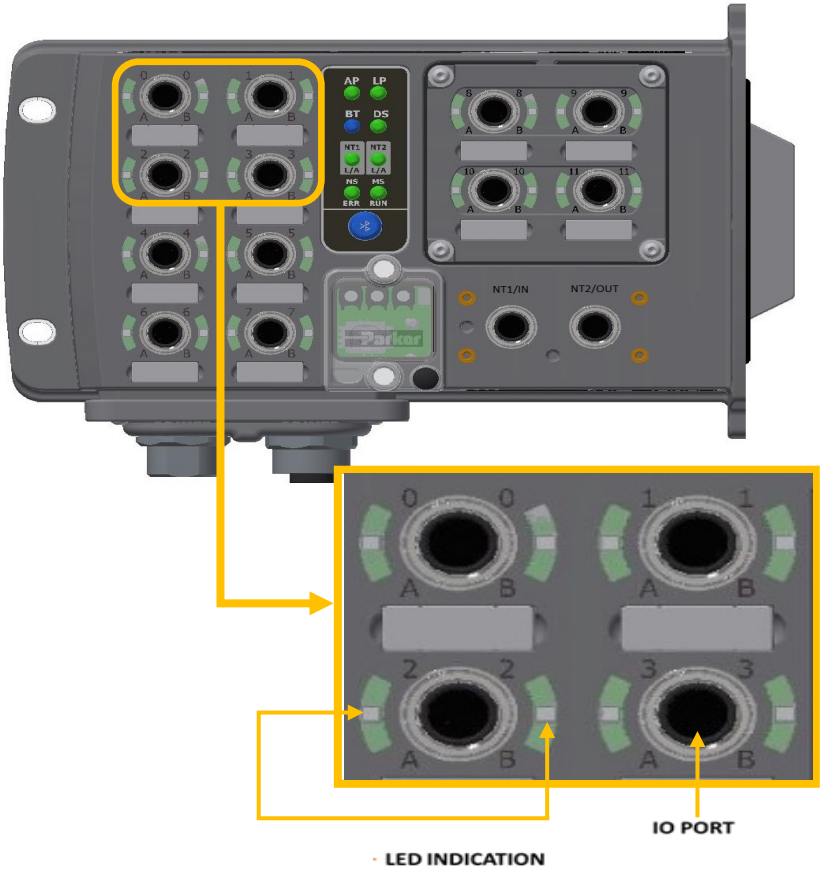


Figure 14 — IO-Port LED

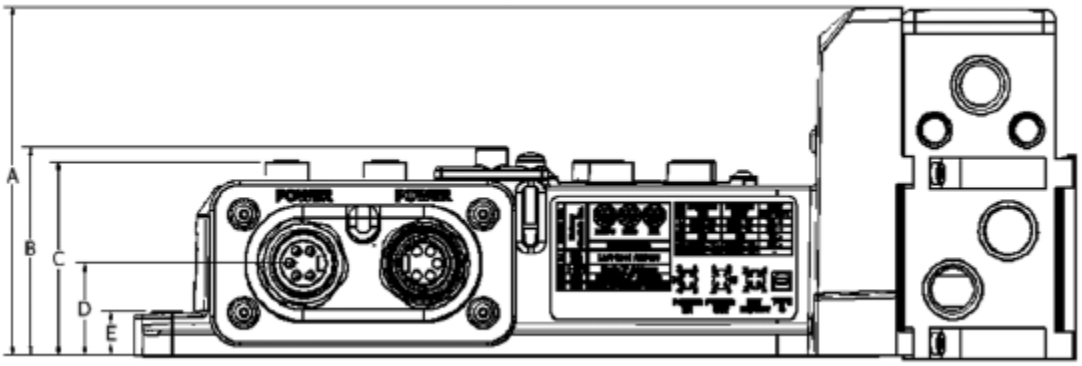
Table 18 — IO Port LED Indication

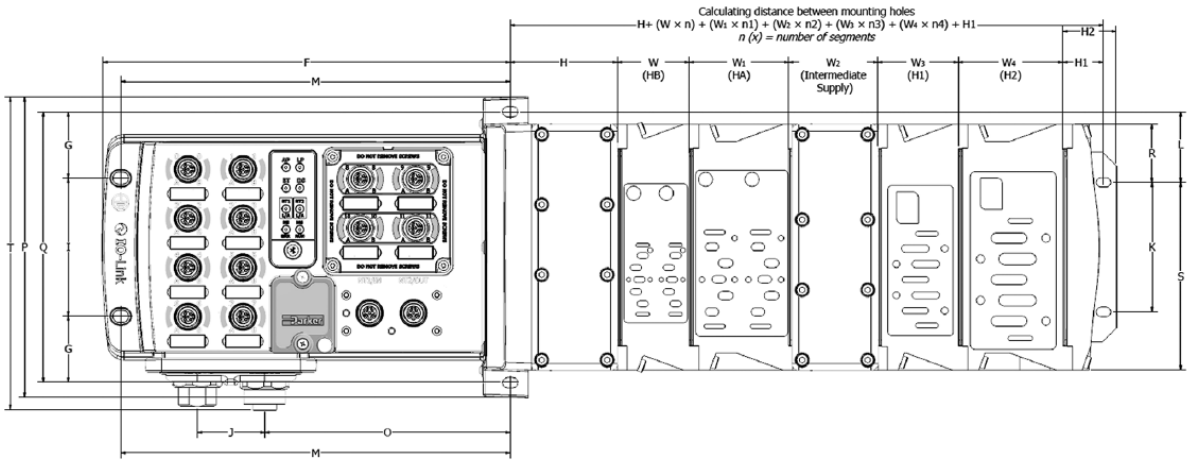
Color Indication	Status
OFF	Input is configured and input is OFF
Light Blue	Output is configured and output is OFF (Type A module) OR I/O is not configurable (Type B module)
Yellow	Input is ON or Output is actuated
Yellow flashing	During firmware upgrade
Red	Over current at I/O or IO-Link point
Red flashing	Short-circuit at supply/Validation Error/Data Storage Error
Green	IO-Link is configured, and IO-Link slave connected
Green rapid flashing	IO-Link port is getting configured
Green flashing	IO-Link is configured, and IO-Link slave not connected
Magenta	The application image present in flash is not valid
Magenta flashing	Watchdog error

CHAPTER - 3 **Technical Data**

3.1 Dimensions

Footprint dimensions: length, width, height of entire PCH





n (x) = number of segments

A	B	C	D	E	F	G	H	H_1	H_2	J	K	L
4.42 (112.3)	2.64 (67.1)	2.46 (62.5)	1.17 (29.7)	.55 (14)	9.32 (236.7)	1.51 (38.4)	2.36 (59.9)	.9 (22.9)	1.22 (31)	1.55 (39.4)	2.95 (74.9)	1.6 (40.6)

M	O	P	Q	R	S	T	W	W_1	W_2	W_3	W_4
8.91 (226.3)	5.61 (142.5)	6.86 (174.2)	6.18 (157)	1.33 (33.8)	4.28 (108.7)	7.14 (181.4)	1.63 (41.4)	2.28 (57.9)	2.03 (51.6)	1.82 (46.2)	2.39 (60.7)

Inches (mm)

Mounting holes dimensions

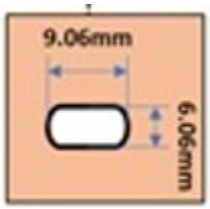


Figure 15 — Physical Dimensions

3.2 Mechanical Data

Table 19 — Mechanical Data

Parameters	Details
Housing material	Housing/Enclosure: PBT with 33% GF and UL94-V0 Base Cover (plate): Aluminum 380
Enclosure rating	IP 65 (only when plugged-in and threaded-in)
Supply Voltage	7/8” 4 or 5 pin male and female pin connector or AIDA
Input ports/Output ports	M12, A-coded (12 x female)
Dimensions (L x B x H in mm)	226.6mm x 130.7mm x 55mm
Mounting type	Screw Mount
Ground strap attachment	M5
Weight	Approx. 1.3 kg

3.3 Operating Conditions

Table 20 — Operating Conditions

Parameters	Details
Operating Temperature	0°C to 50°C
Storage Temperature	-25°C to 70°C
Industrial Immunity	IEC 61000-6-2
Industrial Emission	IEC 61000-6-4
Shock/Vibrations	IEC 60068-2-27:2008
	IEC 60068-2-6:2007
Electrostatic Discharge	IEC 61000-4-2
Electrical Fast Transient/ Burst	IEC 61000-4-4
Surge Immunity	IEC 61000-4-5

3.4 Electrical Data

Table 21 — Electrical Data

Topic	Details
Supply Voltage	24VDC (-15% to +20%)
Logic current at 24 V (V1)	Max Current 8A – Actual usage depends on configuration.
Auxiliary current at 24 V (V2)	Max Current 12A – Actual usage depends on configuration.
Input current at 24V (Zone 1-3)	Max Current 3.84A – Actual usage depends on configuration.
Input current at 24V (Zone 4)	Max Current 1.28A – Actual usage depends on configuration

CHAPTER - 4 **PCH Portal Function**

4.1 PCH Portal Function

The EtherCAT slaves usually are configured using EtherCAT masters like TwinCAT or other configuration tool provided by the master manufacturer. The device descriptor is required in the form of ESI file and is available on the Parker website. The ESI file contains information regarding the slave configuration. The EtherCAT master uses the available Boxes in ESI file to connect with the PCH Portal. There are total of 16 boxes available in ESI which can be scanned automatically or can be plugged manually.

The PCH Portal is categorized under Modular Device Profile. The modules available are flexible and reconfigurable. There are 39 slots available in the configuration where different sets of modules can be applied. The 12 port PCH Portal contains 3 IO-Link groups as shown in Fig 2 and 8 port PCH Portal contains 2 IO-Link groups. Each group of IO-Link can be “A” Module or “B” Module or “C” Module. Each group has 4 ports as shown in Figure 2.

- “A” Module has 4 IO-Link, 8 DI and 8 DO channels.
- “B” Module has 4 IO-Link, 4 DI and 4 DO channels.
- “C” Module has 2 IO-Link, 6 DO and 2 DI channels.

4.2 Slot Configuration

The PCH Portal follows a pin-based configuration.
Each slot Pin A can be configured as Standard Input (type PNP/NPN)/Output of 1 bit and slot Pin B can be configured as Standard Input (type PNP/NPN)/Output and IO-Link.
Slot 25 corresponds to Valve Module which can control the 32 available valve outputs on the PCH Portal.
Slot 26 to Slot 37 corresponds to IO-Link Status Module.
Slot 38 and 39 corresponds to Reserve Module one with 28/50 bytes I/O and other with 50 bytes Output, respectively.
Slots can be configured as mentioned in the table below:

Table 22 — Slot Configuration

Slot No.	Slot Name	Description
1	Module Port 0 Pin A	Slot for DI/DO Port 0 Pin A
2	Module Port 0 Pin B	Slot for DI/DO/IO-Link for Port 0 Pin B
3	Module Port 1 Pin A	Slot for DI/DO Port 1 Pin A
4	Module Port 1 Pin B	Slot for DI/DO/IO-Link for Port 1 Pin B
5	Module Port 2 Pin A	Slot for DI/DO Port 2 Pin A
6	Module Port 2 Pin B	Slot for DI/DO/IO-Link for Port 2 Pin B
7	Module Port 3 Pin A	Slot for DI/DO Port 3 Pin A
8	Module Port 3 Pin B	Slot for DI/DO/IO-Link for Port 3 Pin B
9	Module Port 4 Pin A	Slot for DI/DO Port 4 Pin A
10	Module Port 4 Pin B	Slot for DI/DO/IO-Link for Port 4 Pin B
11	Module Port 5 Pin A	Slot for DI/DO Port 5 Pin A
12	Module Port 5 Pin B	Slot for DI/DO/IO-Link for Port 5 Pin B
13	Module Port 6 Pin A	Slot for DI/DO Port 6 Pin A
14	Module Port 6 Pin B	Slot for DI/DO/IO-Link for Port 6 Pin B
15	Module Port 7 Pin A	Slot for DI/DO Port 7 Pin A
16	Module Port 7 Pin B	Slot for DI/DO/IO-Link for Port 7 Pin B
17	Module Port 8 Pin A	Slot for DI/DO Port 8 Pin A
18	Module Port 8 Pin B	Slot for DI/DO/IO-Link for Port 8 Pin B

Slot No.	Slot Name	Description
19	Module Port 9 Pin A	Slot for DI/DO Port 9 Pin A
20	Module Port 9 Pin B	Slot for DI/DO/IO-Link for Port 9 Pin B
21	Module Port 10 Pin A	Slot for DI/DO Port 0 Pin A
22	Module Port 10 Pin B	Slot for DI/DO/IO-Link for Port 10 Pin B
23	Module Port 11 Pin A	Slot for DI/DO Port 0 Pin A
24	Module Port 11 Pin B	Slot for DI/DO/IO-Link for Port 11 Pin B
25	Valve Module	Slot for Valve Outputs
26	Status IO-Link Port 0 Pin B	Slot for IO-Link Status Module Port 0 Pin B
27	Status IO-Link Port 1 Pin B	Slot for IO-Link Status Module Port 1 Pin B
28	Status IO-Link Port 2 Pin B	Slot for IO-Link Status Module Port 2 Pin B
29	Status IO-Link Port 3 Pin B	Slot for IO-Link Status Module Port 3 Pin B
30	Status IO-Link Port 4 Pin B	Slot for IO-Link Status Module Port 4 Pin B
31	Status IO-Link Port 5 Pin B	Slot for IO-Link Status Module Port 5 Pin B
32	Status IO-Link Port 6 Pin B	Slot for IO-Link Status Module Port 6 Pin B
33	Status IO-Link Port 7 Pin B	Slot for IO-Link Status Module Port 7 Pin B
34	Status IO-Link Port 8 Pin B	Slot for IO-Link Status Module Port 8 Pin B
35	Status IO-Link Port 9 Pin B	Slot for IO-Link Status Module Port 9 Pin B
36	Status IO-Link Port 10 Pin B	Slot for IO-Link Status Module Port 10 Pin B
37	Status IO-Link Port 11 Pin B	Slot for IO-Link Status Module Port 11 Pin B
38	Reserved Channel 1	Slot for Reserved 28/50 bytes I/O
39	Reserved Channel 2	Slot for Reserved 50 bytes Output

4.2.1 Pin A Modules

Table 23 — Pin A Modules

Name	Description
STD_IN_PNP_1Bit	Standard Input PNP
STD_IN_NPN_1Bit	Standard Input NPN
STD_OUT_1Bit	Standard Output

4.2.2 Pin B Modules

Table 24 — Pin B Modules

Name	Description
STD_IN_PNP_1Bit	Standard Input PNP
STD_IN_NPN_1Bit	Standard Input NPN
STD_OUT_1Bit	Standard Output
IOL_I_1Byte	IO-Link 1 Byte Input
IOL_I_2Byte	IO-Link 2 Byte Input
IOL_I_4Byte	IO-Link 4 Byte Input
IOL_I_6Byte	IO-Link 6 Byte Input
IOL_I_8Byte	IO-Link 8 Byte Input
IOL_I_10Byte	IO-Link 10 Byte Input
IOL_I_16Byte	IO-Link 16 Byte Input
IOL_I_24Byte	IO-Link 24 Byte Input
IOL_I_32Byte	IO-Link 32 Byte Input
IOL_O_1Byte	IO-Link 1 Byte Output
IOL_O_2Byte	IO-Link 2 Byte Output
IOL_O_4Byte	IO-Link 4 Byte Output
IOL_O_6Byte	IO-Link 6 Byte Output
IOL_O_8Byte	IO-Link 8 Byte Output
IOL_O_10Byte	IO-Link 10 Byte Output
IOL_O_16Byte	IO-Link 16 Byte Output
IOL_O_24Byte	IO-Link 24 Byte Output
IOL_O_32Byte	IO-Link 32 Byte Output
IOL_I/O_2/2Byte	IO-Link 2 Byte Input /2 Byte Output
IOL_I/O_2/4Byte	IO-Link 2 Byte Input /4 Byte Output
IOL_I/O_4/4Byte	IO-Link 4 Byte Input /4 Byte Output
IOL_I/O_4/2Byte	IO-Link 4 Byte Input /2 Byte Output
IOL_I/O_2/8Byte	IO-Link 2 Byte Input /8 Byte Output
IOL_I/O_4/8Byte	IO-Link 4 Byte Input /8 Byte Output
IOL_I/O_8/2Byte	IO-Link 8 Byte Input /2 Byte Output
IOL_I/O_8/4Byte	IO-Link 8 Byte Input /4 Byte Output
IOL_I/O_8/8Byte	IO-Link 8 Byte Input /8 Byte Output
IOL_I/O_4/32Byte	IO-Link 4 Byte Input /32 Byte Output
IOL_I/O_32/4Byte	IO-Link 32 Byte Input /4 Byte Output
IOL_I/O_16/16Byte	IO-Link 16 Byte Input /16 Byte Output
IOL_I/O_24/24Byte	IO-Link 24 Byte Input /24 Byte Output
IOL_I/O_32/32Byte	IO-Link 32 Byte Input/32 Byte Output

NOTE: The IO-Link modules Structure are always the same: IOL_I/O_x/xBytes in which
I = Input data
O = Output data
I/O = Both Input and Output data
x/x = number of process data items used (It is equal to or greater than the process data length of the IO-Link device).

4.2.3 IO-Link Status Module

Table 25 — IO-Link Status Module

Size (Bytes)	Module	Input Bits								Description
		7	6	5	4	3	2	1	0	
1	Port B0 IO-Link Status Module	RESV	EV	SC	PDI	DF	VF	DC	IOL	Refer to Table 33.
1		Vendor ID 1								Vendor ID
1		Vendor ID 2								
1		Device ID 1								Device ID
1		Device ID 2								
1		Device ID 3								
6	Port B1 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B2 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B3 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B4 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B5 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B6 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B7 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B8 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B9 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B10 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B11 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0

4.2.4 Valve Module

There are 32 valves that are used along with PCH Portal. This module has 4 bytes, and all bits are sequentially mapped to the 32 valves that are to be connected to the device.

Table 26 — Valve Module

Actual Byte No.	Bits								Description
	7	6	5	4	3	2	1	0	
1	V07	V06	V05	V04	V03	V02	V01	V00	Valve Output Data Vxx -> Output on Valve xx xx range is 00 to 31
2	V15	V14	V13	V12	V11	V10	V09	V08	
3	V23	V22	V21	V20	V19	V18	V17	V16	
4	V31	V30	V29	V28	V27	V26	V25	V24	

4.2.5 External Modules

Table 27 — External Modules

Submodule Name	IO Type	Input/Output Bits	Description
28 bytes Input/ 50 bytes Output	Input	External Module Data	Reserved for external module data
	Output	External Module Data	
50 bytes Output	Output	External Module Data	Reserved for external module data

4.3 Module Parameters

The start-up data are available to configure the device during connection and its availability depends on the modules used during the configuration. Available start-up data can be categorized as follows.

1. Module Parameterization
2. IO Config Port X Pin Y – X is 0 to 11 and Y is A or B
3. IO-Link Config Port X – X is 0 to 11
4. Valve Configuration

4.3.1 Module Parameterization

The module parameterization is used to control the start-up data initialization. To configure the device with start-up data, this must be enabled.

Table 28 — Module Parameterization

Configuration Parameter	Bits								Description
	7	6	5	4	3	2	1	0	
	B3	B2	B1	B0	B3	B2	B1	B0	
Module Parameterization	RESERVED							IOxy	MP = 0: Disable, 1: Enable

NOTE:
1. When module parameterization is enabled PCH will accept configuration from Engineering tool or PLC.
2. Irrespective of module parametrization (Enable/Disable) PCH will accept configuration from Web interface or Configuration tool.

4.3.2 IO Config Port X Pin Y

This start-up data can only be configured while using the Standard I/O modules of Pin A and Pin B. Following table shows the parameters available for configuration under this category. See Table 28 for instructions on enabling configuration via PLC.

Table 29 — IO Config Port X Pin Y

Module	Configuration Parameter	Bits								Description
		7	6	5	4	3	2	1	0	
		B3	B2	B1	B0	B3	B2	B1	B0	
STD_IN_NPN/ STD_IN_PNP	DIO Counter Control (Warning Mode)	RESERVED							CCxy	CCxy = 0: Disable CCxy = 1: Enable
	DIO Counter Type	RESERVED							CTxy	CTxy = 0: Up Counter CTxy = 1: Down Counter
	DI Inversion	RESERVED							DIxy	DIxy = 0: Invert Disable DIxy = 1: Invert Enable
	DI De-bounce Time	DBTxy								0 - 120 msec
Standard Output	DO Fault Mode	RESERVED							FMxy	FMxy = 0: Fault Value FMxy = 1: Last Good
	DIO Counter Control	RESERVED							CCxy	CCxy = 0: Disable CCxy = 1: Enable
	DIO Counter Type	RESERVED							CTxy	CTxy = 0: Up Counter CTxy = 1: Down Counter

NOTE: xy is dependent on slot to which this module is plugged in.

- **DIO Counter Control:** This parameter contains the following options:
  1. Disable
  2. Enable

  This parameter enables or disables the cycle count limit notification functionality of digital input or output for the corresponding channel. It also enables/disables changing of counter type and cycle reset parameter. If this parameter is enabled, then the PCH device raises the cycle limit reaching a warning when the cycle count limit is reached. The cycle count limit is configured through configuration tool. This has following two values:
  Enable (1): Warning mode enabled.
  Disable (0): Warning mode disabled.

- **DIO Counter Type:** This parameter will have the following options:
    1. Up Counter
    2. Down Counter

  This parameter defines the behavior of cycle count parameter of the digital IO as an up counter or down counter for the corresponding channel. This parameter contains the following two values.
  Up counter (0): The cycle count associated with digital IO increments by one for every cycle of digital IO. The cycle count continues to increment beyond the configured cycle limit value (up to max limit of 20,000,000) in case cycle count type is configured as up counter. The cycle count stops incrementing after it reaches the max limits of 20,000,000.

  Down counter (1): The cycle count associated with digital IO decrements by one for every cycle of digital IO. The cycle count does not decrement beyond zero after the respective IO is operated more than the configured maximum cycles in case the cycle type is configured as down counter.
  The transition of digital IO from OFF to ON to OFF is counted as one cycle.

- **DI Inversion:** This parameter will have the following options:
    1. OFF
    2. ON

  This parameter enables or disables the inversion on digital input for each corresponding input channel. If this parameter is enabled, then the inverted status of the respective input is communicated to PLC. The invert functionality is not applicable to LED indication on the PCH Portal. This parameter has two values:
  ON (1): Enables the inversion mode in the PCH Portal.
  OFF (0): Disables the inversion mode in the PCH Portal.

- **DI De-bounce time:**
  This parameter defines the de-bounce time for each corresponding channel to avoid jitter in the input signal. This parameter applies for both ON to OFF and OFF to ON transition. If the de-bounce time configured is 0, then it disables the de-bounce logic.
  The valid range of this parameter 0 to 120 msec in decimal.

- **DO Fault Mode:** This parameter will have the following options:
    1. OFF
    2. Last Good

  Fault Mode (FM): This field is presently not used and the same is removed from the data map in the next release.

4.3.3 IO-Link Config Port X

This start-up data is available with IO-Link Modules configured at Pin B slots. The parameters available for configuration are described in below table.

Table 30 — IO-Link Config Port X

S. No.	Configuration Parameter	Bits								Description
		7	6	5	4	3	2	1	0	
		B3	B2	B1	B0	B3	B2	B1	B0	
1	IO-Link Configuration	Base		Time						Cycle Time

This parameter can be used to influence the IO-Link Communication speed. Calculated using the multiplier and the time base, the IO-Link Cycle time can be increased.
The time base is described in Table B3. The multiplier is entered in decimal form from 0 to 63.

Bit								Description
7	6	5	4	3	2	1	0	
Time base		Multiplier						Bit 0 to 5: Multiplier These bits contain a 6-bit multiplier for the calculation of Master Cycle Time or Minimum Cycle Time. Permissible values for the multiplier are 0 to 63. Bit 6 to 7: Time Base These bits specify the time base for the calculation of Master Cycle Time or Minimum Cycle Time.

Possible values of Master Cycle Time and Minimum Cycle Time:

Time base encoding	Time base value	Calculation	Cycle time
00	0.1 ms	Multiplier x time base	0.4 ms to 6.3 ms
01	0.4 ms	6.4 ms + multiplier x time base	6.4 ms to 31.6 ms
10	1.6 ms	32.0 ms + multiplier x time base	32.0 ms to 132.8 ms
11	RESERVED		
NOTE: The value 0.4 results from the minimum possible transmission time.			

S. No.	Configuration Parameter	Bits								Description
		7	6	5	4	3	2	1	0	
		B3	B2	B1	B0	B3	B2	B1	B0	
2	IO-Link Configuration	Refer below values for the selection of “Validation Type”								Validation Type

This parameter defines the behavior of "Validation Type" of the IO-Link. This parameter has following three values:

No Validation 0x0000
Compatible 0x0001
Identical 0x0002

NOTE: The above Validation Type Configuration are applicable for IO-Link Port #0 to IO-Link Port #11.

3	IO-Link Configuration	VID	VID	VID	VID	VID	VID	VID	VID	Vendor ID 1
4		VID	VID	VID	VID	VID	VID	VID	VID	Vendor ID 2
5		DID	DID	DID	DID	DID	DID	DID	DID	Device ID 1
6		DID	DID	DID	DID	DID	DID	DID	DID	Device ID 2
7		DID	DID	DID	DID	DID	DID	DID	DID	Device ID 3
8		Serial Number - Byte No. 01-16								Serial Number
9		Refer below values for the selection of “Parameter Server”								Parameter Server

This parameter defines the behavior of "Parameter Server (Data Storage)" of the IO-Link. This parameter has following five values:

Disable : 0x0040
Upload : 0x0081
Download : 0x0082
Upload + Download : 0x0083
Clear : 0x0020

NOTE: The above Parameter Server Configuration are applicable for IO-Link Port #0 to IO-Link Port #11.

4.3.4 Valve Configuration

The Valve module carries this start-up data, and this can be configured when valve module is used. Following table shows the available parameter under this category.

Table 31 — Valve Configuration Information

Configuration Parameter	Bits								Description
	7	6	5	4	3	2	1	0	
	B3	B2	B1	B0	B3	B2	B1	B0	
Valve Driver 1 Fault Mode	FM07	FM06	FM05	FM04	FM03	FM02	FM01	FM00	0 - Off 1 - Last Good
Valve Driver 1 Counter Control	CC07	CC06	CC05	CC04	CC03	CC02	CC01	CC00	0 - Disable 1 - Enable
Valve Driver 1 Counter Type	CT07	CT06	CT05	CT04	CT03	CT02	CT01	CT00	
Valve Driver 2 Fault Mode	FM15	FM14	FM13	FM12	FM11	FM10	FM09	FM08	0 - Off 1 - Last Good
Valve Driver 2 Counter Control	CC15	CC14	CC13	CC12	CC11	CC10	CC09	CC08	0 - Disable 1 - Enable
Valve Driver 2 Counter Type	CT15	CT14	CT13	CT12	CT11	CT10	CT09	CT08	
Valve Driver 3 Fault Mode	FM23	FM22	FM21	FM20	FM19	FM18	FM17	FM16	0 - Off 1 - Last Good
Valve Driver 3 Counter Control	CC23	CC22	CC21	CC20	CC19	CC18	CC17	CC16	0 - Disable 1 - Enable
Valve Driver 3 Counter Type	CT23	CT22	CT21	CT20	CT19	CT18	CT17	CT16	
Valve Driver 4 Fault Mode	FM31	FM30	FM29	FM28	FM27	FM26	FM25	FM24	0 - Off 1 - Last Good
Valve Driver 4 Counter Control	CC31	CC30	CC29	CC	CC27	CC26	CC25	CC24	0 - Disable 1 - Enable
Valve Driver 4 Counter Type	CT31	CT30	CT29	CT28	CT27	CT26	CT25	CT24	

4.4 Configuring the PCH Portal with EtherCAT Master

For example, the connection of the PCH_Portal_A_B_C to a Beckhoff TwinCAT controller is shown with the TwinCAT System Manager. The exact procedure depends on the project planning software used.

4.4.1 Installing ESI Files

The device description has the following name: ESI_Parker_PCH-Portal-MPx.xml “x = 0 or 1’ (with 0 or 1 corresponding to the default value of the parameter module parameterization). Copy the file in the appropriate TwinCAT directory. If during the installation of TwinCAT3, the default settings are used, which is C: \TwinCAT\3.1\Config\Io\ EtherCAT.

4.4.2 Scanning the Device

Before connecting devices to the EtherCAT network, the EtherCAT system must be in a safe, de-energized state. Start the TwinCAT System Manager in Config mode. Scan PCH_PORTAL_A_B_C as a box.

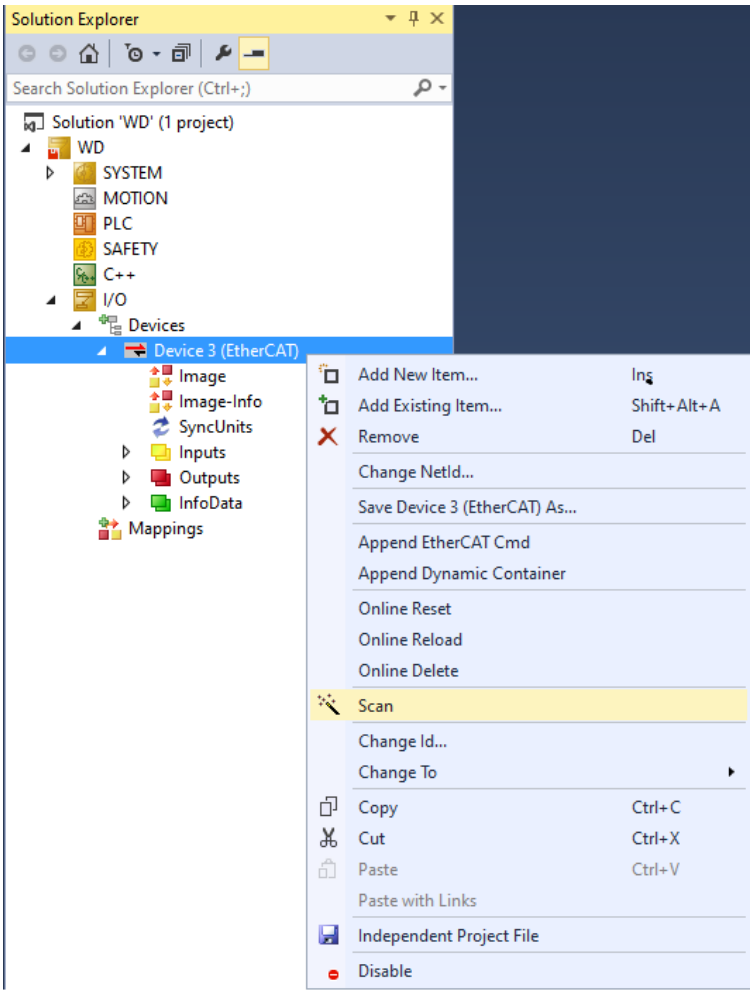


Figure 16 — Scanning the Device

4.4.3 Manually Attach Device

Before connecting devices to the EtherCAT network, the EtherCAT system must be in a safe, de-energized state. Start the TwinCAT System Manager in Config mode. Attach PCH_PORTAL_A_B_C as a box.

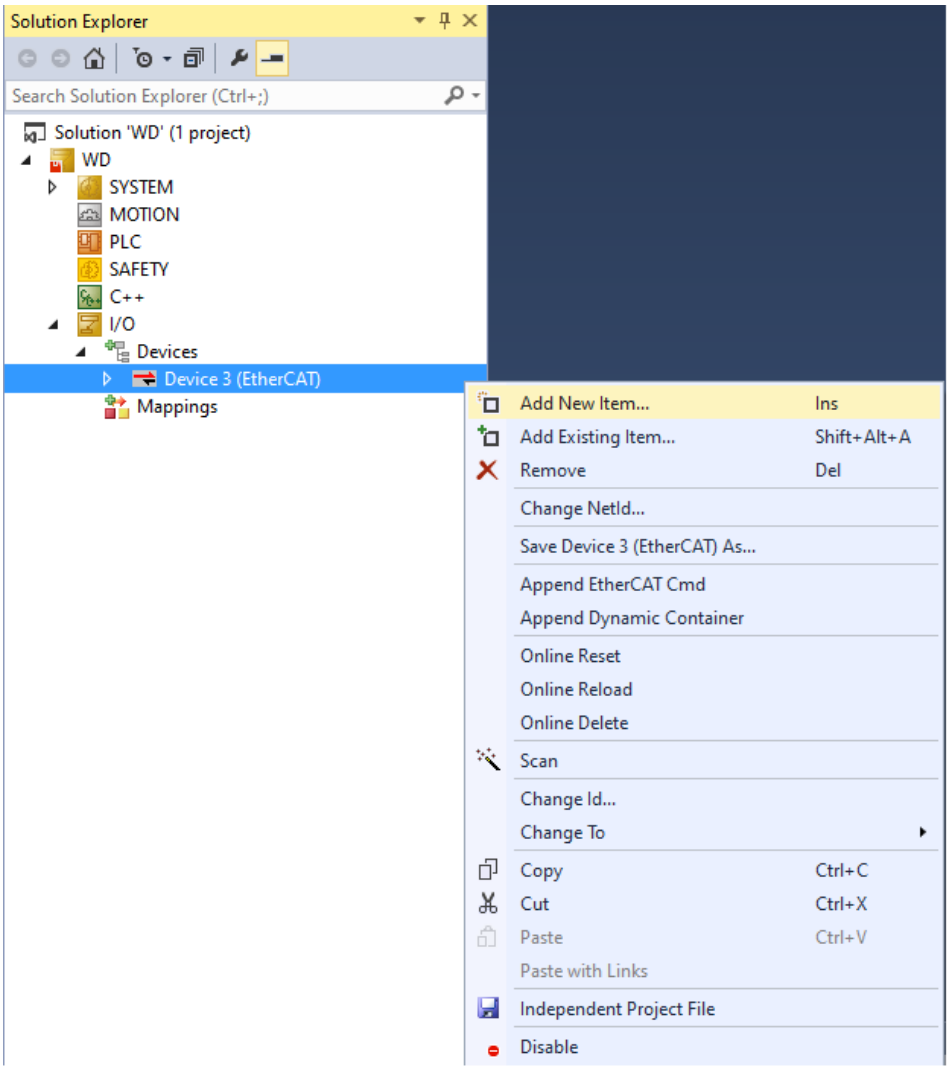


Figure 17 — Manually Attach Device

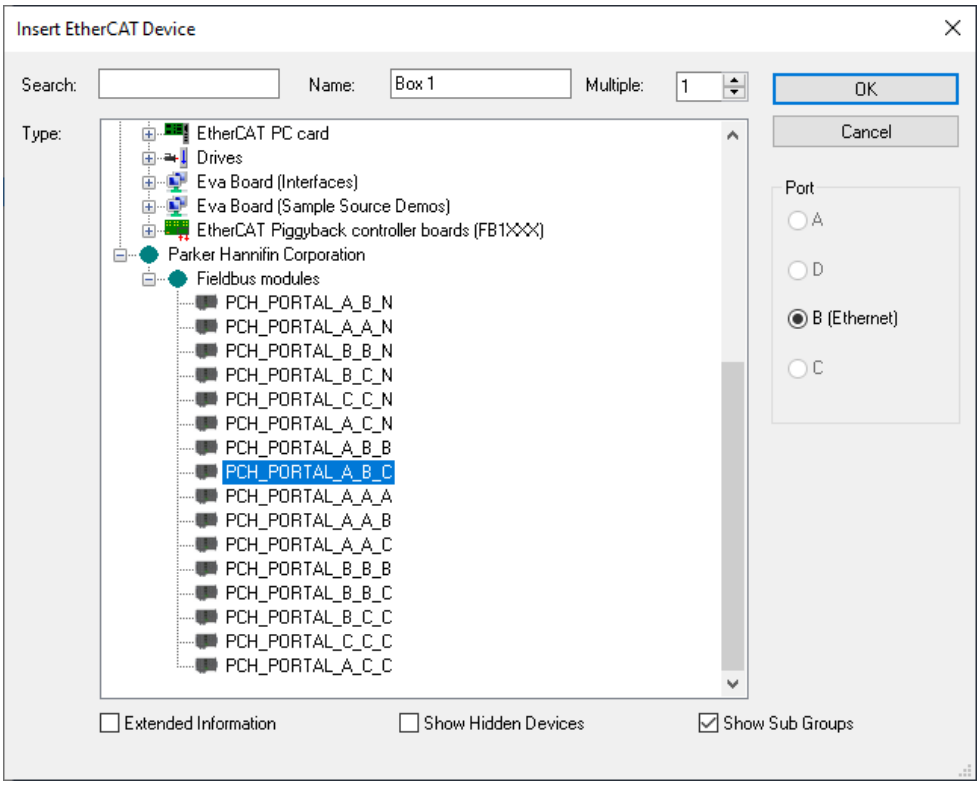


Figure 18 — Select Appropriate Box

4.4.4 Required Setting on the Device

After the automatic scanning or manual addition, the device appears in the tree structure of TwinCAT.

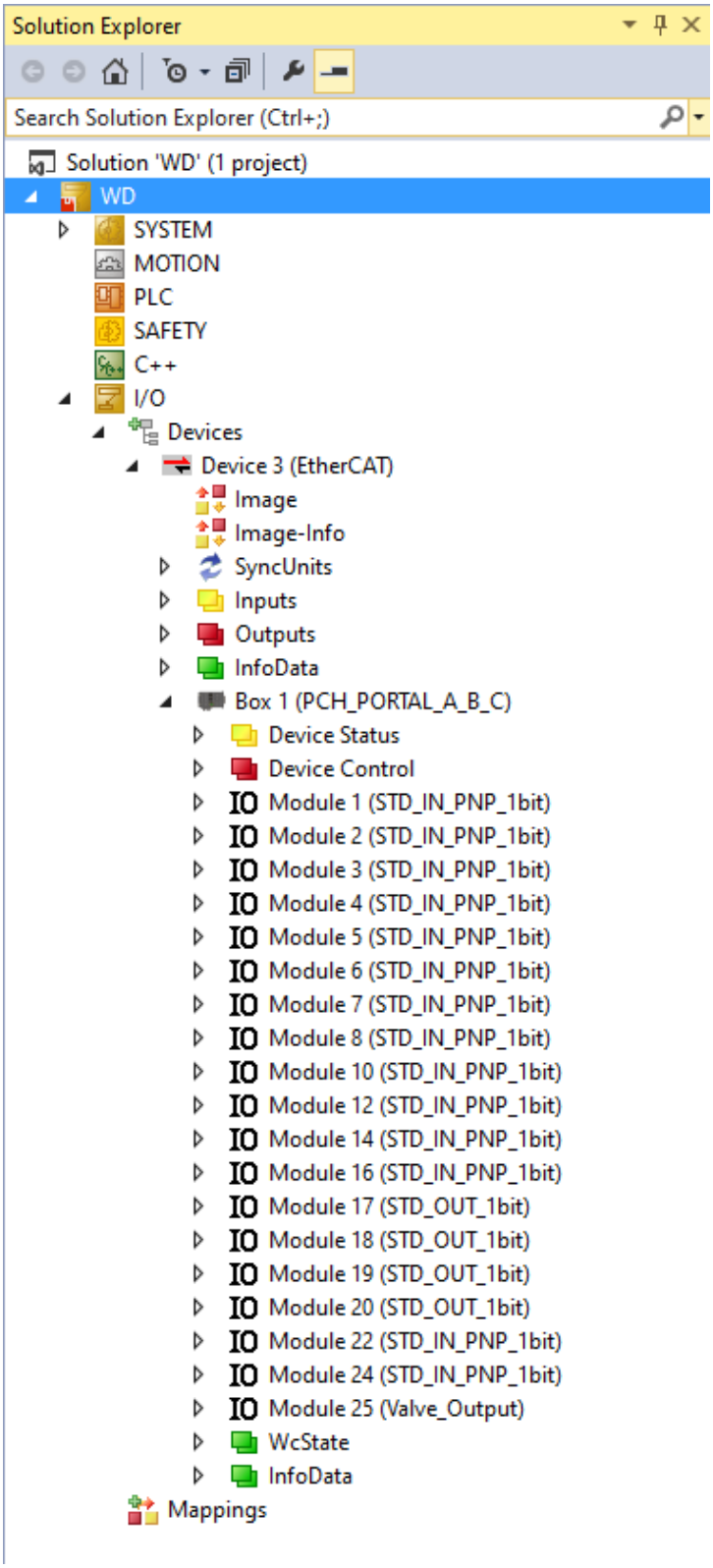


Figure 19 — Device in the Tree Structure of TwinCAT

Check the default setting in the device: EoE settings to access Web Server of the device (In the Master Configuration tool, Navigate to Advance Settings → Mailbox → EoE → Switch Port must be selected).

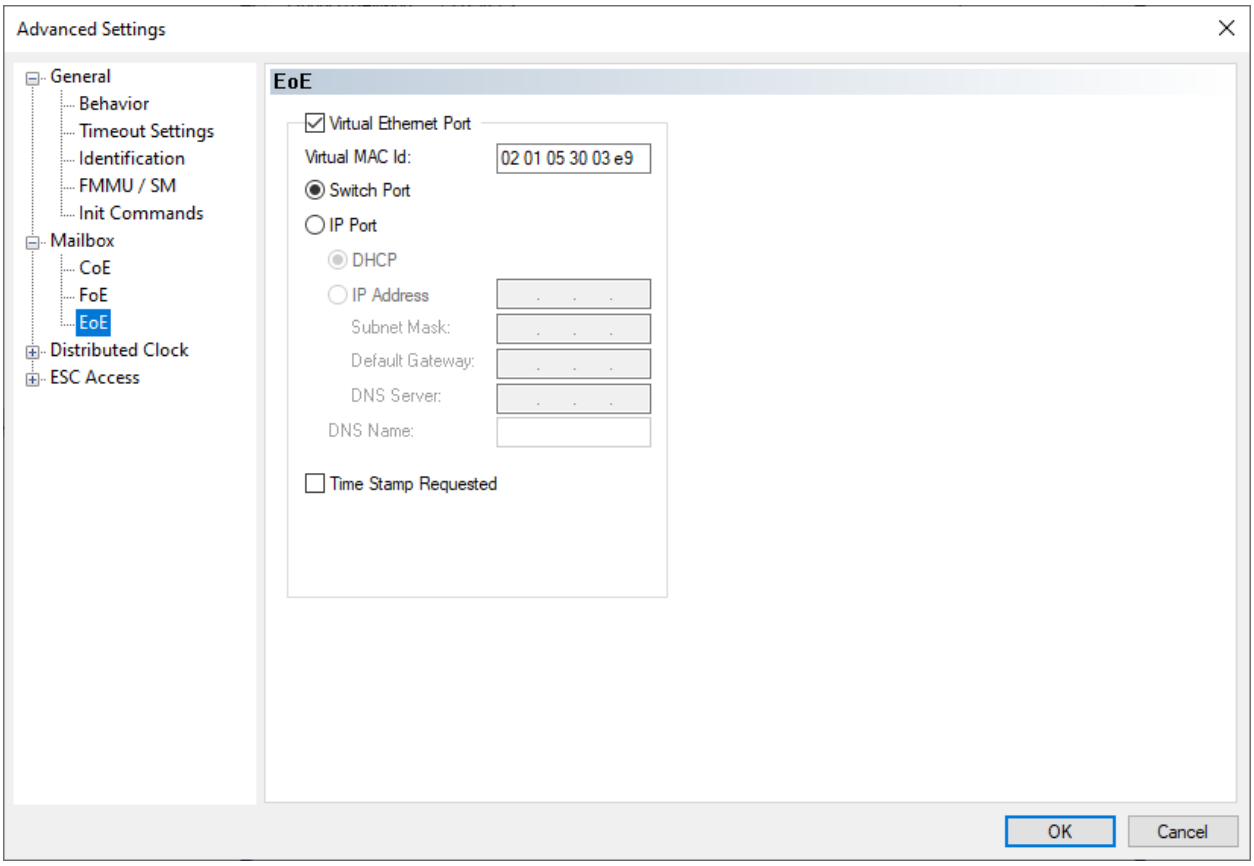


Figure 20 — Default Setting

4.4.5 Configuring the Module

To Configure the slot and modules, navigate to Slot tab and assign modules as required.
The slots for future expansions are not used. Several process data (buffer size) can be assigned to the other slots. Unused slots may remain empty and then are not transferred as cyclical process data.

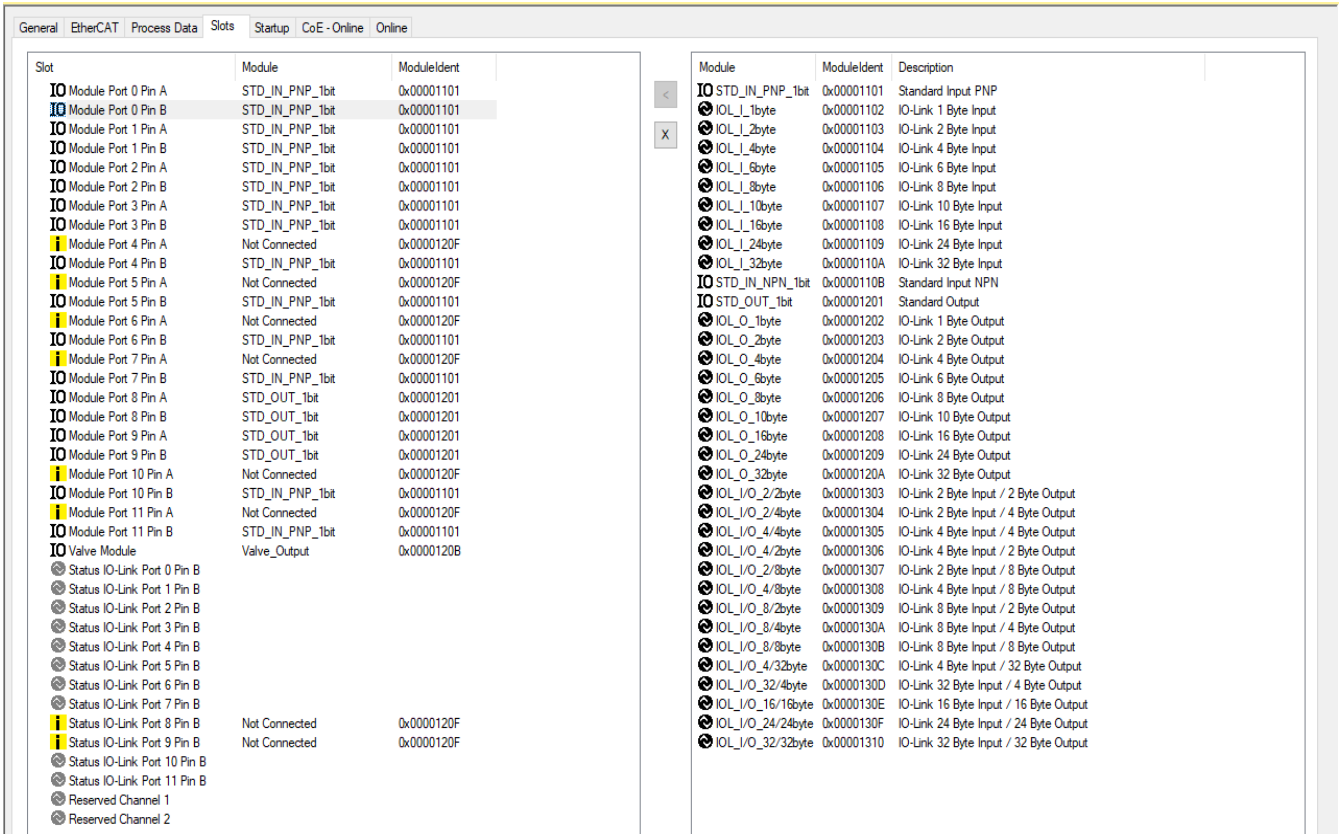


Figure 21 — Configure the Module.

4.4.6 Startup

In the start-up, the IO-Link ports and outputs are pre-configured. The entries are transferred when the configuration is overwritten.
For example, change the Cycle Warning mode double on DIO Counter Control and write value 0x01(1).

General | EtherCAT | Process Data | Slots | Startup | CoE - Online | Online

Transition	Protocol	Index	Data	Comment
<PS>	CoE	0x1A00 C 0	01 00 08 01 00 60	download pdo 0x1A00 entr...
<PS>	CoE	0x1A01 C 0	01 00 08 01 10 60	download pdo 0x1A01 entr...
<PS>	CoE	0x1A02 C 0	01 00 08 01 20 60	download pdo 0x1A02 entr...
<PS>	CoE	0x1A03 C 0	01 00 08 01 30 60	download pdo 0x1A03 entr...
<PS>	CoE	0x1A04 C 0	01 00 08 01 40 60	download pdo 0x1A04 entr...
<PS>	CoE	0x1A05 C 0	01 00 08 01 50 60	download pdo 0x1A05 entr...
<PS>	CoE	0x1A06 C 0	01 00 08 01 60 60	download pdo 0x1A06 entr...
<PS>	CoE	0x1A07 C 0	01 00 08 01 70 60	download pdo 0x1A07 entr...
<PS>	CoE	0x1A09 C 0	01 00 08 01 90 60	download pdo 0x1A09 entr...
<PS>	CoE	0x1A0B C 0	01 00 08 01 B0 60	download pdo 0x1A0B ent...
<PS>	CoE	0x1A0D C 0	01 00 08 01 D0 60	download pdo 0x1A0D ent...
<PS>	CoE	0x1A0F C 0	01 00 08 01 F0 60	download pdo 0x1A0F entr...
<PS>	CoE	0x1610 C 0	01 00 08 01 00 71	download pdo 0x1610 entr...
<PS>	CoE	0x1611 C 0	01 00 08 01 10 71	download pdo 0x1611 entr...
<PS>	CoE	0x1612 C 0	01 00 08 01 20 71	download pdo 0x1612 entr...
<PS>	CoE	0x1613 C 0	01 00 08 01 30 71	download pdo 0x1613 entr...
<PS>	CoE	0x1A15 C 0	01 00 08 01 50 61	download pdo 0x1A15 entr...
<PS>	CoE	0x1A17 C 0	01 00 08 01 70 61	download pdo 0x1A17 entr...
<PS>	CoE	0x1618 C 0	04 00 08 01 80 71 08 02 8...	download pdo 0x1618 entr...
<PS>	CoE	0x1C12 C 0	06 00 27 16 10 16 11 16 1...	download pdo 0x1C12 index
<PS>	CoE	0x1C13 C 0	0F 00 26 1A 00 1A 01 1A ...	download pdo 0x1C13 index
<PS>	CoE	0xF030 C 0	23 00 01 11 00 00 01 11 0...	download slot cfg
PS	CoE	0x2191:01	0x01 (1)	Module Parametrization
PS	CoE	0x2001:02	0x00 (0)	DIO Counter Control
PS	CoE	0x2001:03	0x00 (0)	DIO Counter Type
PS	CoE	0x2001:04	0x00 (0)	DI Inversion
PS	CoE	0x2001:05	0x00 (0)	DI De-bounce Time
PS	CoE	0x2021:02	0x00 (0)	DIO Counter Control
PS	CoE	0x2021:03	0x00 (0)	DIO Counter Type
PS	CoE	0x2021:04	0x00 (0)	DI Inversion
PS	CoE	0x2021:05	0x00 (0)	DI De-bounce Time
PS	CoE	0x2031:02	0x00 (0)	DIO Counter Control
PS	CoE	0x2031:03	0x00 (0)	DIO Counter Type
PS	CoE	0x2031:04	0x00 (0)	DI Inversion
PS	CoE	0x2031:05	0x00 (0)	DI De-bounce Time
PS	CoE	0x2041:02	0x00 (0)	DIO Counter Control
PS	CoE	0x2041:03	0x00 (0)	DIO Counter Type
PS	CoE	0x2041:04	0x00 (0)	DI Inversion
PS	CoE	0x2041:05	0x00 (0)	DI De-bounce Time
PS	CoE	0x2051:02	0x00 (0)	DIO Counter Control
PS	CoE	0x2051:03	0x00 (0)	DIO Counter Type
PS	CoE	0x2051:04	0x00 (0)	DI Inversion
PS	CoE	0x2051:05	0x00 (0)	DI De-bounce Time
PS	CoE	0x2061:02	0x00 (0)	DIO Counter Control
PS	CoE	0x2061:03	0x00 (0)	DIO Counter Type
PS	CoE	0x2061:04	0x00 (0)	DI Inversion
PS	CoE	0x2061:05	0x00 (0)	DI De-bounce Time
PS	CoE	0x2071:02	0x00 (0)	DIO Counter Control

Figure 22 — Change the Parameter Value

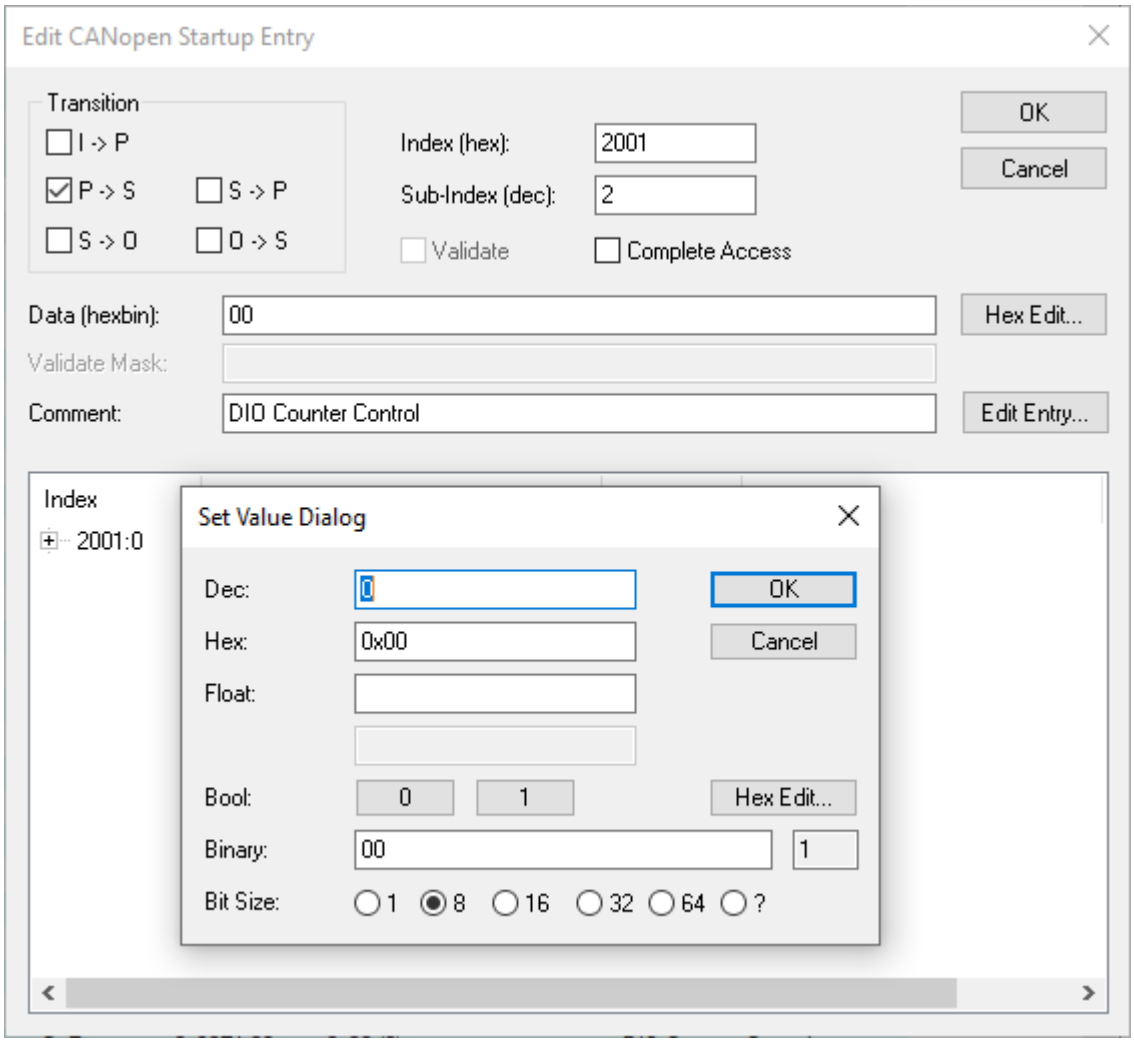


Figure 23 — Edit CANopen Startup Entry

4.5 Cyclic Communication

The PCH Portal device provides cyclic communication method where process data is exchange implicitly. Process data are discrete inputs and outputs.

4.5.1 Process Input Data

4.5.1.1 Device Status Bytes

The Device Status Module is used to diagnose the PCH Portal. It helps in identifying the faults and warnings that are reported by the device.

NOTE: For an explanation of the behaviour of the diagnostic Status Bytes, please refer to “Process Input Status Bits” under Table 37.

Table 32 — Device Status Byte

Byte No.	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Description
1	External Module	RESV	Valve	IO/IOLINK	Network	Logic Voltage	Auxiliary Voltage	MS/ CoProc	Status: 1 – Error / Warning occurred. 0 - No Error / Warning.
2	Target Count	External Sensor Power Fault	Temperature Warning	Auxiliary Current	Logic Current	Trending Data	Warning	Error	
3	RESV	RESV	RESV	OC3	OC2	OC1	OC	FS	FS – Fuse Status (Electronic Fuse) 0 - Fuse Not Blown 1 - Fuse Blown. OC - Port Over Current OC1 - Module 1 Over Current OC2 - Module 2 Over Current OC3 - Module 3 Over Current 0 - No Over Current 1 - Over Current
4	RESERVED								
5	VF07	VF06	VF05	VF04	VF03	VF02	VF01	VF00	VF - Valve Fault Status 0 - No Fault 1 - Short to Ground
6	VF15	VF14	VF13	VF12	VF11	VF10	VF09	VF08	
7	VF23	VF22	VF21	VF20	VF19	VF18	VF17	VF16	
8	VF31	VF30	VF29	VF28	VF27	VF26	VF25	VF24	
9	RESERVED								
10	RESERVED								
11	RESERVED								
12	RESERVED								

- **Status Bytes:** Indicates the module on which an event is generated, and the type of event generated.
  Example: When the Logic Voltage is in warning range (19.V to 20.4V), the Logic Voltage and Warning Bits are set.

- **Fuse and Over Current Status:**
  1. A shorted condition of Pin-1 to common/ground will open the electronic fuse and sets FS bit.
  2. A shorted condition of Pin-2 or Pin-4 to common/ground with the output ON will latch the OC bit and the OC1, 2 or 3 bits are set according to the board on which short condition occurred.
     Example: When Over Current occurs at Port 5B, OC2 and OC bits get set. When Over Current condition is removed OC2 bit gets reset, but OC bit remains set.

- **Valve Fault Status**: A bit set in this region indicates short circuit / over current condition in corresponding valve.

4.5.1.2 Reading Input

To read the value of any module input, navigate to the respective module → Expand the module and navigate to the "Online" tab to check the live value. Value 0x00(0) corresponds to input OFF and 0x01(1) corresponds to input ON.

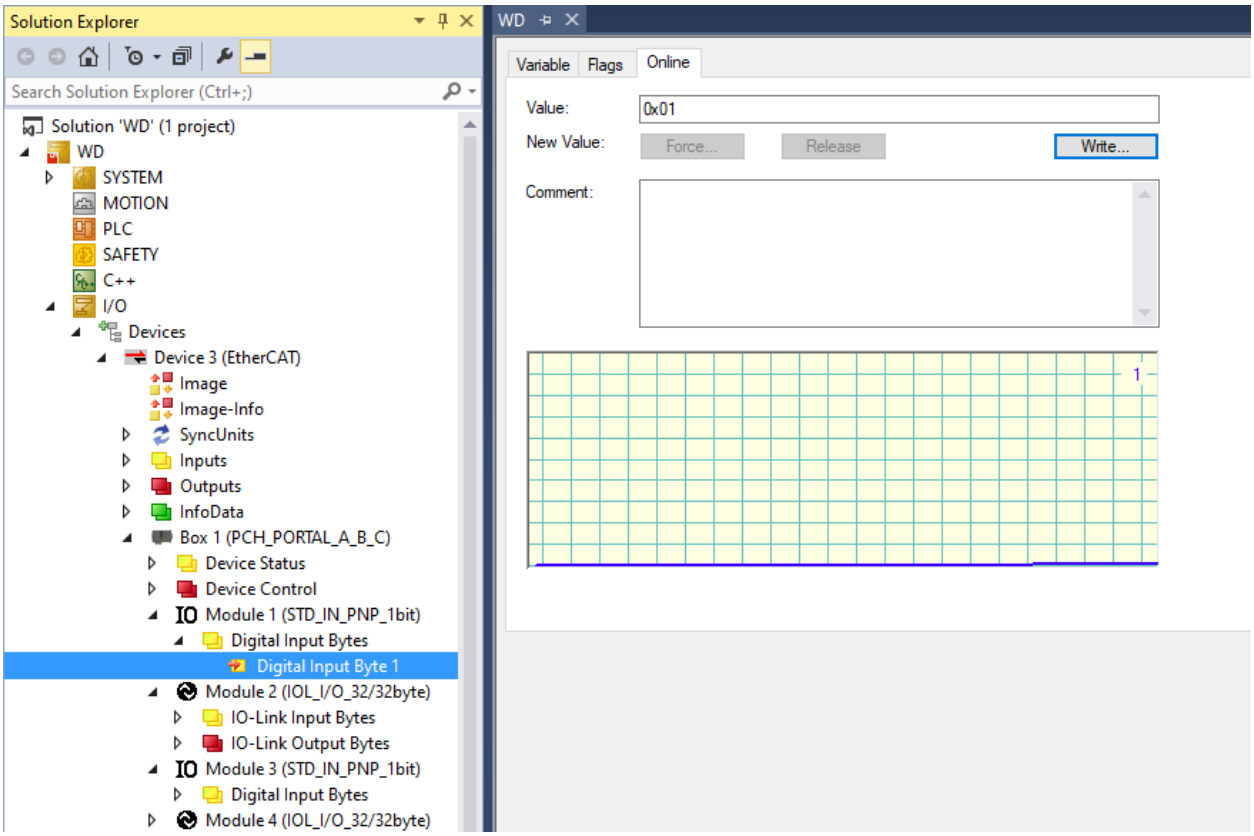
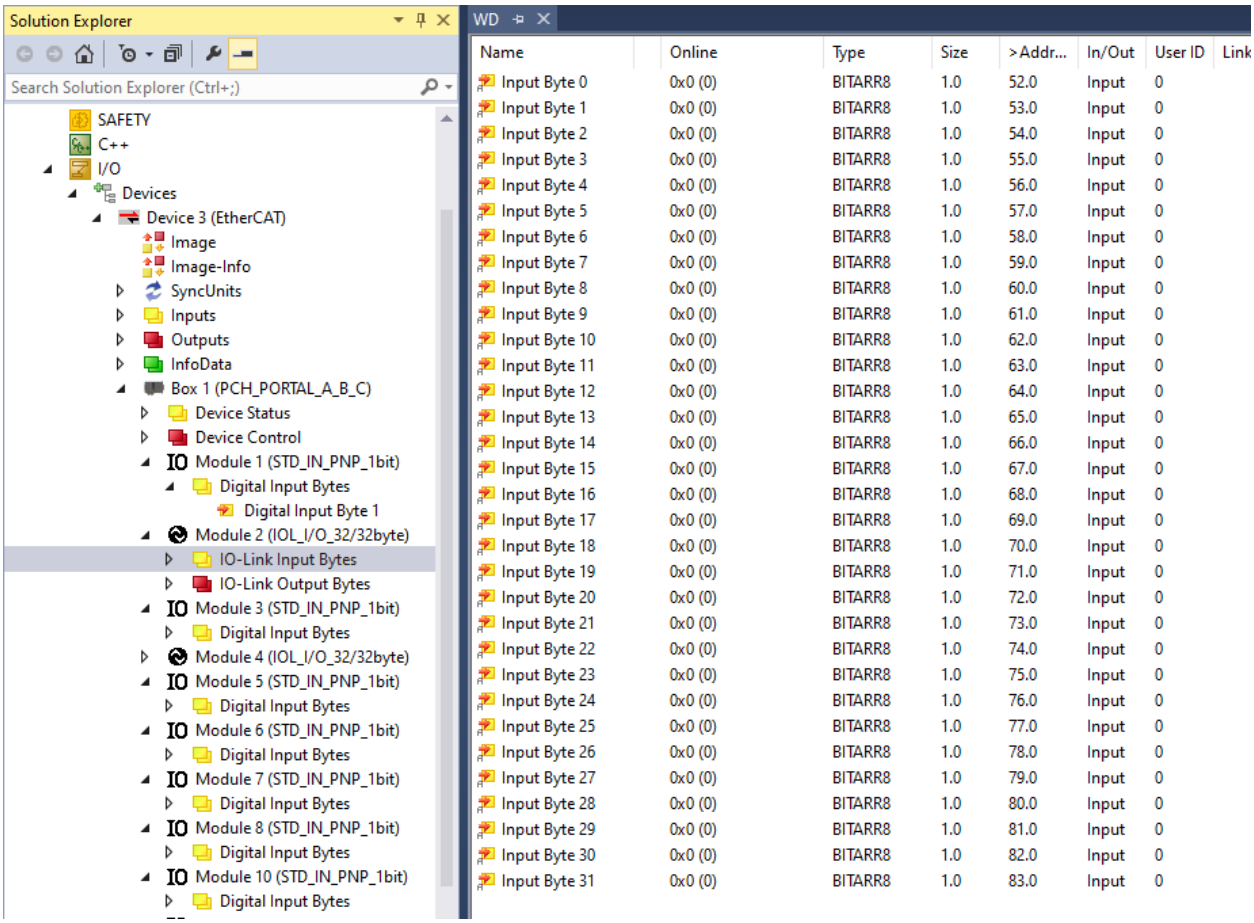


Figure 24 — Reading Input

4.5.1.3 IO-Link Process Data Input

To read the input value of any IO-Link module → Navigate to the respective module → Expand the module click on IO-Link Input Bytes to check the process data input values.
Online column updates the values upon receiving process data input from the IO-Link sensor connected to the module.



Name	Online	Type	Size	>Addr...	In/Out	User ID	Link
Input Byte 0	0x0 (0)	BITARR8	1.0	52.0	Input	0	
Input Byte 1	0x0 (0)	BITARR8	1.0	53.0	Input	0	
Input Byte 2	0x0 (0)	BITARR8	1.0	54.0	Input	0	
Input Byte 3	0x0 (0)	BITARR8	1.0	55.0	Input	0	
Input Byte 4	0x0 (0)	BITARR8	1.0	56.0	Input	0	
Input Byte 5	0x0 (0)	BITARR8	1.0	57.0	Input	0	
Input Byte 6	0x0 (0)	BITARR8	1.0	58.0	Input	0	
Input Byte 7	0x0 (0)	BITARR8	1.0	59.0	Input	0	
Input Byte 8	0x0 (0)	BITARR8	1.0	60.0	Input	0	
Input Byte 9	0x0 (0)	BITARR8	1.0	61.0	Input	0	
Input Byte 10	0x0 (0)	BITARR8	1.0	62.0	Input	0	
Input Byte 11	0x0 (0)	BITARR8	1.0	63.0	Input	0	
Input Byte 12	0x0 (0)	BITARR8	1.0	64.0	Input	0	
Input Byte 13	0x0 (0)	BITARR8	1.0	65.0	Input	0	
Input Byte 14	0x0 (0)	BITARR8	1.0	66.0	Input	0	
Input Byte 15	0x0 (0)	BITARR8	1.0	67.0	Input	0	
Input Byte 16	0x0 (0)	BITARR8	1.0	68.0	Input	0	
Input Byte 17	0x0 (0)	BITARR8	1.0	69.0	Input	0	
Input Byte 18	0x0 (0)	BITARR8	1.0	70.0	Input	0	
Input Byte 19	0x0 (0)	BITARR8	1.0	71.0	Input	0	
Input Byte 20	0x0 (0)	BITARR8	1.0	72.0	Input	0	
Input Byte 21	0x0 (0)	BITARR8	1.0	73.0	Input	0	
Input Byte 22	0x0 (0)	BITARR8	1.0	74.0	Input	0	
Input Byte 23	0x0 (0)	BITARR8	1.0	75.0	Input	0	
Input Byte 24	0x0 (0)	BITARR8	1.0	76.0	Input	0	
Input Byte 25	0x0 (0)	BITARR8	1.0	77.0	Input	0	
Input Byte 26	0x0 (0)	BITARR8	1.0	78.0	Input	0	
Input Byte 27	0x0 (0)	BITARR8	1.0	79.0	Input	0	
Input Byte 28	0x0 (0)	BITARR8	1.0	80.0	Input	0	
Input Byte 29	0x0 (0)	BITARR8	1.0	81.0	Input	0	
Input Byte 30	0x0 (0)	BITARR8	1.0	82.0	Input	0	
Input Byte 31	0x0 (0)	BITARR8	1.0	83.0	Input	0	

Figure 25 — IO-Link Process Data Input

4.5.1.4 IO-Link Status Module

Table 33 — IO-Link Status Module

Size (Bytes)	Module	Input Data								Description
		B7	B6	B5	B4	B3	B2	B1	B0	
1	Port B0 IO-Link Status Module	RESV	EV	SC	PDI	DF	VF	DC	IOL	Refer the details below the table.
1		Vendor ID 1								Vendor ID
1		Vendor ID 2								
1		Device ID 1								Device ID
1		Device ID 2								
1		Device ID 3								
6	Port B1 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B2 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B3 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B4 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B5 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B6 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B7 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B8 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B9 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B10 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0
6	Port B11 IO-Link Status Module	Same as Port B0 IO-Link Status Module definition								Same as Port B0

IO-Link Status (Byte 1):

IO-Link Status (IOL) : 0 – Port is not IO-Link, 1 – IO-Link Port enabled.
Device Connect Status (DC) : 0 – Device Not Connected, 1 – Device Connected.
Validation Fail Status (VF) : 0 – Validation Okay, 1 – Validation Failure.
Data Storage Fail Status (DF) : 0 – Data Storage Okay, 1 – Data Storage Failure.
Process Data Invalid Status (PDI) : 0 – Process Data Valid, 1 – Process Data Invalid.
IO-Link Short Circuit Status (SC) : 0 – No IO-Link Short Circuit, 1 – IO-Link Short Circuit.
IO-Link Event Status (EV) : 0 – No IO-Link Event, 1 – IO-Link Event.

4.5.2 Process Output Data

4.5.2.1 Device Control

- **Reset Event (RST):** A 0 to 1 transition clears the OC bit. OC bit is cleared only when none of the bits OC1, OC2 and OC3 are SET.

4.5.2.2 Actuating Outputs

To turn ON outputs of any modules configured as Output with PLC access taken, navigate to the respective module → Expand the module → Navigate to the Online tab and click on the Write button. In the dialog box write value 0x01(1). Value 0x00(0) corresponds to Output OFF and 0x01(1) corresponds to Output ON.

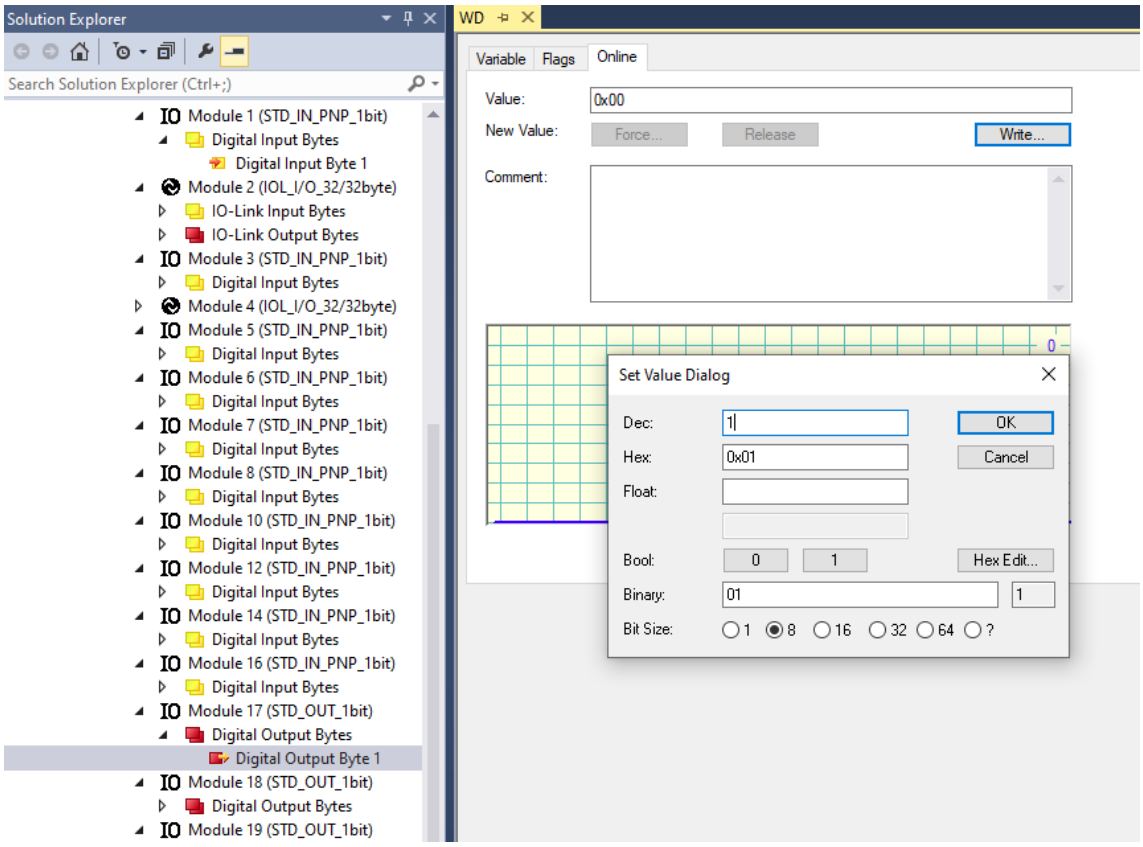


Figure 26 — Actuating Outputs

4.5.2.3 IO-Link Process Data Output

To update process data output of any IO-Link module → Navigate to the respective IO-Link Module → Expand the module, click IO-Link Output Byte → Click on respective output byte to be actuated → Online tab and click on the Write button. In the dialog box, write value 0x00(0) – 0xFF (255).

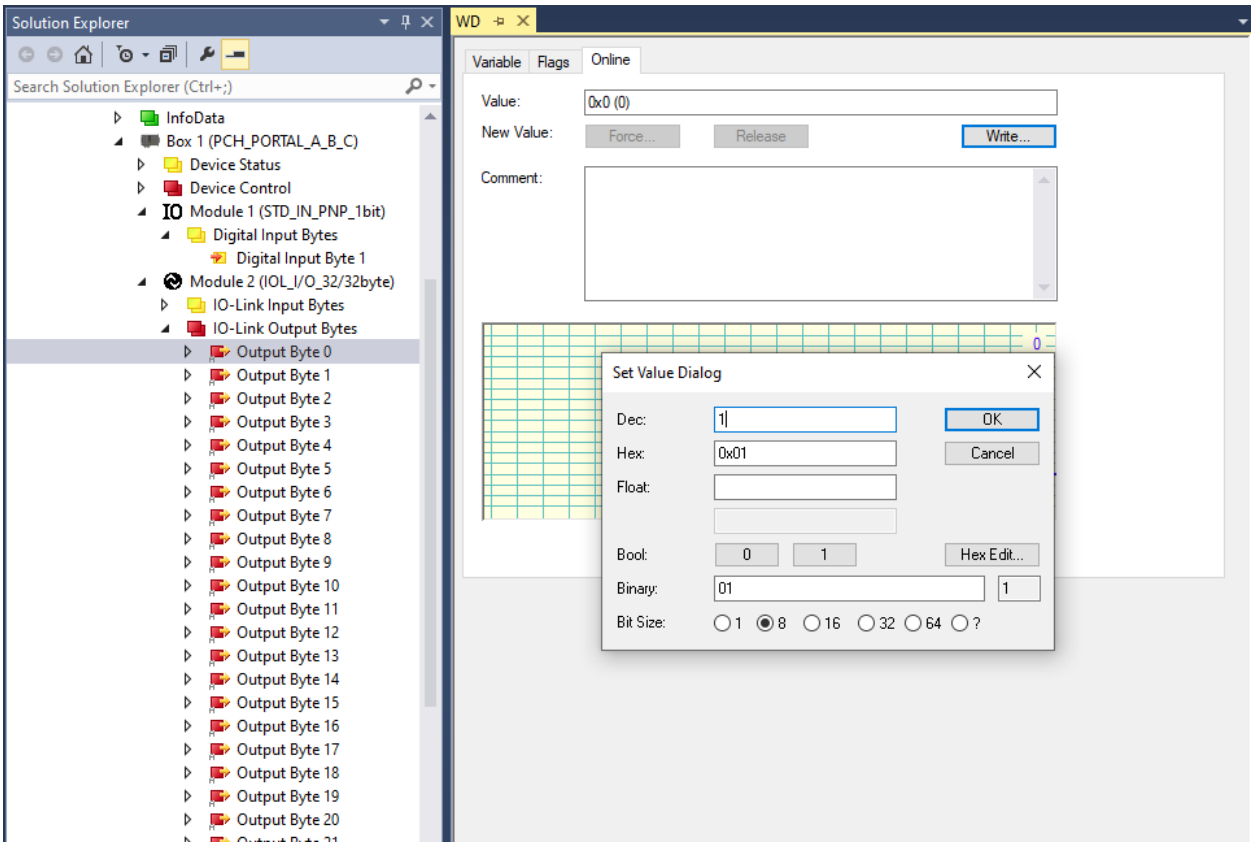


Figure 27 — IO-Link Process Data Output

4.5.2.4 Valve Outputs

To turn ON Valve outputs with PLC access taken, navigate to the Valve Outputs module → Expand the module → Navigate to Output Byte X (x = 0 to 3 for Valve 0 to 31) → Click on respective output byte to be actuated → Online tab and click on the Write button. In the dialog box, write value 0x00(0) – 0xFF (255) to turn Valve Output ON.

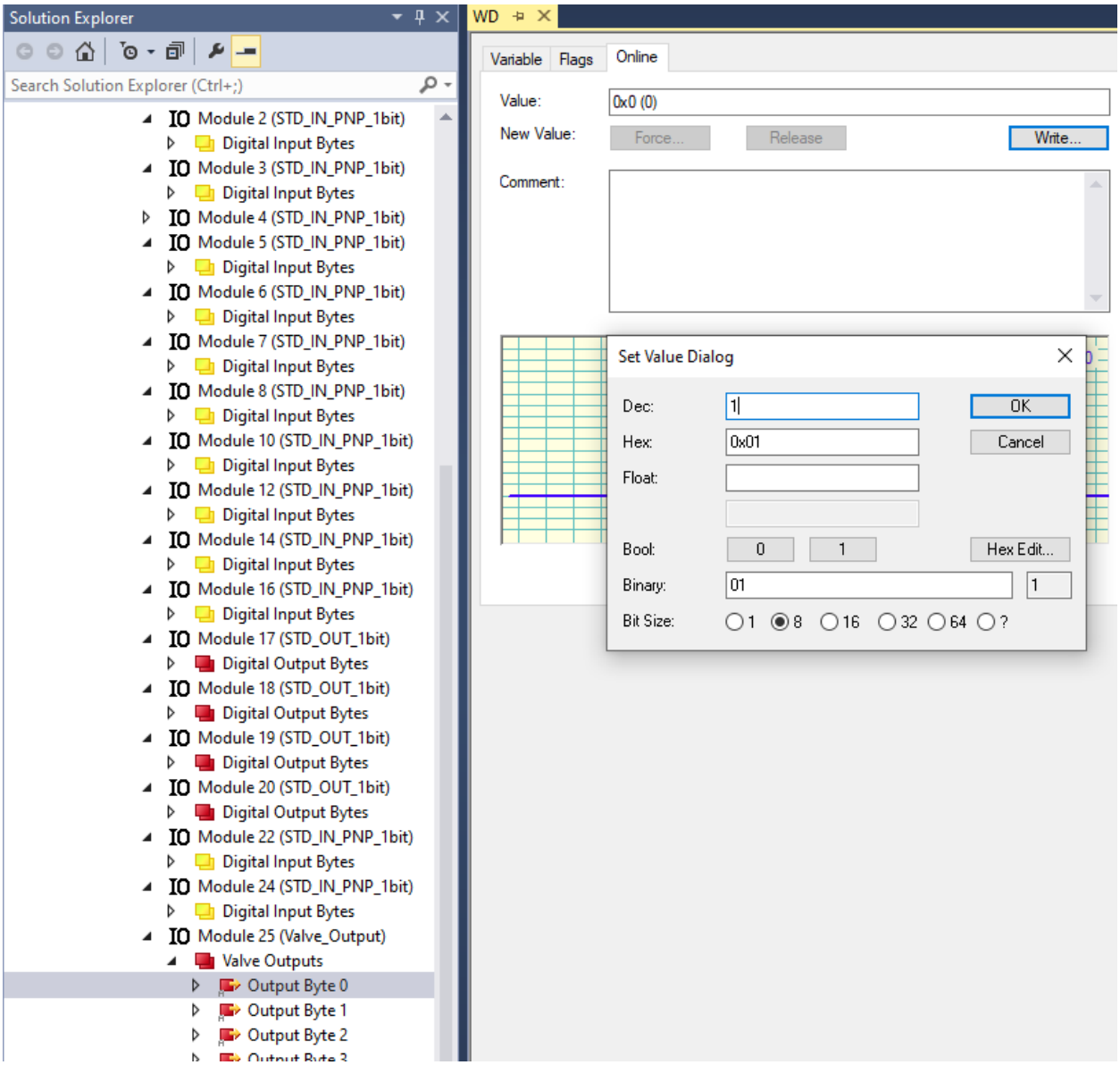


Figure 28 — Valve Outputs

4.6 Acyclic Communication

The PCH Portal provides acyclic communication method to access errors/warnings/IO-Link parameters. To check the acyclic data, navigate to CoE - Online tab and select Auto update check box.

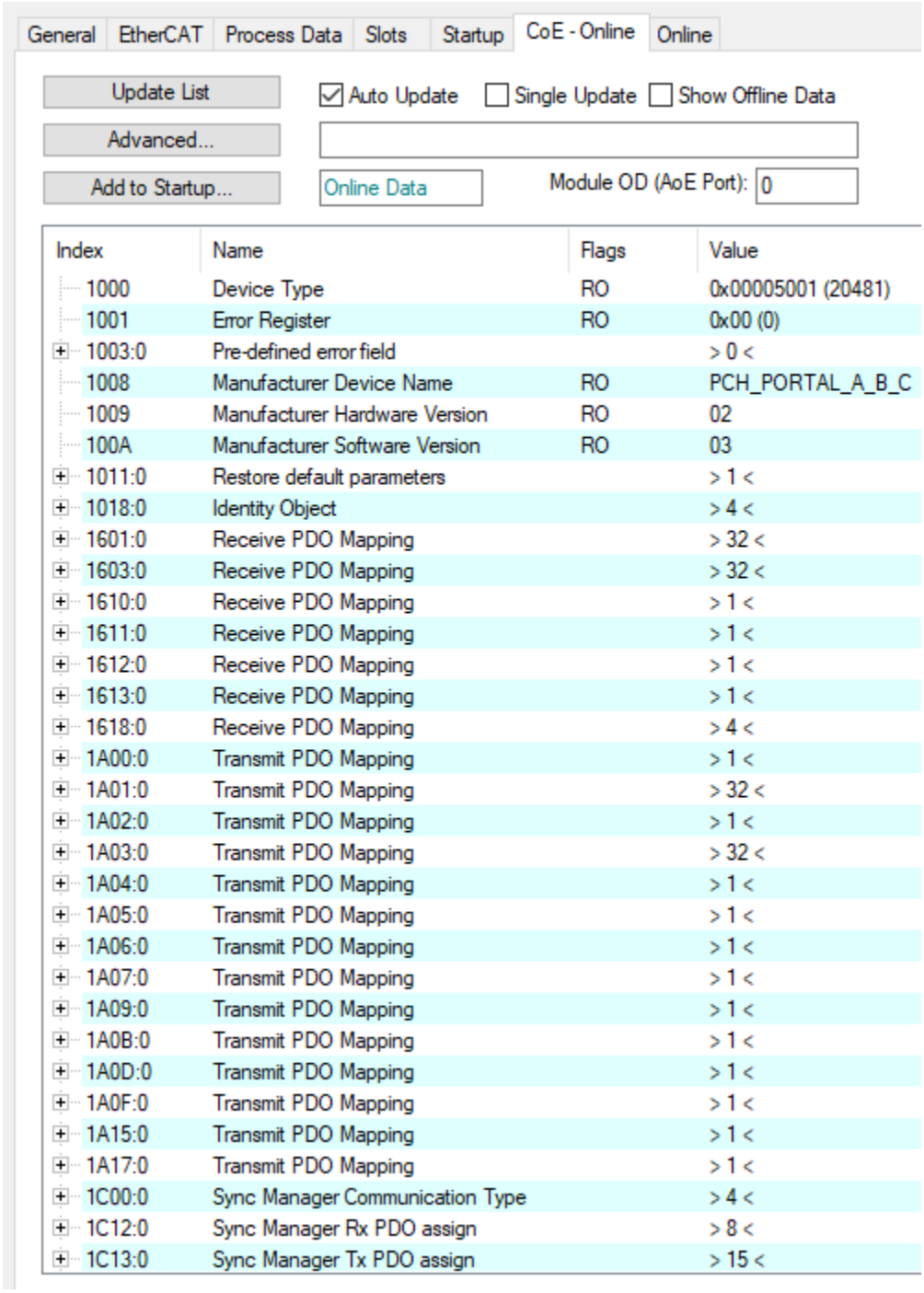


Figure 29 — Acyclic Communication

4.6.1 IO-Link Service Data

Example Read:

In Instance, select 2720:02 (here Port number 1)
At 2720:03 specify the respective index MSB and on 2720:04 specify the respective index LSB values by double clicking on them.
At 2720:05 specify the Sub-Index.
At 2720:01 specify the Control value 0x03(3) - Read command.
At 2720:07 status of the current read query can be seen (0x01(1) indicates busy state).

The Read data is displayed in the data field:
At 2720:08 indicates whether there is an error or not (0x80(128) – Error 0x00(0) – No Error).
At 2720:09 read data is populated if there is no error. In case of error, error code is populated.

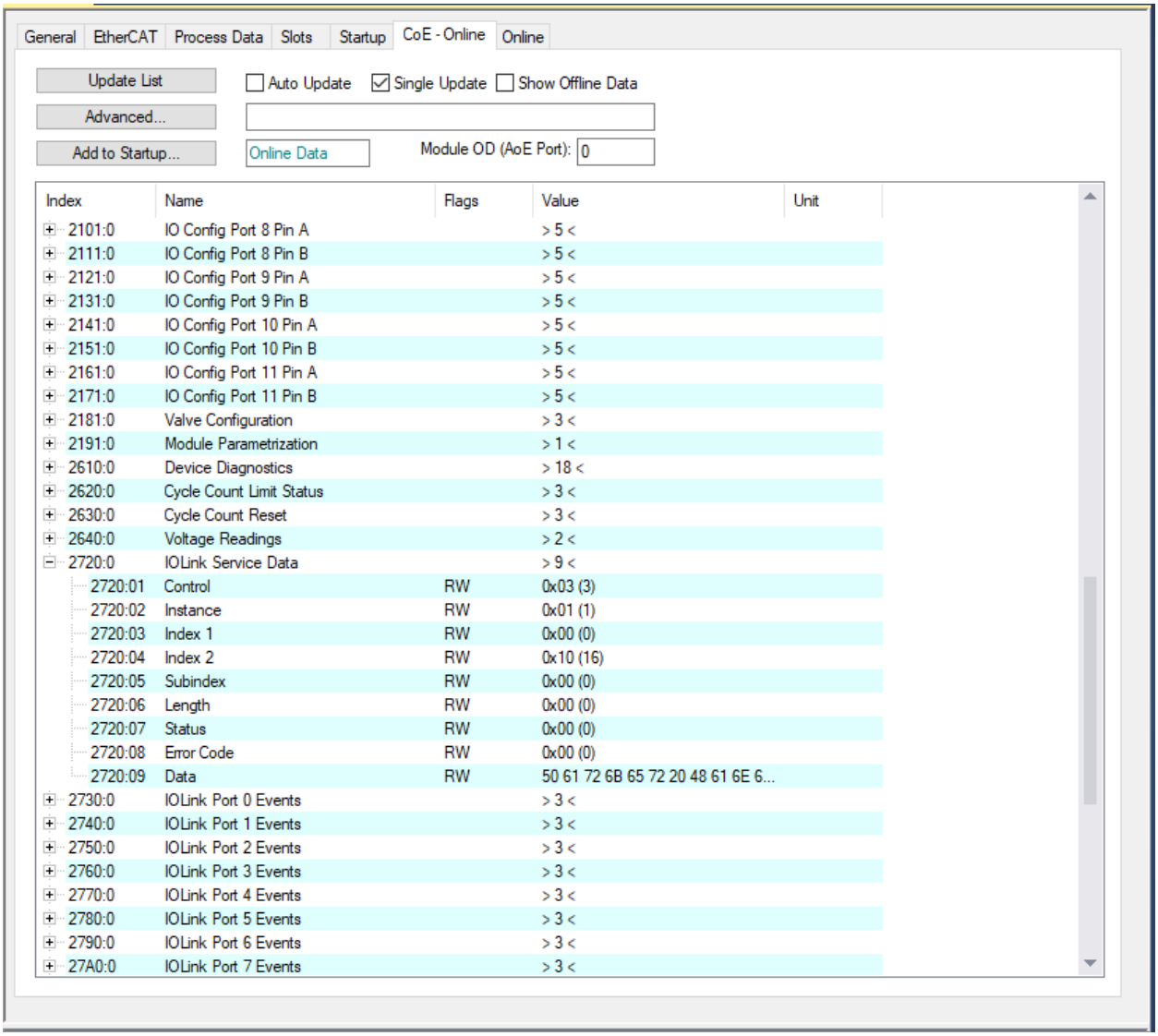


Figure 30 — IO-Link Service Data Read

Example Write:

In Instance, select 2720:02 (here Port number 1).
At 2720:03 specify the respective index MSB and on 2720:04 specify the respective index LSB values by double clicking on them.
At 2720:05 specify the Sub-Index.
At 2720:06 specify the length of data.
At 2720:09 specify the Data.
At 2720:01 specify the Control value 0x02(2) - Write command.
At 2720:07 status of the current write query can be seen (0x01(1) indicates busy state).

The Write operation result is displayed as below:
At 2720:08 indicates whether there is an error or not (0x80(128) – Error 0x00(0) – No Error).
At 2720:09 data field gets cleared if there is no error. In case of error, error code is populated.

Write request:

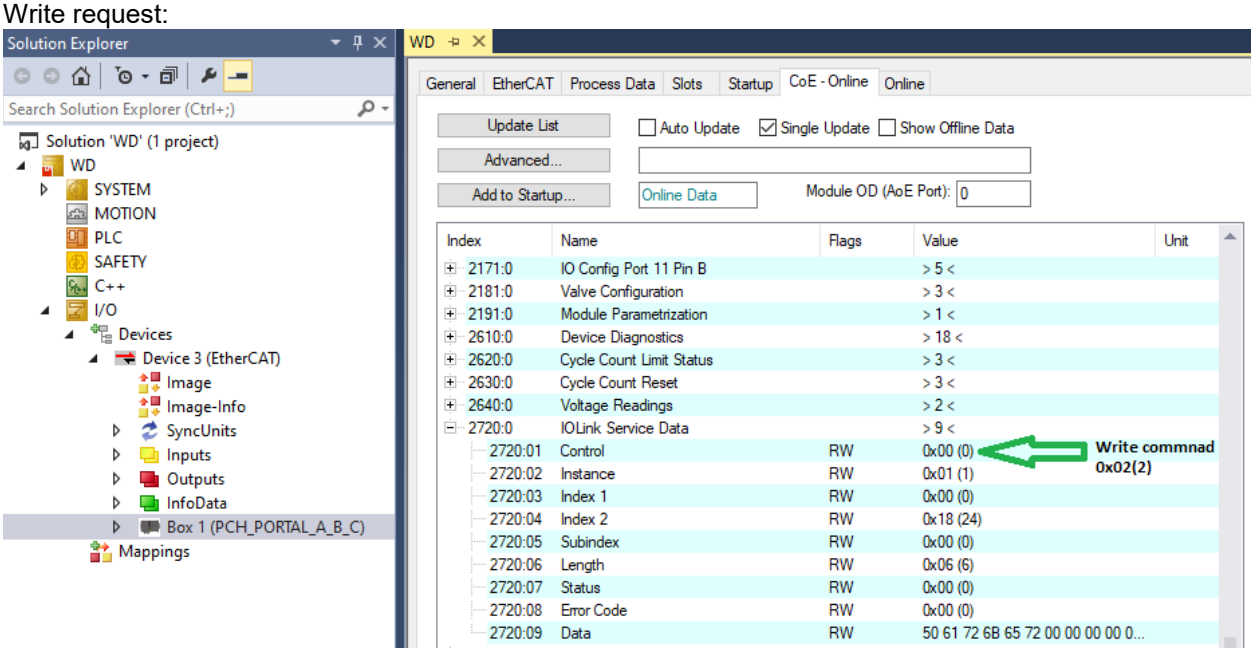


Figure 31 — Write Request

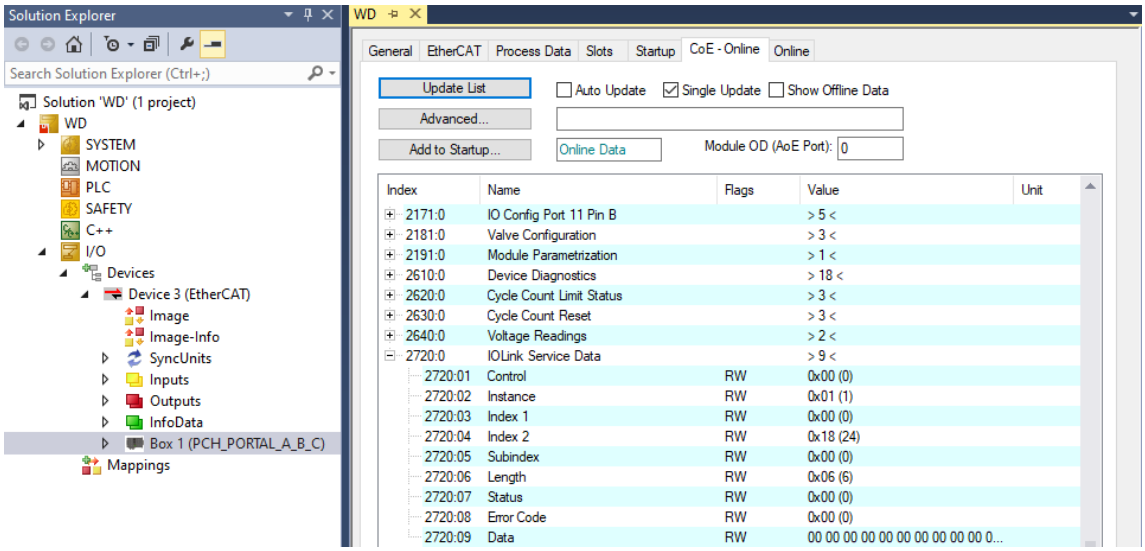


Figure 32 — Write Operation Results

4.6.2 IO-Link Events:

IO-Link Slave events can be read acyclic for each port.
If there is an IO-Link slave event, event bit gets set for the respective IO-Link Status Module (refer to 4.2.3) and events can be read via an acyclic query in the CoE – Online tab.
Index 2730:0 to 27E0:0 displays events for all the 12 possible IO-Link ports.

Table 34 — IO-Link Events

Module	Parameter
Event Read Response	Number of IO-Link Events
	Size of each IO-Link Event in bytes
	IO-Link Event 1 to 30 (210 Bytes)

Example event:
At 2730:01 Number of Events generated is displayed after last reading.
At 2730:02 Size of events generated is 7 bytes (1 single event).
At 2730:03 Data is displayed. This data contains Timestamp, Event Qualifier, and Event Code.

Table 35 — Structure of an IO-Link Event Data

Module	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Timestamp	Event Timestamp Byte 1 (Higher Byte)							
	Event Timestamp Byte 2							
	Event Timestamp Byte 3							
	Event Timestamp Byte 4 (Lower Byte)							
Event Qualifier	Mode		Type		Source	Instance		
Event Code	Event Code (Higher Byte)							
	Event Code (Lower Byte)							

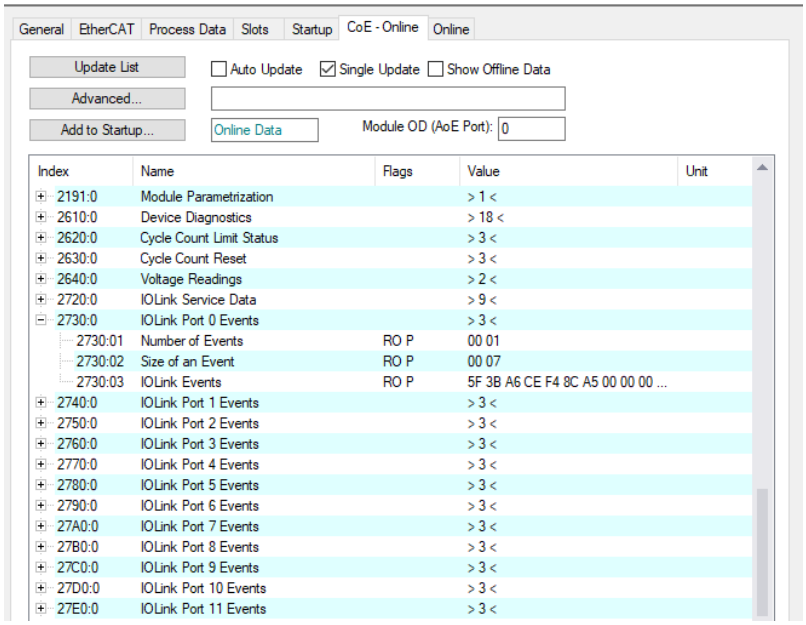


Figure 33 — IO-Link Events

4.6.3 Diagnostic Data

The following table provides index and sub-index details required to read diagnostic data from PCH Portal.

Table 36 — Diagnostic Data

S.No.	Area/ Module	Bits								Access Type	Description	EtherCAT	
		B7	B6	B5	B4	B3	B2	B1	B0			Index	Sub-Index
0	Auxiliary Voltage	RESV	RESV	RESV	RESV	Auxiliary Voltage Warning Level		Auxiliary Voltage Fault Level		RO	Auxiliary Voltage Fault and Warning Levels 0x00 - No Fault and Warning 0x01 - Low 0x10 - High 0x11 - No Supply or High/Low Voltage cut-off	0x2610	0x01
1		RESERVED											
2		AUX Voltage (millivolts)								RO	Device AUX Voltage	0x2640	0x02
3													
4	Logic Voltage	RESV	RESV	RESV	RESV	Logic Voltage Warning Level		Logic Voltage Fault Level		RO	Logic Voltage Fault and Warning Levels 0x00 - No Fault and Warning 0x01 - Low 0x10 - High 0x11 - Reserved	0x2610	0x02
5		RESERVED											
6		Logic Voltage (millivolts)								RO	Device Logic Voltage	0x2640	0x01
7													
8	MS/ Co-Proc	RESERVED											
9		RESV	RESV	RESV	RESV	RESV	RESV	Database Initialization Failed	Back-plane Initialization Failed	RO	Device Start-up Fail 0 - No Failure 1 - Failure	0x2610	0x03
10		RESERVED											
11		RESV	RESV	RESV	RESV	RESV	RESV	Backplane Break <Warning>	Back-plane Break <Fault>	RO	Backplane Break Fault/Warning 0 - No Break 1 - Break	0x2610	0x04
12		RESV	RESV	RESV	RESV	Watch Dog Expired Warning/Fault		Watch Dog Expired Module		RO	Watch Dog Expired - Module 0x00 - No Error 0x01 - Co-Proc 0x10 - Valve 0x11 - IO Module Watch Dog Expired - Warning/Fault 0x00 - No Warning/Fault 0x01 - Warning 0x10 - Fault 0x11 – Reserved	0x2610	0x05

13	MS/ Co-Proc	Module Position - Watch Dog Expired								RO	Module Position. Watch Dog Expired 0 - No Watch Dog Expired 1-3 – Module Position. 4-255 – Reserved		
14 to 17		RESERVED											
18	Valve	VCL 07	VCL 06	VCL 05	VCL 04	VCL 03	VCL 02	VCL 01	VCL 00	RO	Cycle Count Limit Reached 0 - No Cycle Count Limit Reached 1 - Cycle Count Limit Reached Note: On Cycle Count Limit reaching the corresponding Valve, bit is set for 2 secs and then moved back to 0.	0x2620	0x01
19		VCL 16	VCL 14	VCL 13	VCL 12	VCL 11	VCL 10	VCL 09	VCL 08				
20		VCL 23	VCL 22	VCL 21	VCL 20	VCL 19	VCL 18	VCL 17	VCL 16				
21		VCL 31	VCL 30	VCL 29	VCL 28	VCL 27	VCL 26	VCL 25	VCL 24				
22		VCL - RST 07	VCL - RST 06	VCL - RST 05	VCL - RST 04	VCL - RST 03	VCL - RST 02	VCL - RST 01	VCL - RST 00	WO	Cycle Count Reset 0 - No Change 1 - Set to Reset the Cycle Count	0x2630	0x01
23		VCL - RST 15	VCL - RST 14	VCL - RST 13	VCL - RST 12	VCL - RST 11	VCL - RST 10	VCL - RST 09	VCL - RST 08				
24		VCL - RST 23	VCL - RST 22	VCL - RST 21	VCL - RST 20	VCL - RST 19	VCL - RST 18	VCL - RST 17	VCL - RST 16				
25		VCL - RST 31	VCL - RST 30	VCL - RST 29	VCL - RST 28	VCL - RST 27	VCL - RST 26	VCL - RST 25	VCL - RST 24				
26 to 35		RESERVED											
36		RESV	RESV	RESV	RESV	Valve Driver - 4	Valve Driver - 3	Valve Driver - 2	Valve Driver - 1	RO	Valve Driver - SPI Comm/ Aux Power Supply Warning 0 - OK 1 - Warning	0x2610	0x06
37 to 39		RESERVED											
40		RESV	RESV	RESV	RESV	Valve Driver - 4	Valve Driver - 3	Valve Driver - 2	Valve Driver - 1	RO	Valve Driver - SPI Comm/ Aux Power Supply Fault 0 - OK 1 - Fault	0x2610	0x07

41	Valve	RESV	RESV	RESV	RESV	RESV	RESV	**EEPROM Corrupt**	**EEPROM - I2C Comm Error**	**RO**	EEPROM - I2C Comm Fault 0 - EEPROM - I2C Comm OK 1 - EEPROM - I2C Comm Fault EEPROM - Corrupt 0 - EEPROM Not Corrupted 1 - EEPROM Corrupted	0x2610	0x08
42 to 43		RESERVED											
44	IO/ IO-Link	**ICL 034**	**ICL 032**	**ICL 024**	**ICL 022**	**ICL 014**	**ICL 012**	**ICL 004**	**ICL 002**	**RO**	Cycle Count Limit Reached 0 - No Cycle Count Limit Reached 1 - Cycle Count Limit Reached Note: On Cycle Count Limit reaching the corresponding Input, bit is set to 1 for 2 secs and then gets reset to 0.	0x2620	0x02
45		**ICL 074**	**ICL 072**	**ICL 064**	**ICL 062**	**ICL 054**	**ICL 052**	**ICL 044**	**ICL 042**				
46		**ICL 114**	**ICL 112**	**ICL 104**	**ICL 102**	**ICL 094**	**ICL 092**	**ICL 084**	**ICL 082**				
47 to 48		RESERVED											
49		**ICC - RST 034**	**ICC - RST 032**	**ICC - RST 024**	**ICC - RST 022**	**ICC - RST 014**	**ICC - RST 012**	**ICC - RST 004**	**ICC - RST 002**	**WO**	Cycle Count Reset 0 - No Change 1 - Set to Reset the Cycle Count	0x2630	0x02
50		**ICC - RST 074**	**ICC - RST 072**	**ICC - RST 064**	**ICC - RST 062**	**ICC - RST 054**	**ICC - RST 052**	**ICC - RST 044**	**ICC - RST 042**				
51		**ICC - RST 114**	**ICC - RST 112**	**ICC - RST 104**	**ICC - RST 102**	**ICC - RST 094**	**ICC - RST 092**	**ICC - RST 084**	**ICC - RST 082**				
52 to 63		RESERVED											
64		**OCL 034**	**OCL 032**	**OCL 024**	**OCL 022**	**OCL 014**	**OCL 012**	**OCL 004**	**OCL 002**	**RO**	Cycle Count Limit Reached 0 - No Cycle Count Limit Reached 1 - Cycle Count Limit Reached. Note: On Cycle Count Limit reaching the corresponding DO, bit is set to 1 for 2 secs and then gets reset to 0.	0x2620	0x03
65		**OCL 074**	**OCL 072**	**OCL 064**	**OCL 062**	**OCL 054**	**OCL 052**	**OCL 044**	**OCL 042**				
66		**OCL 114**	**OCL 112**	**OCL 104**	**OCL 102**	**OCL 094**	**OCL 092**	**OCL 084**	**OCL 082**				
67 to		RESERVED											

68	IO/ IO-Link											
69		OCC - RST 034	OCC - RST 032	OCC - RST 024	OCC - RST 022	OCC - RST 014	OCC - RST 012	OCC - RST 004	OCC - RST 002	WO	Cycle Count Reset 0 - No Change 1 - Set to Reset the Cycle Count	0x2630	0x03
70		OCC - RST 074	OCC - RST 072	OCC - RST 064	OCC - RST 062	OCC - RST 054	OCC - RST 052	OCC - RST 044	OCC - RST 042				
71		OCC - RST 114	OCC - RST 112	OCC - RST 104	OCC - RST 102	OCC - RST 094	OCC - RST 092	OCC - RST 084	OCC - RST 082				
72 to 84		RESERVED											
85		ADC - I2C Communication Warning – Module Position								RO	ADC - I2C Comm Warning 0 - ADC - I2C Comm OK 1 - 3 – Module Position. 4-255 – Reserved	0x2610	0x09
86		IO-Link Transceiver - USART 1 Communication Warning – Module Position								RO	IO-Link Transceiver - USART – 1 0 - Comm OK 1-3 – Warning at Module Position 4-255 – Reserved	0x2610	0x0A
87		IO-Link Transceiver - USART 2 Communication Warning – Module Position								RO	IO-Link Transceiver - USART - 2 0 - Comm OK 1-3 – Warning at Module Position 4-255 – Reserved		
88		IO-Link Transceiver - USART 3 Communication Warning – Module Position								RO	IO-Link Transceiver - USART - 3 0 - Comm OK 1-3 – Warning at Module Position 4-255 – Reserved		

89	IO / IO-Link	**IO-Link Transceiver - USART 4 Communication Warning – Module Position**	**RO**	IO-Link Transceiver - USART – 4 0 - Comm OK 1-3 – Warning at Module Position 4-255 – Reserved		
90 to 100		RESERVED				
101		**External Flash Corrupt – Module Position**	**RO**	EEPROM - SPI Communication Fault 0 - EEPROM - SPI Comm OK 1-3 – Module Position. 4-255 – Reserved	0x2610	0x0B
102		**ADC - I2C Communication Error – Module Position**	**RO**	ADC - I2C Comm Fault 0 - ADC - I2C Comm OK 1-3 – Module Position. 4-255 – Reserved	0x2610	0x0C
103		**IO-Link Transceiver - SPI Communication Error – Module Position**		IO-Link Transceiver - SPI Comm Fault 0 - IO-Link Transceiver- SPI Comm OK 1-3 – Module Position 4-255 – Reserved	0x2610	0X0D
104		**IO-Link Transceiver - USART 1 Communication Error – Module Position**	**RO**	IO-Link Transceiver - USART - 1 Comm Fault 0 - IO-Link Transceiver - USART Comm OK 1-3 – Module Position. 4-255 – Reserved	0x2610	0X0E

105	IO/ IO-Link	IO-Link Transceiver - USART 2 Communication Error – Module Position	RO	IO-Link Transceiver - USART - 2 Comm Fault 0 - IO-Link Transceiver - USART Comm OK 1-3 – Module Position 4-255 – Reserved		
106		IO-Link Transceiver - USART 3 Communication Error – Module Position	RO	IO-Link Transceiver - USART - 3 Comm Fault 0 - IO-Link Transceiver - USART Comm OK 1-3 – Module Position. 4-255 – Reserved		
107		IO-Link Transceiver - USART 4 Communication Error – Module Position	RO	IO-Link Transceiver - USART - 3 Comm Fault 0 - IO-Link Transceiver - USART Comm OK 1 -3 – Module Position. 4-255 – Reserved		
108		External Module - Error – Module Position	RO	External Module - Fault 0 - No Error 1-3 – Module Position. 4-255 – Reserved Note: This is meant for non-classified error in external module.	0x2610	0X0F
109		Fuse Status - Fault – Module Position	RO	Fuse Status - Fault 0 - No Fuse Fault 1-3 – Module Position. 4-255 – Reserved	0x2610	0X10

110	IO/ IO-Link	**Over Current - Fault – Module Position**								**RO**	Over Current - Fault 0 - No Over Current Fault 1-3 – Module Position. 4-255 – Reserved	0x2610	0X11
111		**Over Current - Fault – Channel No**								**RO**	Over Current - Fault 0 - 23 Channel No. (Refer to Table 17 for Channel Description).	0x2610	
112 to 145		RESERVED											
146	Network	RESV	RESV	RESV	RESV	RESV	RESV	**PLC - Output Access**	**IP Address**	**RO**	IP Address 0 - Valid IP Address 1- Invalid IP Address PLC - Output Access 0 - Access Enabled 1 - Access Disabled	0x2610	0x12
147	---	RESERVED											
NA	IO-Link Events	Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 0 IO-Link Events	0x2730	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 1 IO-Link Events	0x2740	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 2 IO-Link Events	0x2750	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 3 IO-Link Events	0x2760	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 4 IO-Link Events	0x2770	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 5 IO-Link Events	0x2780	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 6 IO-Link Events	0x2790	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 7 IO-Link Events	0x27A0	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 8 IO-Link Events	0x27B0	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 9 IO-Link Events	0x27C0	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 10 IO-Link Events	0x27D0	0x01
		Total 214 bytes (2 bytes of Total Events, 2 bytes of Event size, 210 bytes of event data)								**RO**	Port 11 IO-Link Events	0x27E0	0x01

NA	IO-Link Index Sub-index Acyclic Data Access Service	---	---	---	---	---	---	---	---	**WO**	*Read Request (03) using Write Service DS - Data Size, RR - Read Request, PN - Port Number, IX - IOL Index, SX - IOL Sub-index, DF - Data Field.	0x2720	1 to 9
		---	---	---	---	---	---	---	---			Control = RD/WR, Instance = PN, Index = IX, Sub-index = SX, Length = DS, Error Code=EC, Data = DF EC = 0x00 success, EC = 0x80 Error, When EC=0x80, DF contains 2 bytes of Error Code	
		---	---	---	---	---	---	---	---	**RO**	*Read Response (03) using Read Service DS - Data Size, DF - Data Field DF = (ES1 ES2 EC1 EC2) if ES1=0, ES2=0x80 DF = (ES1 ES2 Data) if ES1, ES2 = 0.		
		---	---	---	---	---	---	---	---				
		---	---	---	---	---	---	---	---	**WO**	*Write Request (02) using Write Service DS - Data Size, WR - Write Request, PN - Port Number, IX - IOL Index, SX - IOL Sub-index, MS - Message Size, MG - Message.		
		---	---	---	---	---	---	---	---				
		---	---	---	---	---	---	---	---	**RO**	*Write Response (02) using Read Service DS - Data Size, DR - Data Received, WR - Write Response DF = (ES1 ES2 EC1 EC2) if ES1=0, ES2=0x80 DF = (ES1 ES2 Data) if ES1, ES2 = 0.		
		---	---	---	---	---	---	---	---				

NOTE:

* Refer to 4.6.1: IO-Link Service Data

CHAPTER - 5 **Configuration Tool/Web Interface**

The PCH Portal provides the following interfaces for configuration and monitoring of PCH Portal.

5.1 The PC Configuration Tool/Web Interface

The PC Configuration tool is Windows PC based application that communicates over USB and Bluetooth Interface to the PCH Portal.

To connect the PC configuration tool via USB interface connect the cable between the PC and PCH Portal and launch PCH Portal Configuration Tool to get connected with the PCH Portal.

To connect PCH Portal web page via Ethernet interface connect the ethernet cable between the PC and PCH Portal and enter the PCH Portal's IP address in the browser.

NOTE: Ethernet over EtherCAT must be configured in order to access web pages.

User can select prefered language from the language dropdown. Supported languages are English, French, German, Italian, Chinese, Korean and Japanese.

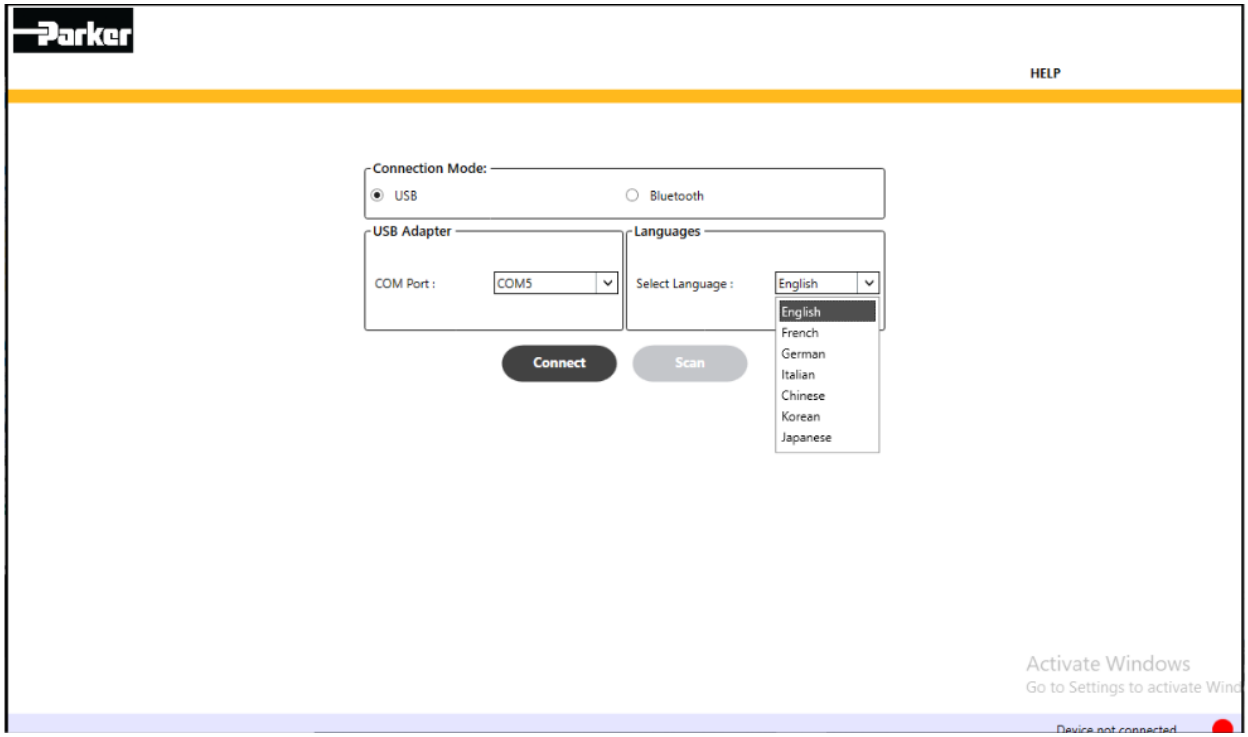


Figure 34 — PC Configuration Tool

To connect PC configuration tool via Bluetooth interface, a low energy USB Dongle (BLED112) must be connected to USB port of Windows PC. Also, turn ON the Bluetooth on the PCH Portal by pressing the Bluetooth button for at least 3 seconds.

Select the ‘Bluetooth’ radio button on the screen. This will enable the ‘Scan’ button on the UI. To connect to the PCH Portal, click on the ‘Scan’ button. After scan is completed the available PCH Portal devices will be shown. The PCH Portal device can be identified using the device name displayed in the scan device list. The PCH Portal device name will be displayed as PCH-XXXX where XXXX is the last 4 digits of the MAC address printed on the label of the PCH Portal.

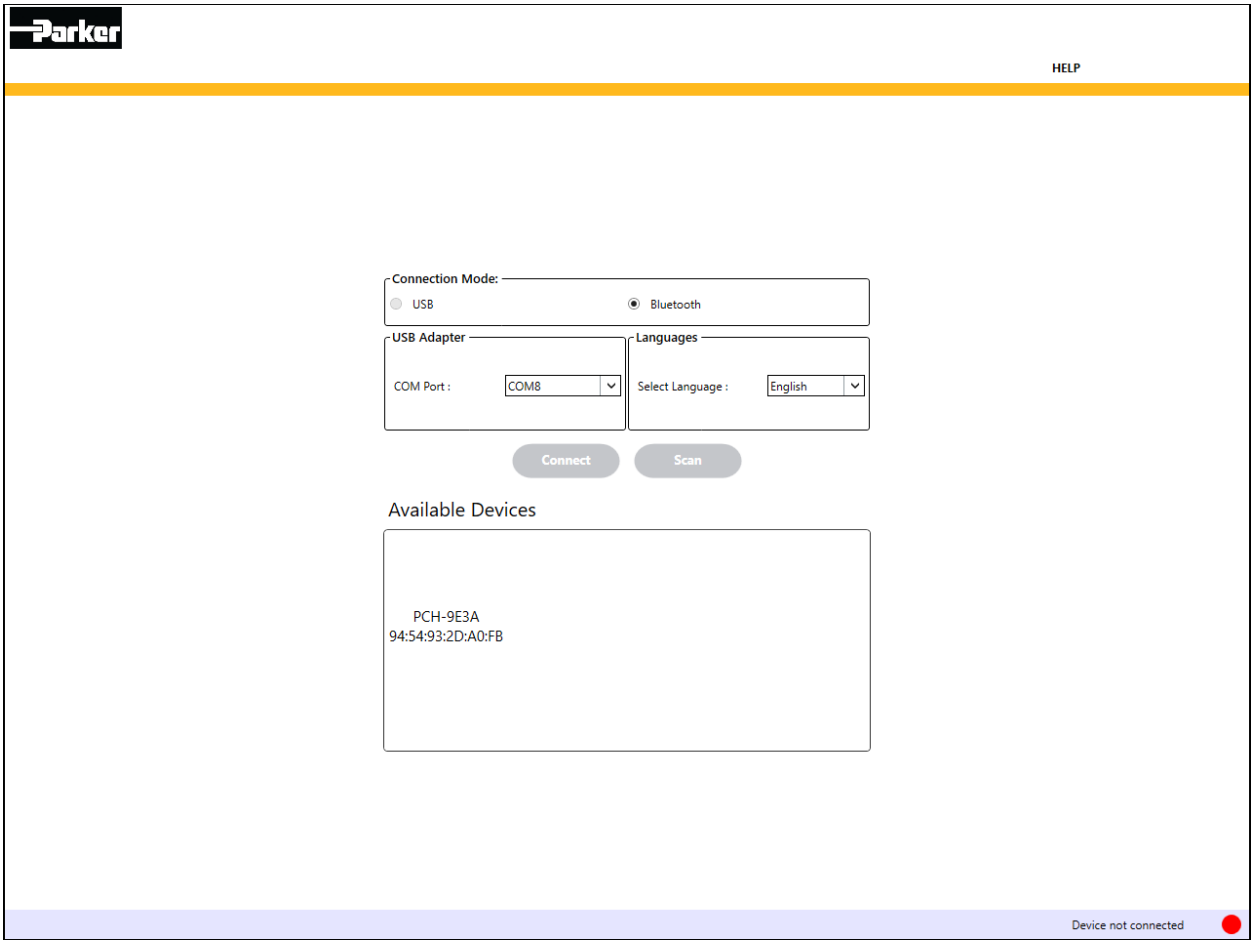


Figure 35 — Bluetooth connection screen

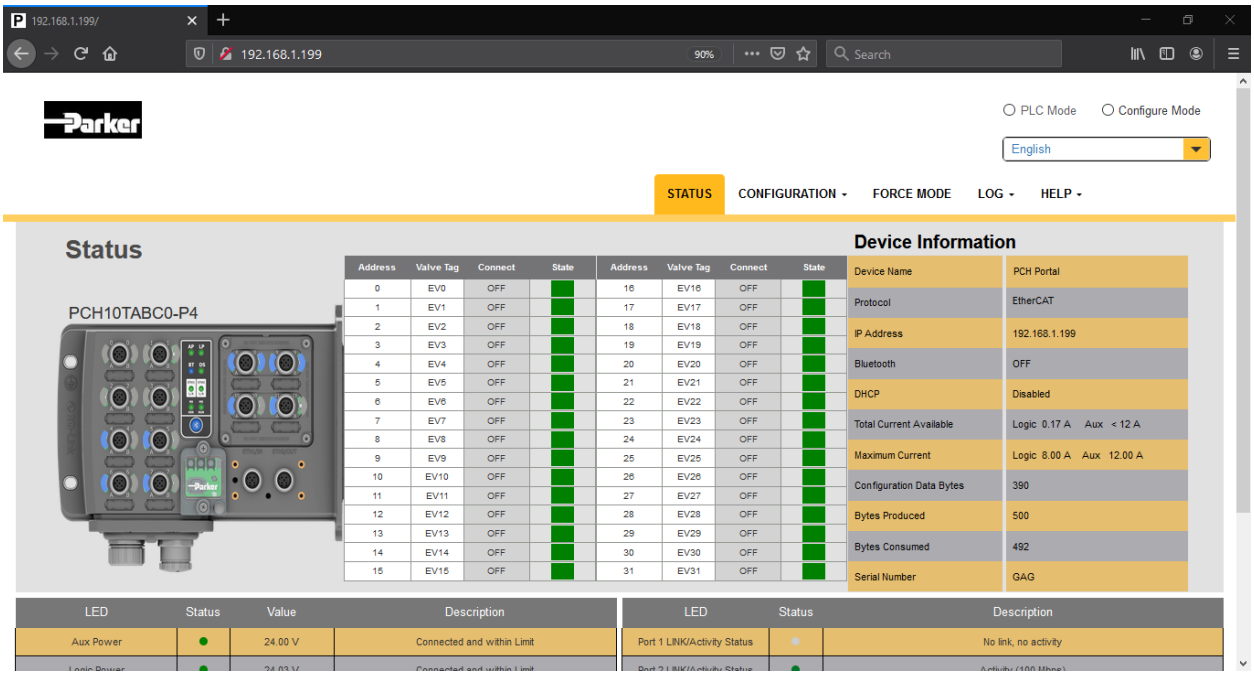


Figure 36 — Web Interface

NOTE:

a. PCH Portal web page supports Microsoft Edge, Google Chrome and Mozilla Firefox browsers only.
b. The GUI on web page is same as that on PC configuration tool.
c. Please use latest version of browsers.

To configure PCH Portal enter Configuration mode by clicking on the “Configure mode” radio button and providing a valid password. The default password is “parker”. Configuration (write) access to PCH Portal is granted if it is not already in configuration mode.

While the PCH Portal is in Configuration mode, if the user connects the PLC, then the PLC does not gain control of the PCH until user releases the access from Configuration tool.

NOTE:

a. Screens automatically refresh so inactivity is not applicable until web browser is closed and utility is closed.
b. Once configuration mode is accessed by the PC Utility/Web server, the PLC cannot configure and actuate PCH Portal Outputs/Valves. PLC can read only inputs and device status from PCH Portal.

The “PLC Mode” radio button is selected if PLC is connected to the PCH Portal (refer to the upper right corner of the image below).

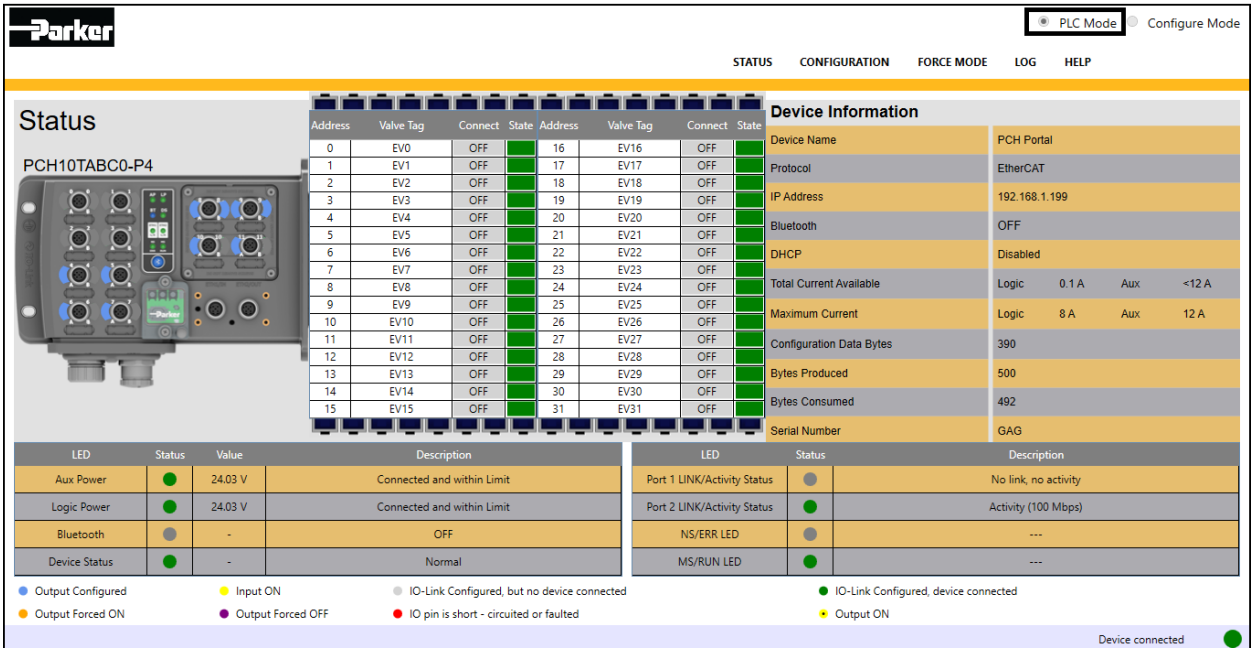


Figure 37 — PLC Mode

5.1.1 Status Screen

The “Status” screen displays live status of the PCH Portal. All the device information like protocol, IP address etc. is displayed in the table on the right-hand side. Status of all the LEDs are displayed in the table at the bottom. Digital Input, Digital Output and IO-Link pin status is displayed on the device image on the left-hand side. Valve status is displayed in the table at the center.

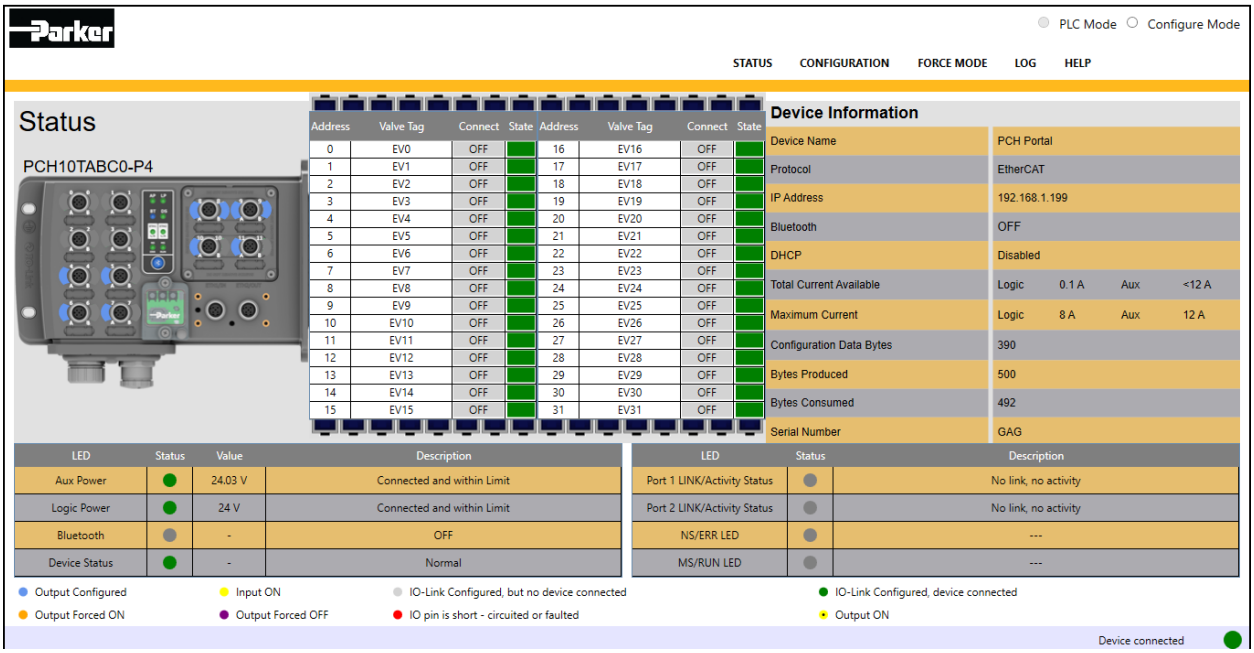


Figure 38 — Status Screen

5.1.2 Port Configuration Screen

The “Port Config” screen allows user to view or change the pin configuration of PCH Portal. User can make configuration changes from the pin images or from the “Port Configuration Detail” table.

NOTE: LED colors have different meanings between status and configuration screens.

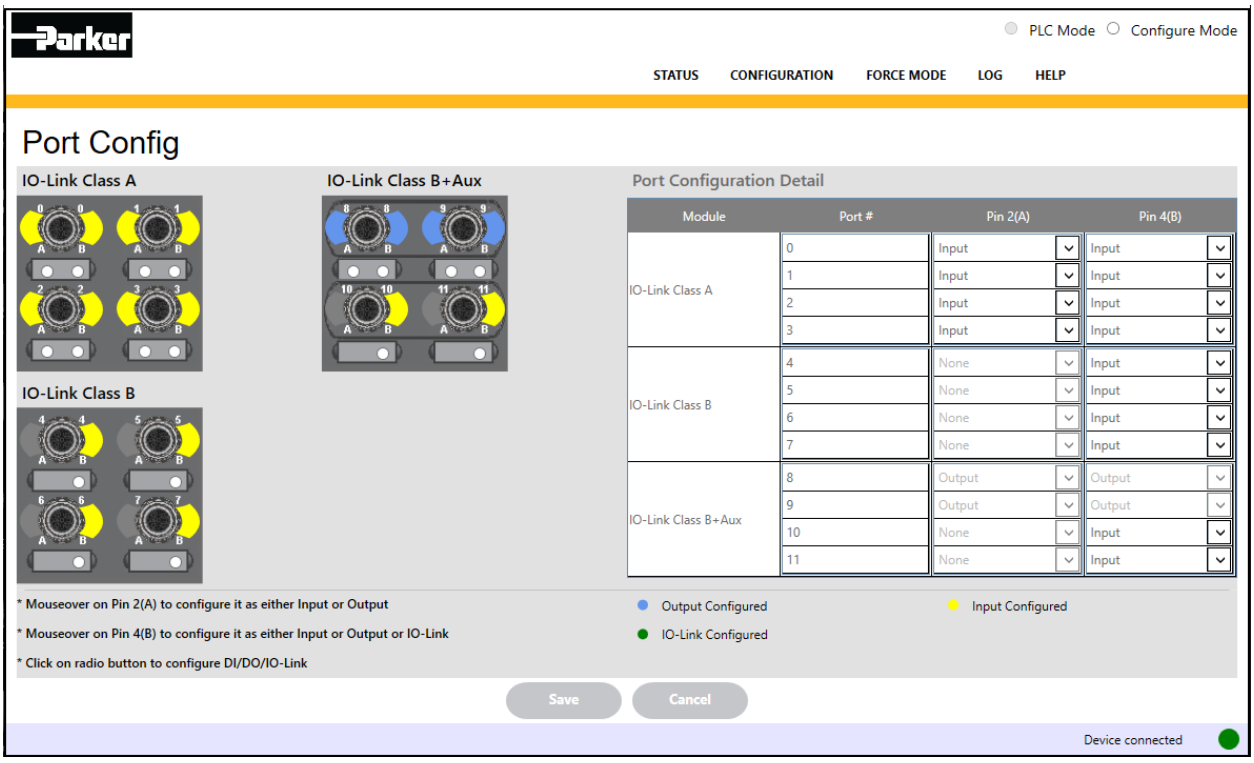


Figure 39 — Port Config Screen

5.1.3 Pin Config

The pin configuration can also be changed from the “Pin Config” tree structure. To see or change the configuration details for a particular Digital Input/Digital Output/IO-Link pin, select the appropriate radio button on the PCH Portal graphic in the “Port Config” screen.

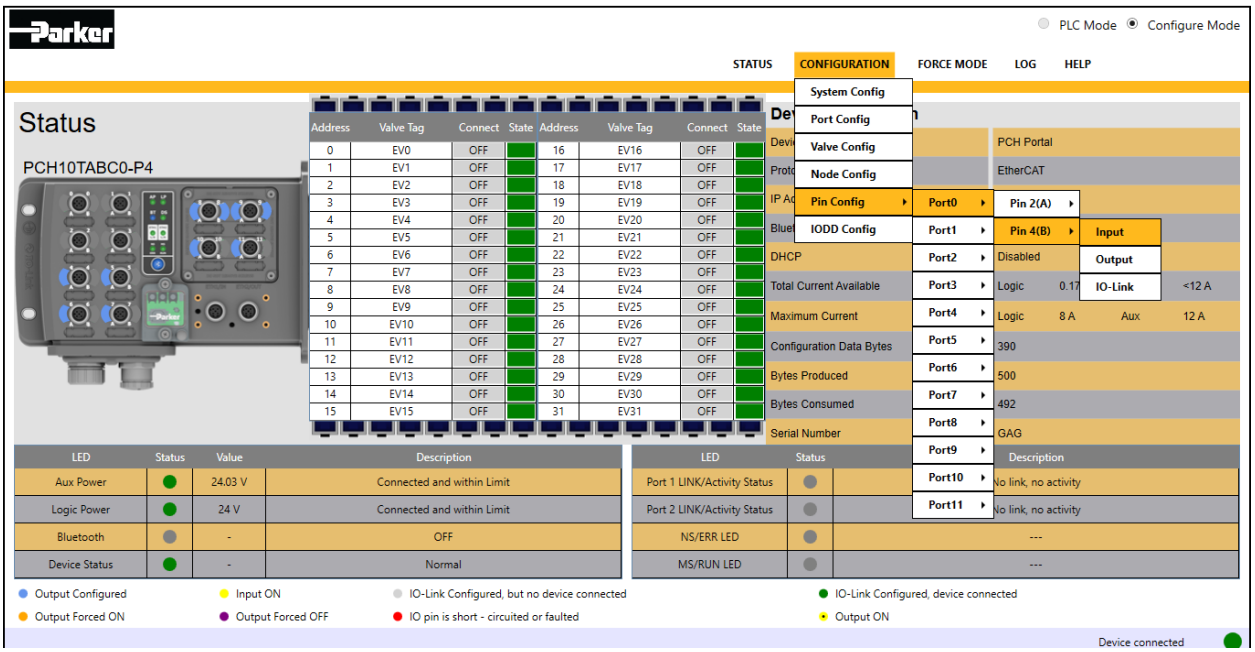


Figure 40 — Change Pin Config

5.1.4 Digital Input Configuration Screen

User can see or change the below parameters on this screen:

a. Description of Channel
b. Digital Input Type
c. Invert
d. Debounce Time
e. Cycle Warning Mode
f. Cycle Count Type
g. Upcounter cycle count notification limit/Downcounting preset to 0
h. Cycle Reset

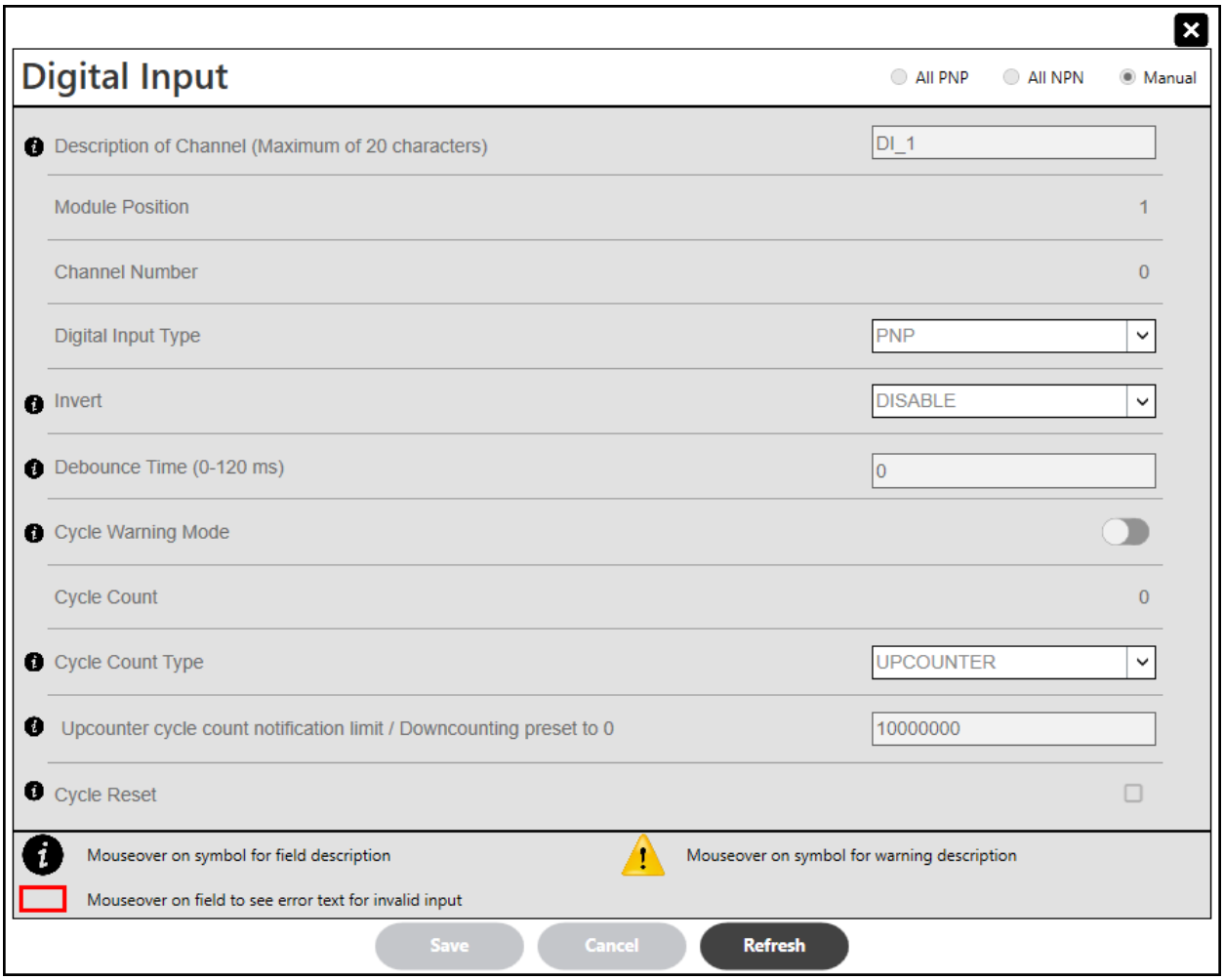


Figure 41 — Digital Input Configuration Screen

5.1.5 Digital Output Configuration Screen

a. Description of Channel
b. Fault Mode
c. Cycle Warning Mode
d. Cycle Count Type
e. Upcounter cycle count notification limit/Downcounting preset to 0
f. Cycle Reset

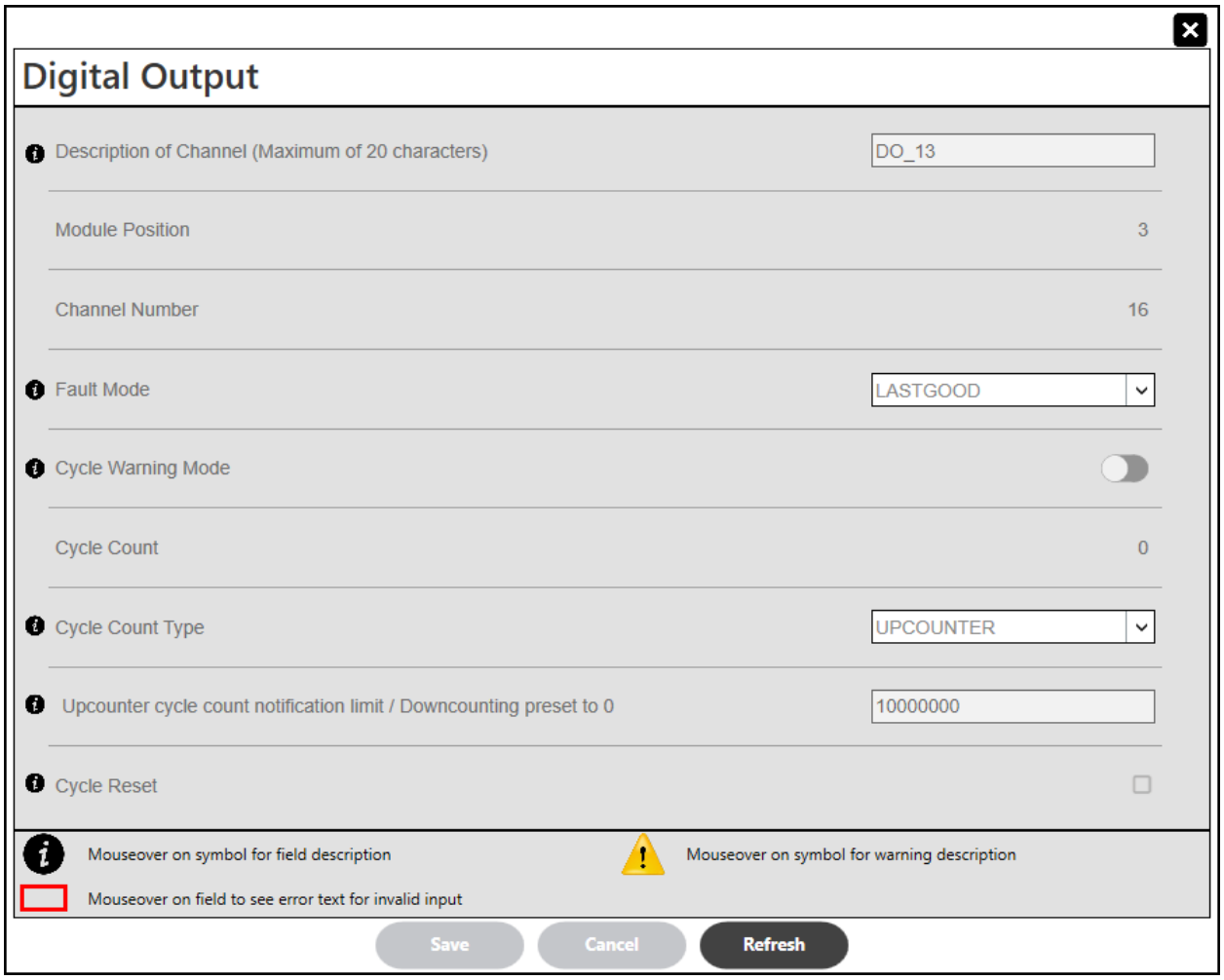


Figure 42 — Digital Output Configuration Screen

5.1.6 IO-Link Port Configuration Screen

a. The live data from the conected IO-Link slave device is displayed under the “Device Information” section.
b. The data in the “Optional Device Information” section is fetched when “Get Info” button is pressed.
c. User can change the “Data Storage”, “Inspection Level” and “Cycle Time” from this screen as long as it is in “Configure Mode’.
d. User can read/write Parameter data by entering the Index and Sub-Index in the “Parameter” section.
e. User can see the cyclic input or can change the cyclic output from the “Process Data” section by selecting the “*i*” icon.
f. The Parameter Content section displays the parameters and their respective data of the IO-Link slave device as long as the IODD file has been uploaded to the PCH Portal. Refer to 5.1.9 for IODD file management.
g. “Read All” button reads all the parameter data from the connected IO-Link slave device and updates data into parameter content table.
h. The “Data Storage” section at the bottom displays the “Device ID” and “Vendor ID” of the IO-Link slave device whose parameters have been uploaded on the current port.

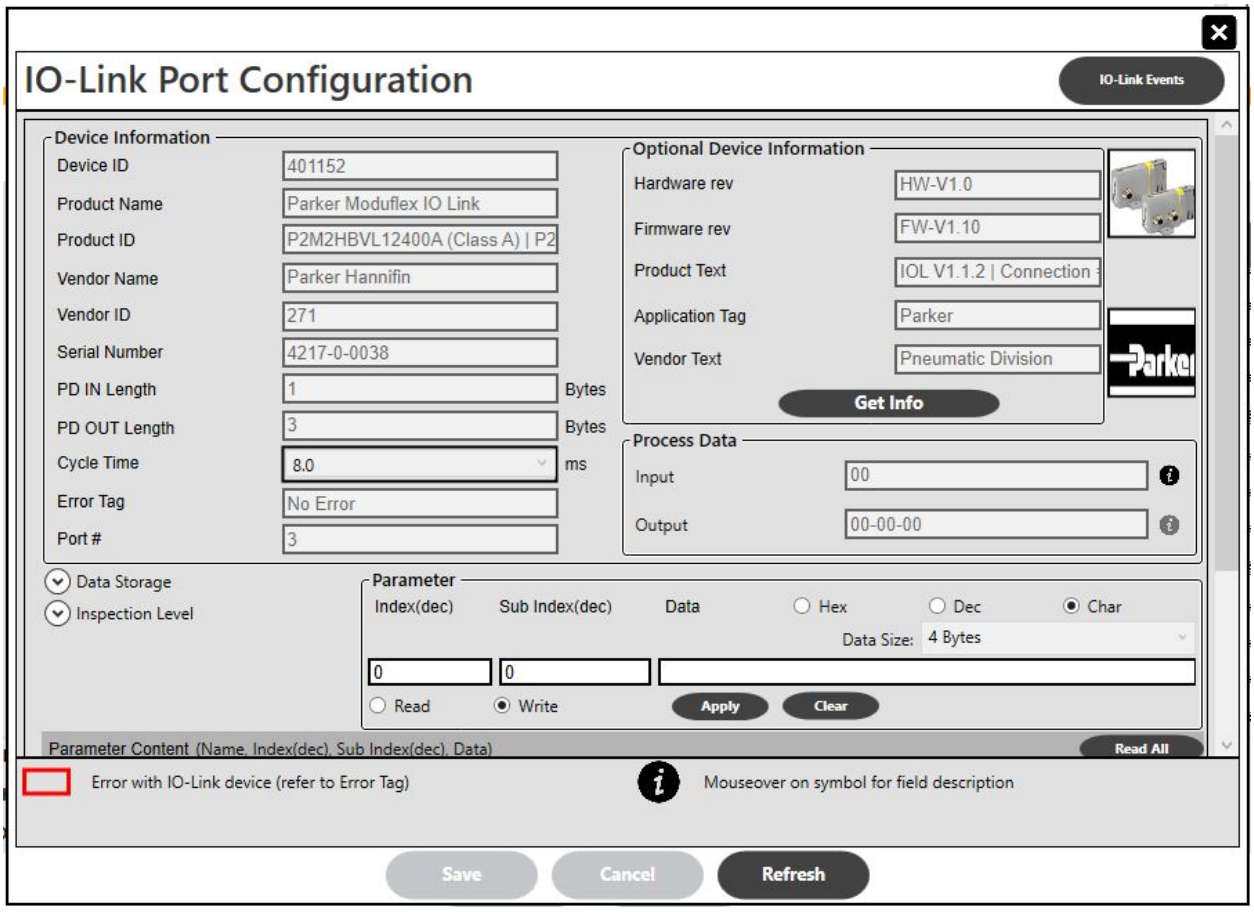


Figure 43 — IO-Link Port Configuration Screen

5.1.7 IO-Link Events Screen

Events related to IO-Link are logged in the “IO-Link Events” screen of the respective IO-Link port. The “IO-Link Events” screen is accessed by selecting the “IO-Link Events” button as shown in Figure 44 User has to refresh this screen to see new logs. User can export these logs in CSV format. User can also clear the logs as long as they are in “Configuration Mode”.

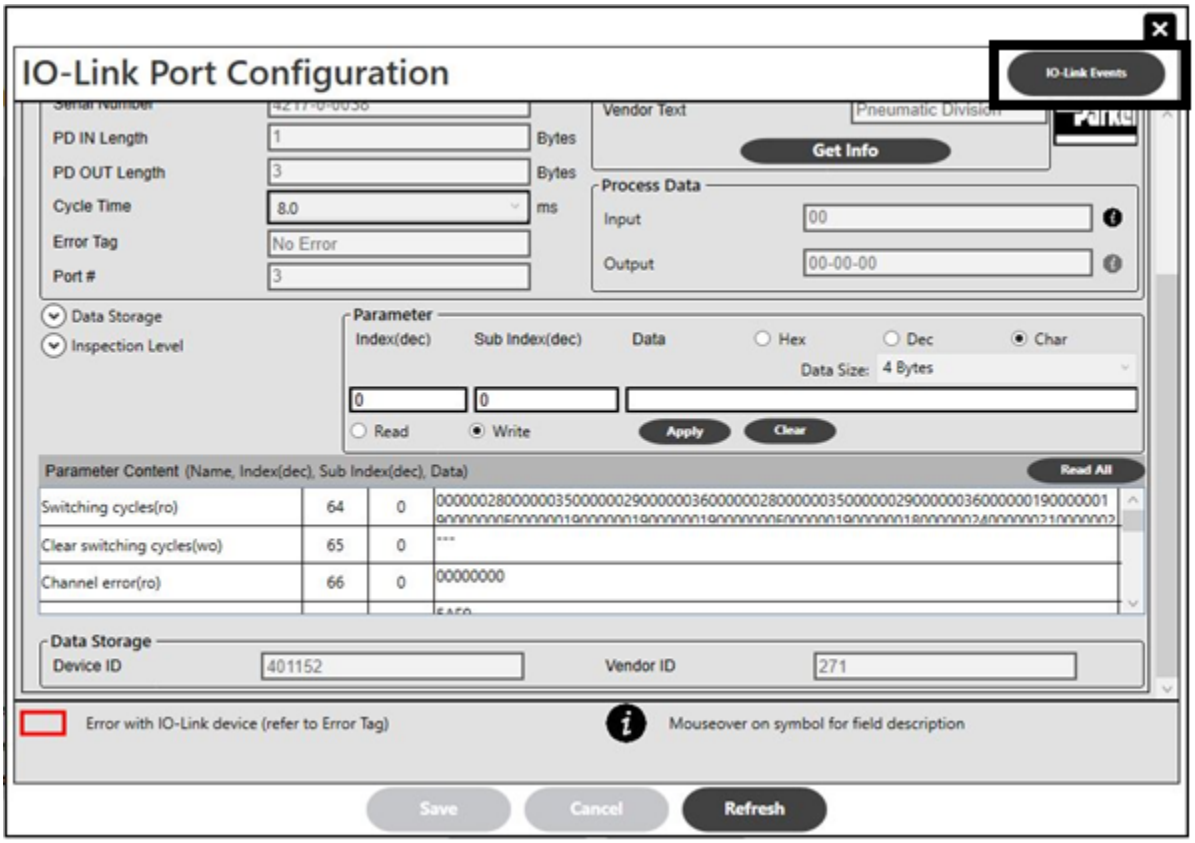


Figure 44 — Navigation to IO-Link Event

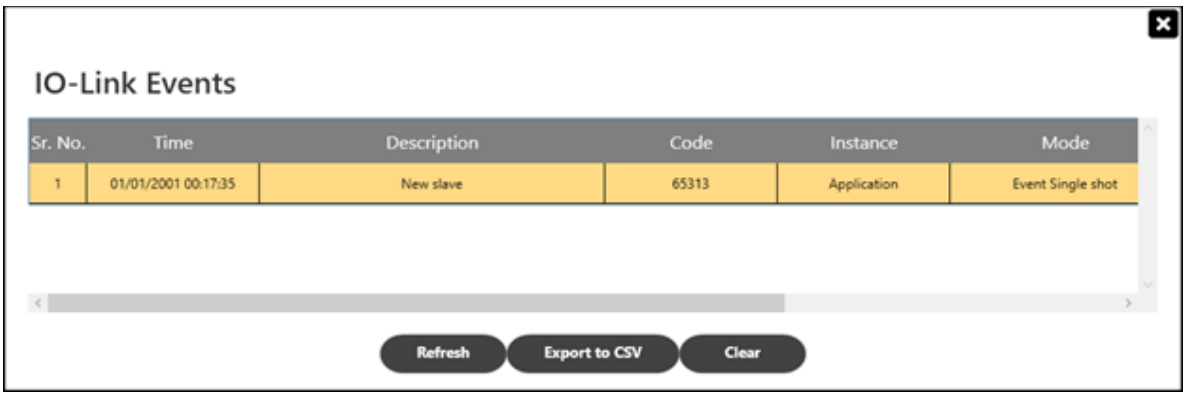


Figure 45 — IO-Link Events Screen

NOTE:

a) A maximum of 30 events are logged at a time.
b) “Read All” button reads “Read only” and “Read Write” parameter data and updates into parameter content table as long as the IODD file has been uploaded to the PCH Portal. Refer to 5.1.9 for IODD file management.

5.1.8 Valve Configuration Screen

The “Valve Config” screen is used to change the configuration of any Valve.The following parameters of valves can be changed through Valve Config Screen:

a. Valve Tag
b. Fault Mode
c. Cycle Warning mode
d. Cycle Count Type
e. Cycle Limit
f. Cycle Reset

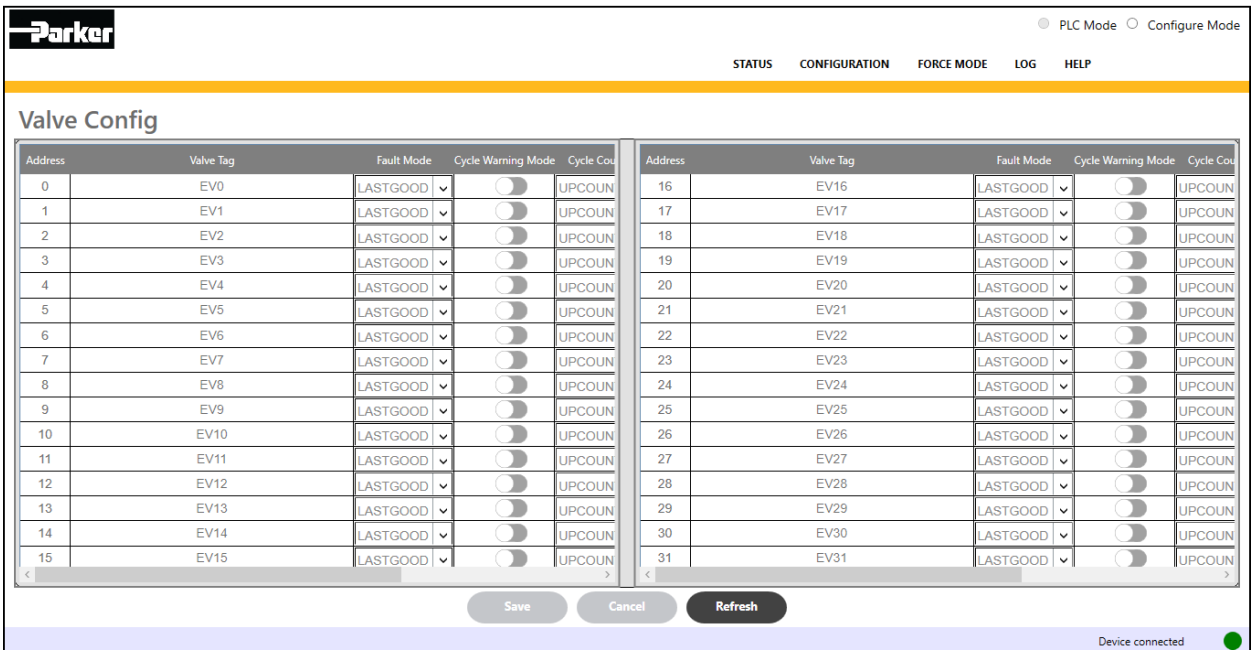


Figure 46 — Valve Config Screen

5.1.9 IODD Configuration Screen

The “IODD Config” screen is used to upload an IODD file to the PCH Portal IODD library in the device or delete an IODD file from PCH Portal IODD library. IODD files are loaded into the IODD library regardless of what IO-Link port they are, or will be, connected to.

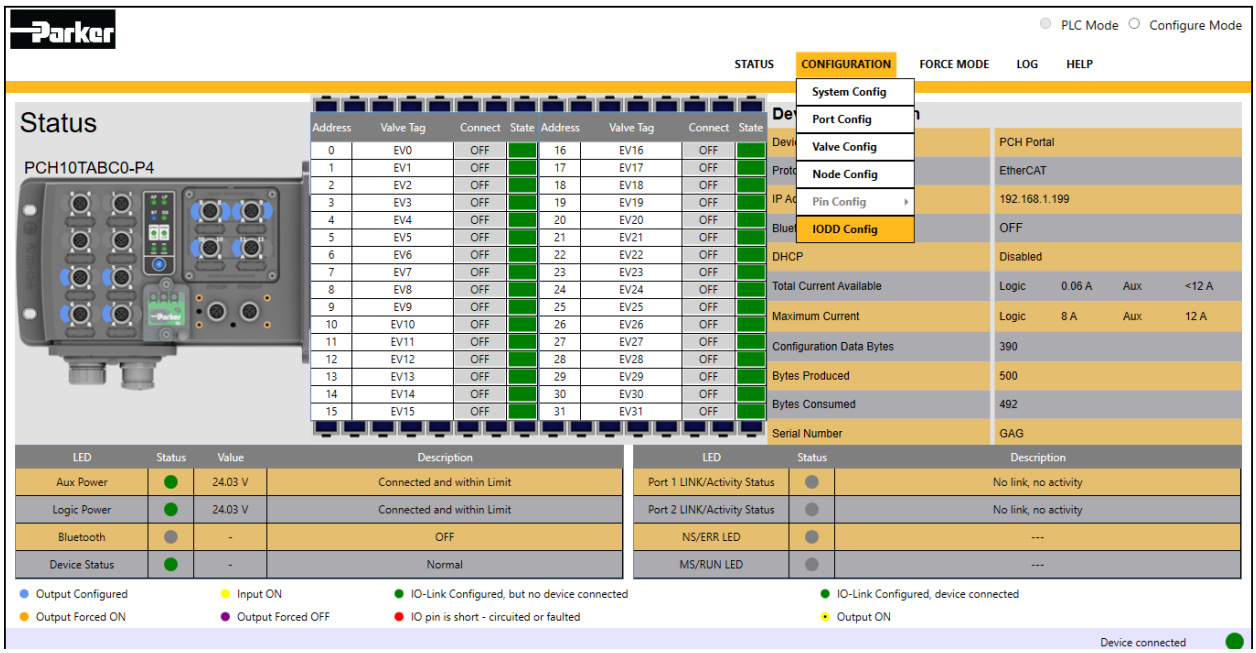


Figure 47 — Navigation to IODD Configuration screen

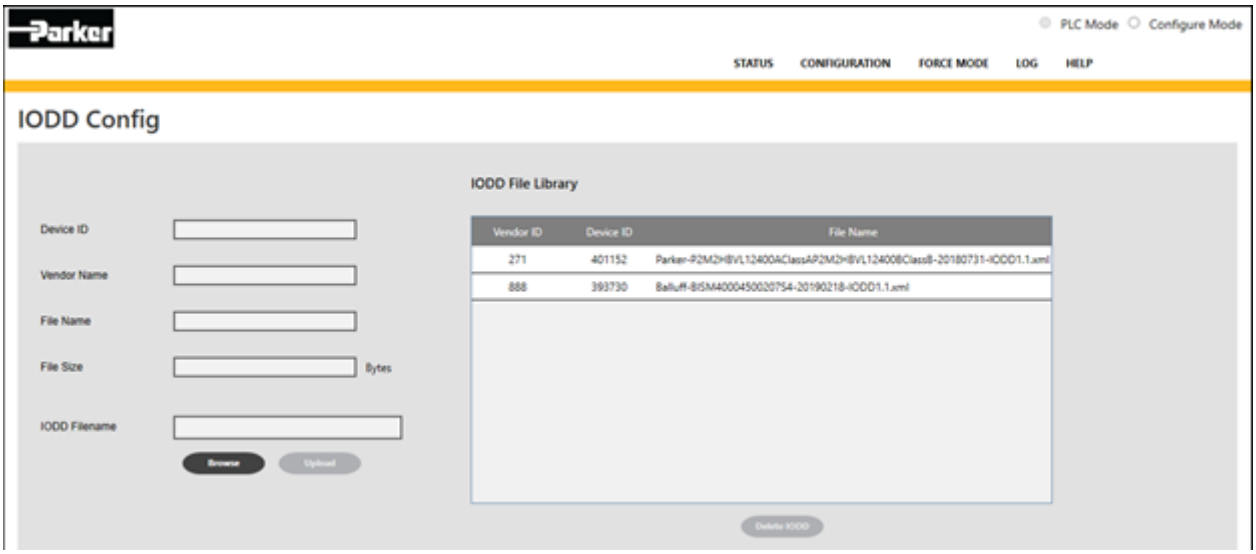


Figure 48 — IODD Config Screen

NOTE:

a. After uploading an IODD file, device image and vendor logo gets updated automatically, but in web interface user must upload the device image and vendor logo manually after uploading the IODD file.

b. User does not need configuration access to upload/delete IODD files.

c. User can upload maximum 12 IODD files into the PCH Portal.

5.1.10 Force Mode Screen

To actuate DO/Valves of PCH Portal enter Force mode by clicking on “Force mode” tab, then click on the slider button and provide valid password. The default password is “parker”. Access to PCH Portal force mode is granted if it is not already in force mode. User has to click on the radio buttons or on the Valve’s “Connect” column to actuate the Digital Outputs and Valves respectively.

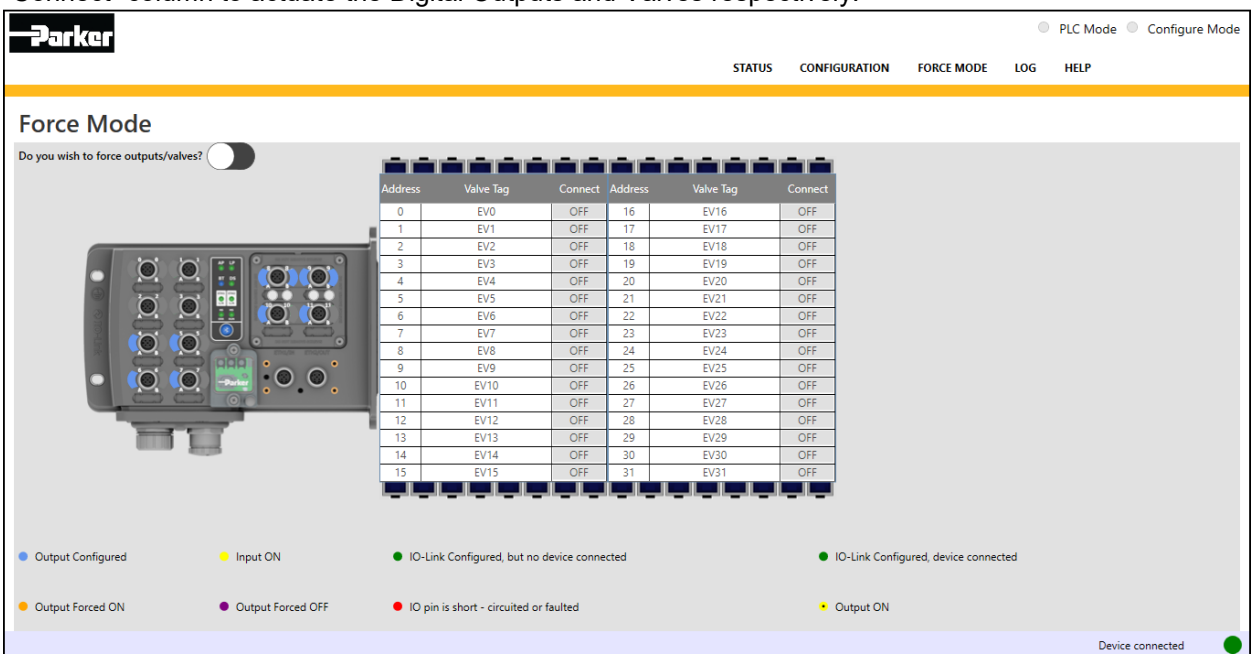


Figure 49 — Force Mode Screen

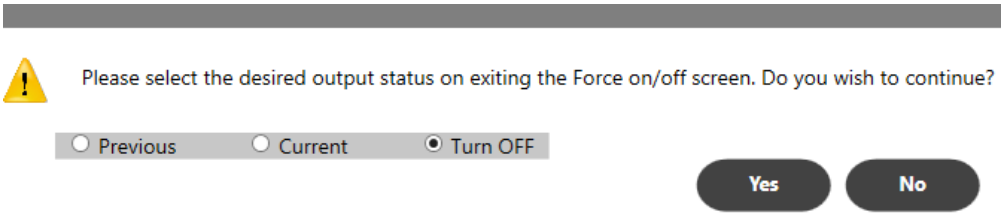


Figure 50 — Force Mode Output Status

On exiting the Force ON/OFF Screen, the user needs to select either Previous, Current or Turn OFF options, which impacts Values and Digital Outputs.

5.1.11 Help Screen

User can click on the “HELP” tab to open the detailed GUI Help manual document.

5.1.12 System Configuration Screen

The “System Configuration” screen displays the system wide parameters such as date, time, network configuration addresses, MAC address, System ON Time, and Bluetooth configuration settings. Some of these parameters are user configurable in configuration mode. QuickConnect is not applicable for EtherCAT and hence it is non-configurable.

QuickConnect Mode for EtherCAT: OFF

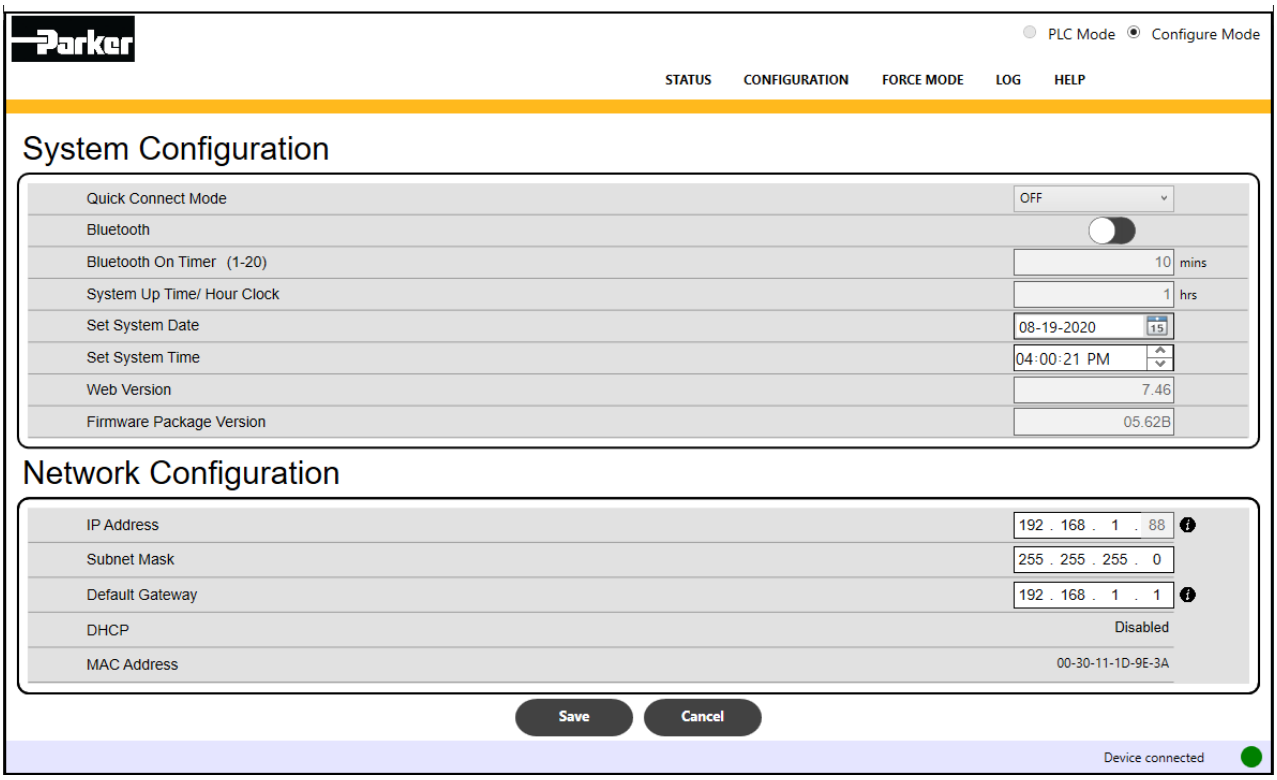


Figure 51 — System Configuration Screen

5.1.13 Node Configuration Screen

The “Node Configuration” page provides the capability to save the configuration of the PCH device to connected Windows PC, as well as to load the saved configuration from PC to PCH device.
It also provides the option to restore the PCH device to its factory default settings.

NOTE: In Restore to Factory Default option the PCH Portal device data will be cleared. It takes around 15 seconds to perform this operation. “Restore in Progress” is indicated via blinking cyan DS LED.

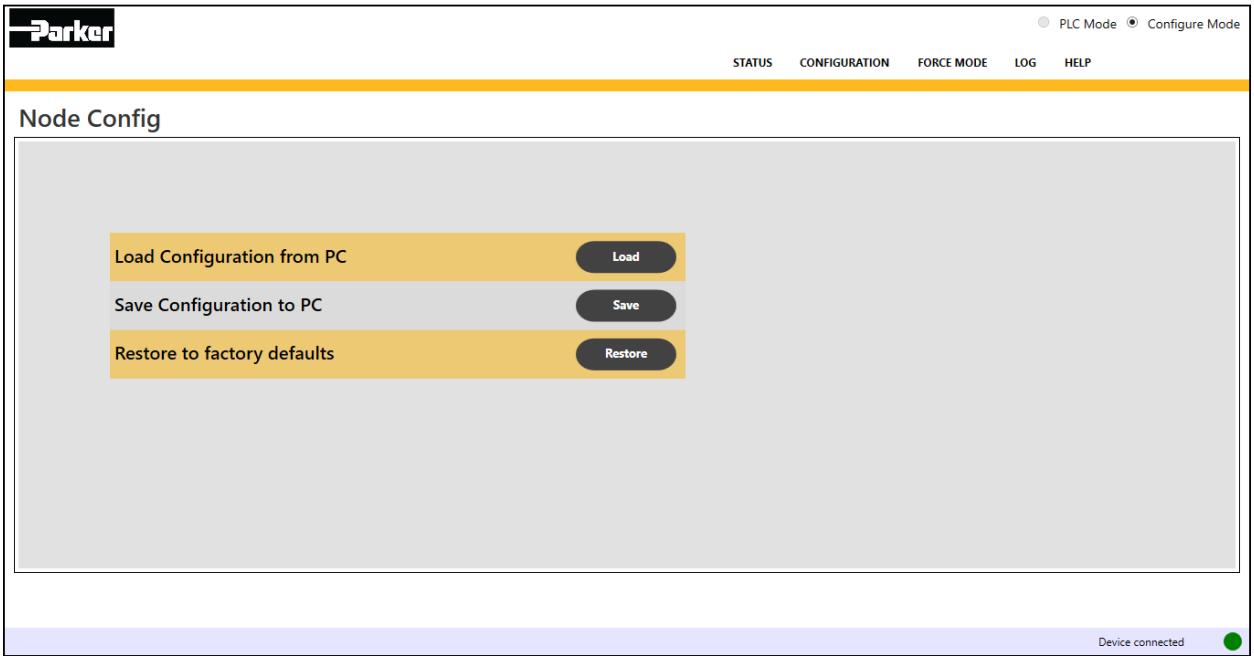


Figure 52 — Node Config Screen

5.1.14 Logs:Screen

The “LOGS” tab displays three options “Warnings”, “Events” and “Errors”. All the events provide time/date stamp details as well as module information. It also provides the action the user action required to recover from the Error and Events.

NOTE: A maximum of 40 events are logged at a time.

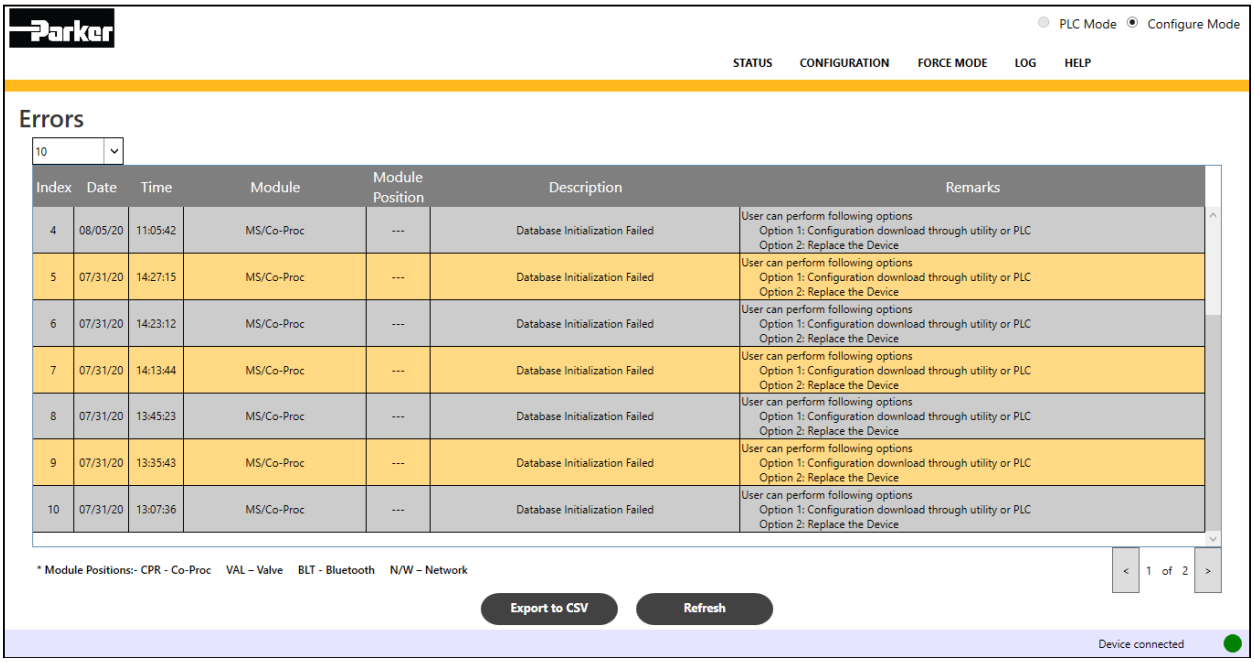


Figure 53 — Errors Screen

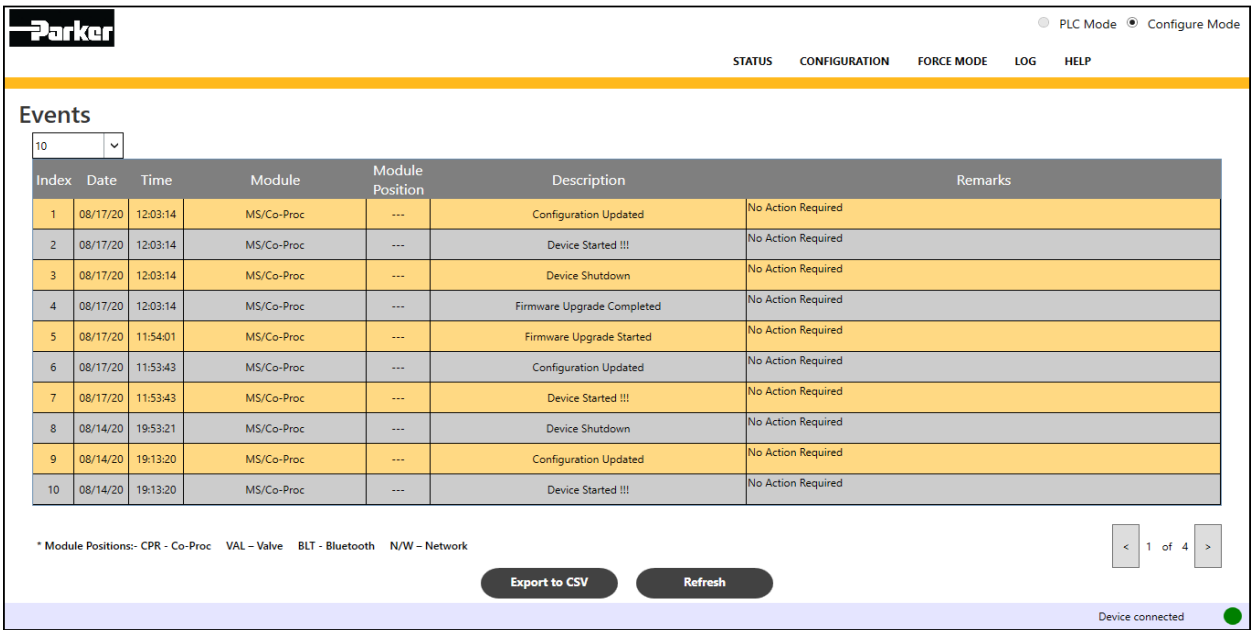


Figure 54 — Events Screen

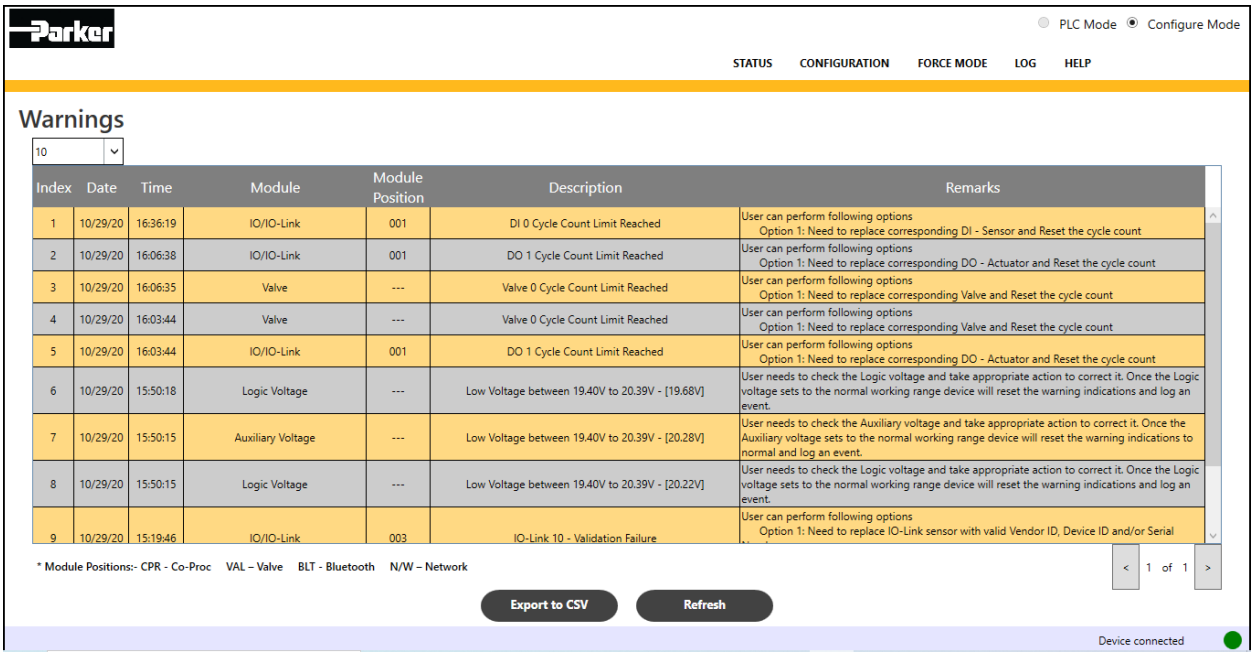


Figure 55 — Warnings Screen

5.2 Bluetooth Mobile Application

The Bluetooth mobile application is also available to view status and configure the PCH Portal. This Bluetooth application is available for Android and iOS mobile devices and tablets. Please download the application from app store and install to your mobile device to get connected with PCH Portal over Bluetooth interface.

Please ensure Bluetooth communication of PCH Portal is turned ON before connecting . It can be turned on via configuration tool/web interface or by pressing Bluetooth button (and holding for more than 3 seconds) on Bluetooth module. Bluetooth LED flashes and turns solid when connected to the phone or tablet.

CHAPTER - 6 **Troubleshooting**

6.1 Troubleshooting

Table 37 — Troubleshooting Information

Description	Area/Module	Category	Event Log Message Format: Date | Time | Module | Module Position | Description	Process Input Status Bits	User Actions
Auxiliary Power - Low Voltage below 19.40V (Hysteresis 19.60V) Note: Under voltage cut-off:14.70V Under voltage cut-off recovery:15.70V	Auxiliary Voltage	Error	MM-DD-YY | HRS: MIN:SEC | Auxiliary Voltage | --- | Low Voltage below 19.40V - [<Actual Voltage>V]	Aux Voltage bit = 1 Error bit = 1	# User needs to check the Auxiliary voltage and take appropriate action to correct it. Once the Auxiliary voltage sets to the normal working range, the device resets the error indications to normal and log an event.
Auxiliary Power - Low Voltage between 19.40V and 20.40V (Hysteresis 19.60V to 20.60V)		Warning	MM-DD-YY | HRS: MIN:SEC | Auxiliary Voltage | --- | Low Voltage between 19.40V to 20.39V - [<Actual Voltage>V]	Aux Voltage bit = 1 Warning bit = 1	# User needs to check the Auxiliary voltage and take appropriate action to correct it. Once the Auxiliary voltage sets to the normal working range, the device resets the warning indications to normal and log an event.
Auxiliary Power - Voltage between 20.40V and 28.80V (Hysteresis 20.60V to 28.60V)		Event	MM-DD-YY | HRS: MIN:SEC | Auxiliary Voltage | --- | Normal Voltage between 20.40V to 28.80V - [<Actual Voltage>V]	NA	# No Action Required
Auxiliary Power - High Voltage between 28.80V and 29.50V (Hysteresis 28.60V to 29.30V)		Warning	MM-DD-YY | HRS: MIN:SEC | Auxiliary Voltage | --- | High Voltage between 28.81V to 29.50V - [<Actual Voltage>V]	Aux Voltage bit = 1 Warning bit = 1	# User needs to check the Auxiliary voltage and take appropriate action to correct it. Once the Auxiliary voltage sets to the normal working range, the device resets the error indications to normal and log an event.
Auxiliary Power - High Voltage above 29.50V (Hysteresis 29.30V) Note: Overvoltage cut-off: 30.00 V Overvoltage cut-off recovery: 29.50V		Error	MM-DD-YY | HRS: MIN:SEC | Auxiliary Voltage | --- | High Voltage above 29.50V - [<Actual Voltage>V]	Aux Voltage bit = 1 Error bit = 1	# User needs to check the Auxiliary voltage and take appropriate action to correct it. Once the Auxiliary voltage sets to the normal working range, the device resets the error indications to normal and log an event.
Logic Voltage below ~16.00V <Shutdown> Note: This event is not logged, only the indicators are mentioned wherever applicable Note: Under voltage cut-off:14.70V Under voltage cut-off recovery:15.70V	Logic Voltage	---	---	NA	# Power is below min limits; unit does not power ON until the voltage is above min limits.
Logic Power - Low Voltage between below 19.40V (Hysteresis 19.60V).		Error	MM-DD-YY | HRS: MIN:SEC | Logic Voltage | --- | Low Voltage below 19.40V - [<Actual Voltage>V]	Logic Voltage bit = 1 Error bit = 1	# User needs to check the Logic voltage and take appropriate action to correct it. Once the Logic voltage sets to normal working range, the device resets the error indications to normal and log an event.

Description	Area/Module	Category	Event Log Message Format: Date | Time | Module | Module Position | Description	Process Input Status Bits	User Actions
Logic Power - Low Voltage between 19.40V and 20.40V (Hysteresis 19.60V to 20.60V)	Logic Voltage	Warning	MM-DD-YY | HRS: MIN:SEC | Logic Voltage | --- | Low Voltage between 19.40V to 20.39V - [<Actual Voltage>V]	Logic Voltage bit = 1 Warning bit = 1	# User needs to check the Logic voltage and take appropriate action to correct it. Once the Logic voltage sets to the normal working range, device resets the warning indications and log an event.
Logic Power - Voltage between 20.40V and 28.80V (Hysteresis 20.60V to 28.60V)		Event	MM-DD-YY | HRS: MIN:SEC | Logic Voltage | --- | Normal Voltage between 20.40V to 28.80V - [<Actual Voltage>V]	NA	# No Action Required
Logic Power - High Voltage above 28.80V (Hysteresis 28.60V)		Warning	MM-DD-YY | HRS: MIN:SEC | Logic Voltage | --- | High Voltage above 28.80V - [<Actual Voltage>V]	Logic Voltage bit = 1 Warning bit = 1	# User needs to check the Logic voltage and take appropriate action to correct it. Once the Logic voltage is sets to the normal working range, the device resets the warning indications and log an event.
Logic Voltage above ~29.50V <Shutdown> Note: This event is not logged, only indicators are mentioned wherever applicable Note: Overvoltage cut-off: 30.00 V Overvoltage cut-off recovery: 29.50V		---	---	NA	# Power is above max limits; the device does not power on until logic voltage is below max limits
Model Specification Mismatch Note: For this event no information is updated in any Data map for PLC. It is notified only through Device/Configuration Tool Indicators and Message Logging.	MS/Co-Proc	Error	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | <Module Position>| Model Specification Mismatch where <Module Position> for IO Modules is indicated as 001 - Module Position 1 002 - Module Position 2 003 - Module Position 3 and Other modules are indicated as N/W - Network Module (this indicates Protocol Mismatch) VAL - Valve Module	NA	# User can perform the following options: Option 1: Power Cycle the Device. Option 2: Upgrade Firmware of the Device. Option 3: Replace the IO Module as per configured Model Specification. Option 4: Replace the Device.
Device in Bootloader This occurs when device fails to jump from Boot mode to Application mode due to Application image corruption Note: This event is not logged, only indicators are mentioned wherever applicable.		Error	---	NA	# User can perform the following options: Option 1: Upgrade Firmware of the Device Option 2: Replace the Device
Device Started		Event	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Device Started	NA	#No Action Required

Description	Area/Module	Category	Event Log Message Format: Date | Time | Module | Module Position | Description	Process Input Status Bits	User Actions
Backplane Initialization Failed	MS/Co-Proc	Error	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Backplane Initialization Failed	MS/CoProc bit = 1 Error bit = 1	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Upgrade Firmware of the Device (i.e., to upgrade I/O module firmware) Option 3: Replace the Device
B40 Initialization Failed Note: For this event, no information is updated in any Data map for PLC. It is notified only through Device/Configuration Tool Indicators and Message Logging.		Error	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | N/W Module Initialization Failed	NA	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Upgrade Firmware of N/W module through FTP Option 3: Replace the Device
Database Initialization Failed		Error	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Database Initialization Failed	MS/CoProc bit = 1 Error bit = 1	# User can perform the following options: Option 1: Configuration download through utility or PLC Option 2: Replace the Device
Device Shutdown		Event	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Device Shutdown	NA	# No Action Required
Backplane Communication Break - <Warning>		Warning	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Backplane Communication Break	MS/CoProc bit = 1 Warning bit = 1	# User can perform the following option: Option 1: Eliminate the Noise Source
Backplane Communication Break - <Fault>		Error	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Backplane Communication Break	MS/CoProc bit = 1 Error bit = 1	# User can perform the following options: Option 1: Eliminate the Noise Source Option 2: Power Cycle the Device Option 3: Upgrade Firmware of the Device Option 4: Replace the Device
Backplane Communication Normal		Event	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Backplane Communication Normal	NA	# No Action Required
Configuration Updated Note: This event occurs on any configuration change request from PCH Config Tool or through PLC		Event	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Configuration Updated	NA	# No Action Required

Description	Area/Module	Category	Event Log Message Format: Date | Time | Module | Module Position | Description	Process Input Status Bits	User Actions
Firmware Upgrade Started Note: In Application Mode this event is logged inclusive of Co-Proc Firmware Upgrade. In Boot Loader mode this event is logged excluding Co-Proc Firmware Upgrade since it is done through Boot Loader.	MS/Co-Proc	Event	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Firmware Upgrade Started	NA	# No Action Required
Firmware Upgrade Completed		Event	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | --- | Firmware Upgrade Completed	NA	# No Action Required
Firmware Upgrade Failed Note: This event is limited to failure of IO-Module, Valve, Bluetooth and B40 firmware upgrade only, Co-proc firmware upgrade is excluded from this event since it's firmware upgrade is done through Boot Loader.		Error	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | <Module Position>| Firmware Upgrade Failed where <Module Position> for IO Modules is indicated as 001 - Module Position. 1 002 - Module Position. 2 003 - Module Position. 3 and <Module Position> for Other modules it is indicated as VAL - Valve Module BLT - Bluetooth Module N/W - Network Module	NA	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Upgrade Firmware of the Device Option 3: Replace the Device
Watchdog Expired (for Count > 1 and < 5) Note: In case of Remote modules (i.e., Valve and I/Os) this event can only be logged if event notifying logic of these modules to Co-Proc is not hanged.		Warning	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | <Module Position> | Watch Dog Expired where <Module Position> for IO Modules is indicated as 001 - Module Position. 1 002 - Module Position. 2 003 – Module Position. 3 and <Module Position> for Other modules it is indicated as CPR- Co-Proc Module VAL - Valve Module	MS/CoProc bit = 1 Warning bit = 1	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Upgrade Firmware of specified module
Watchdog Expired (for Count >= 5) Note: In case of Remote modules (i.e., Valve and I/Os) this event can only be logged if event notifying logic of these modules to Co-Proc is not hanged.		Error	MM-DD-YY | HRS: MIN:SEC | MS/Co-Proc | <Module Position> | Watch Dog Expired where <Module Position> for IO Modules is indicated as 001 - Module Position. 1 002 - Module Position. 2 003 - Module Position. 3 and <Module Position> for Other modules it is indicated as CPR- Co-Proc Module VAL - Valve Module	MS/CoProc bit = 1 Error bit = 1	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Upgrade Firmware of specified module Option 3: Replace the Device

Description	Area/Module	Category	Event Log Message Format: Date | Time | Module | Module Position | Description	Process Input Status Bits	User Actions
SPI Communication - B40 <Warning> Note: For this event, no information is updated in any Data map for PLC. It is notified only through Device/Configuration Tool Indicators and Message Logging.	MS/Co-Proc	Warning	MM-DD-YY | HRS: MIN:SEC | MS/Co-proc | --- | N/W Module - SPI Communication Break	NA	# User can perform the following options: Option 1: Restart the device Option 2: Upgrade Firmware of N/W through FTP Option 3: Replace the Device
SPI Communication - B40 Normal		Event	MM-DD-YY | HRS: MIN:SEC | MS/Co-proc | --- | N/W Module - SPI Communication Normal	NA	# No Action Required
RTC VBAT not available		Warning	MM-DD-YY | HRS: MIN:SEC | MS/Co-proc | --- | RTC VBAT not available	NA	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Insert/Replace the RTC Battery Option 3: Replace the Device
Invalid Configuration from PLC Note: For this event, no information is updated in any Data map for PLC. It is notified only through Device/Configuration Tool Indicators and Message Logging.		Warning	MM-DD-YY | HRS: MIN:SEC | MS/Co-proc | --- | Invalid Configuration from PLC	NA	# User can perform the following options: Option 1: Set correct configuration through PLC
Auxiliary Current - Current till 12 Amps	Auxiliary Current	Event	MM-DD-YY | HRS: MIN:SEC | Auxiliary Current | --- | Normal Auxiliary Current till 12Amps	NA	# No Action Required
Auxiliary Current - Current above 12 Amps Note: - HW Cut-Off is at 12.7 Amps		Error	MM-DD-YY | HRS: MIN:SEC | Auxiliary Current | --- | High Auxiliary Current above 12Amps	Aux Current bit = 1 Error bit = 1	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Replace the Device
Logic Current - Current till 7.5 Amps	Logic Current	Event	MM-DD-YY | HRS: MIN:SEC | Logic Current | --- | Normal Logic Current till 7.5Amps - [<Actual Current>Amps]	NA	# No Action Required
Logic Current - Current between 7.5 Amps to 8 Amps		Warning	MM-DD-YY | HRS: MIN:SEC | Logic Current | --- | High Logic Current between 7.5Amps to 8Amps - [<Actual Current>Amps]	Logic Current bit = 1 Warning bit = 1	# User can perform the following options: Option 1: Power Cycle the Device
Logic Current - Current above 8 Amps		Error	MM-DD-YY | HRS: MIN:SEC | Logic Current | --- | High Logic Current above 8Amps - [<Actual Current>Amps]	Logic Current bit = 1 Error bit = 1	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Replace the Device

Description	Area/Module	Category	Event Log Message Format: Date | Time | Module | Module Position | Description	Process Input Status Bits	User Actions
Temperature till 75 °C	Temperature	Event	MM-DD-YY | HRS: MIN:SEC | Temperature Warning | --- | Normal Temperature till 75 °C - [<Actual Temperature>°C]	NA	# No Action Required
Temperature between 75 °C to 80 °C		Warning	MM-DD-YY | HRS: MIN:SEC | Temperature Warning | --- | High Temperature between 75 °C to 80 °C - [<Actual Temperature>°C]	Temperature Warning bit = 1 Warning bit = 1	# User can perform the following options: Option 1: Eliminate the Increasing Temperature Source Option 2: Power Cycle the Device
Temperature above 80 °C		Error	MM-DD-YY | HRS: MIN:SEC | Temperature Warning| --- | High Temperature above 80 °C - [<Actual Temperature>°C]	Temperature Warning bit = 1 Error bit = 1	# User can perform the following options: Option 1: Eliminate the Increasing Temperature Source Option 2: Power Cycle the Device Option 3: Replace the Device
Cycle Count Limit Reached	Valve	Warning	MM-DD-YY | HRS: MIN:SEC | Valve | --- | Valve <Valve No> Cycle Count Limit Reached where <Valve No> varies from 0 to 31	Target Count bit = 1 Warning bit = 1	# User can perform the following options: Option 1: Need to replace corresponding Valve and reset cycle count (Acyclic Data Map - B22.0 to B25.7) Note: The corresponding bits are set for 2 seconds
Short Circuit		Error	MM-DD-YY | HRS: MIN:SEC | Valve | --- | Valve <Valve No> in Fault State where <Valve No> varies from 0 to 31	Valve bit = 1 Error bit = 1 VF00 - VF31 bit = 1 (Valve fault status) w.r.t corresponding valve	# User can perform the following options: Option 1: Need to remove short circuit by replacing Valve
SPI Communication/ Auxiliary Power Supply - Valve Driver <Warning>		Warning	MM-DD-YY | HRS: MIN:SEC | Valve | --- | Valve Driver <Valve Driver No.> - SPI Communication Break/ Auxiliary Supply Fault where <Valve Driver No> varies from 1 to 4	Valve bit = 1 Warning bit = 1	# User can perform the following options: Option 1: Check Auxiliary Power Supply Option 2: Eliminate the Noise Source
EEPROM Corruption		Error	MM-DD-YY | HRS: MIN:SEC | Valve | --- | EEPROM Corrupted	Valve bit = 1 Error bit = 1	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Replace the Device
SPI Communication/ Auxiliary Power Supply - Valve Driver <Fault>		Error	MM-DD-YY | HRS: MIN:SEC | Valve | --- | Valve Driver <Valve Driver No.> - SPI Communication Break/ Auxiliary Supply Fault where <Valve Driver No> varies from 1 to 4	Valve bit = 1 Error bit = 1	# User can perform the following options: Option 1: Check Auxiliary Power Supply Option 2: Eliminate Noise Source Option 3: Power Cycle the Device Option 4: Replace the Device

Description	Area/Module	Category	Event Log Message Format: Date | Time | Module | Module Position | Description	Process Input Status Bits	User Actions
I2C Communication - EEPROM <Fault>	Valve	Error	MM-DD-YY | HRS: MIN:SEC | Valve | --- | EEPROM - I2C Communication Break	Valve bit = 1 Error bit = 1	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Replace the Device
Cycle Count Limit Reached - DI	IO/IO-Link	Warning	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | < Module Position> | DI <Channel No> Cycle Count Limit Reached where <Channel No.> varies from 0 - 23	Target Count bit = 1 Warning bit = 1	# User can perform the following options: Option 1: Need to replace corresponding DI - Sensor and Reset the cycle count (Acyclic Data Map - B49.0 to B51.7) Note: The corresponding bits are set for 2 seconds.
Cycle Count Limit Reached - DO		Warning	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position> | DO <Channel No> Cycle Count Limit Reached where <Channel No> varies from 0 to 23	Target Count bit = 1 Warning bit = 1	# User can perform the following options: Option 1: Need to replace corresponding DO - Actuator and Reset the cycle count (Acyclic Data Map - B69.0 to B71.7) Note: The corresponding bits are set for 2 seconds.
Short to GND or Overload at Pin 2 and Pin 4 of M12		Error	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position> | Over Current at Channel No. <Channel No> where <Channel No> varies from 0 to 23	IO/IO-Link bit = 1 Error bit = 1 OC bit = 1 OC 1,2 or 3 bit = 1 overcurrent w.r.t corresponding I/O module	# User can perform the following option: Option 1: Need to remove short circuit and Power Cycle the Device.
Electronic fuse trip at Pin 1 of M12 due thermal/current overload		Error	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position>| Logic Supply Overload	IO/IO-Link bit = 1 Error bit = 1	# User can perform the following option: Option 1: Need to remove short circuit
IO Module configuration and its relevant configuration in Co-Proc Mismatches		Warning	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position> | IO Configuration Mismatch	IO/IO-Link bit = 1 Warning bit = 1	# It is auto corrected by Co-Proc at Start-up by default configuration in IO Module
I2C Communication - ADC <Warning>		Warning	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position-> | ADC - I2C Communication Break	IO/IO-Link bit = 1 Warning bit = 1	# User can perform the following option: Option 1: Eliminate the Noise Source
USART Communication - IO-Link Transceiver <Warning>		Warning	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position> | IO-Link Transceiver - USART <USART No> Communication Break where <USART No> varies from 0 to 3	IO/IO-Link bit = 1 Warning bit = 1	# User can perform the following option: Option 1: Eliminate the Noise Source
External Flash Corruption		Error	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position>| External Flash Corrupted	IO/IO-Link bit = 1 Error bit = 1	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Replace the Device

Description	Area/Module	Category	Event Log Message Format: Date | Time | Module | Module Position | Description	Process Input Status Bits	User Actions
I2C Communication - ADC <Fault>	IO/IO-Link	Error	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position>| ADC - I2C Communication Break	IO/IO-Link bit = 1 Error bit = 1	# User can perform the following options: Option 1: Eliminate the Noise Source Option 2: Power Cycle the Device Option 3: Replace the Device
SPI Communication - IO-Link Transceiver <Fault>		Error	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position>| IO-Link Transceiver - SPI Communication Break	IO/IO-Link bit = 1 Error bit = 1	# User can perform the following options: Option 1: Power Cycle the Device Option 2: Replace the Device
USART Communication - IO-Link Transceiver <Fault>		Error	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position> | IO-Link Transceiver - USART <USART No> Communication Break where <USART No> varies from 0 to 3	IO/IO-Link bit = 1 Error bit = 1	# User can perform the following options: Option 1: Eliminate the Noise Source Option 2: Power Cycle the Device Option 3: Replace the Device
IO-Link - Validation Failure		Warning	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position> | IO-Link <Port No> - Validation Failure where <Port No> varies from 0 to 11	Refer to Table 33.	# User can perform the following options: Option 1: Need to replace IO-Link sensor with valid Vendor ID, Device ID and/or Serial Number Option 2: Reconfigure Port to No Validation
IO-Link - Short Circuit		Error	Note: This will be logged as part of IO-Link Events	Refer to Table 33.	# User can perform the following options: Option 1: Need to remove short circuit by replacing IO-Link Sensor
IO-Link - Data Storage Error		Warning	Note: This will be logged as part of IO-Link Events	Refer to Table 33.	# User can perform the following options: Option 1: Need to replace the IO-Link sensor with matching Device ID and Vendor ID of data storage Option 2: Reconfigure Port to Disable/ Clear Data Storage
IO-Link - Process Data Invalid		Error	MM-DD-YY | HRS: MIN:SEC | IO/IO-Link | <Module Position>| IO-Link <Port No> - Process Data Invalid where <Port No> varies from 0 to 11	Refer to Table 33.	# User can perform the following option: Option 1: Connect the IO-Link sensor
IO-Link - Device Communication Lost		Error	Note: This is logged as part of IO-Link Events	Refer to Table 33.	# User can perform the following option: Option 1: Connect the IO-Link sensor
Invalid IP Address - Rotary Switch Out of Range	Network	Warning	MM-DD-YY | HRS: MIN:SEC | Network | --- | Invalid IP Address - Rotary Switch Out of Range	Network Bit = 1 Warning Bit = 1	# User can perform the following option: Option 1: Set the correct IP address by setting the Rotary Switch value within valid range

Description	Area/Module	Category	Event Log Message Format: Date | Time | Module | Module Position | Description	Process Input Status Bits	User Actions
PLC - Output Access Disabled	Network	Warning	MM-DD-YY | HRS: MIN:SEC | Network | --- | PLC - Output Access - Output Access Disabled	Network Bit = 1 Warning Bit = 1	# User can perform the following options: Option 1: Change Device Ownership since PLC is not the current owner of the device. Owner change options: 1. Exit Configure Mode of PCH Config Utility/Webserver/ Bluetooth App 2. Exit FTP Mode
Master/PLC connected OPERATIONAL	Network – EtherCAT	Event + B40	MM-DD-YY | HRS: MIN:SEC | Network | --- | Master/PLC Connected	NA	# No Action Required
Master/PLC disconnected PRE-OPERATIONAL		Event + B40	MM-DD-YY | HRS: MIN:SEC | Network | --- | Master/PLC Disconnected	NA	# User can perform following options Option 1: Check connection with Master/PLC and reconnect to PCH Portal if disconnected or halted.

CHAPTER - 7 **Abbreviation List**

7.1 Abbreviations

Table 38 — Abbreviation List

Acronym	Definition
ADC	Analog to Digital Converter
AP	Auxiliary Power
AUX	Auxiliary
BLE	Bluetooth Low Energy
BT	Bluetooth Module Status/Bluetooth
CH	Channel
CoE	CAN Application Protocol over EtherCAT
Comm	Communication
DBT	De-bounce Time
DI	Digital Input
DID	Device ID
DIN	Digital Inversion
DIO	Digital Input Output
DIP	Dual In-line Package
DO	Digital Output
DS	Device Status
EoE	Ethernet over EtherCAT
FM	Fault Mode
FS	Fuse Status
GND	Ground
IO	Input Output
IP	Internet Protocol
IP65	Ingress Protection 65
LED	Light Emitting Diode
LOG	Logic
LP	Logic Power
MS	Module Status
NS	Network Status
OTG	On-The-Go
PCH	Parker Communication for H-Series
PLC	Programmable Logic Controller
RESV	Reserved
USB	Universal Serial Bus
VAUX	Auxiliary Voltage
VID	Vendor ID
VLOG	Logic Voltage

CHAPTER - 8 **Appendix**

8.1 IO-Link Events

8.1.1 IO-Link Event Qualifier

The following list of tables indicates the permissible values for various fields of Event Qualifier.

Table 39 — Permissible Values for Instances

Definition	Value
Unknown	0
Reserved	1 to 3
Application	4
Reserved	5 to 7

Table 40 — Permissible Values for Source

Definition	Value
Device (remote)	0
Master (local)	1

Table 41 — Permissible Values for Event Type

Definition	Value
Reserved	0
Notification	1
Warning	2
Error	3

Table 42 — Permissible Values for Mode

Definition	Value
Reserved	0
Event single shot	1
Event disappears	2
Event appears	3

8.1.2 IO-Link Event Codes

The following table lists the PCH Portal specific events. Refer to IO-Link Specification for the Events defined by IO-Link Standard. For Events generated by IO-Link Slave device, refer to the same document.

Table 43 — PCH Portal specific events

Event Code	Event Description
0xC101	Overtemperature Shutdown Level event error code
0xC102	Overtemperature Warning Level event error code
0xC103	Vdd Supply 0V event error code
0xC104	Vdd Supply UV event error code
0xC105	Vdd Supply UVLO event error code
0xC106	VL Supply UVLO event error code
0xC107	Wake-up event error code
0xC108	L+ Overcurrent Timeout event error code
0xC109	L+ Power Changed event error code
0xC10A	CQ Overcurrent Timeout event error code
0xC10B	CSense event error code
0xC201	Data Storage EEPROM access error code

8.2 Power Consumption Chart

Table 44 — Power Consumption

Module Config	Logic Power			Auxiliary Power				
	Theoretical Max Module Power Draw	Power Available for PCH Network Portal	Power Available for Pass Through	Theoretical Max Module Power Draw	Power Available after Module Draw	Valve Power Draw	Power Available for PCH Network Portal	Power Available for Pass Through
	Logic (A)	Logic (A)	Logic (A)	Aux (A)	Aux (A)	Aux (A)	Aux (A)	Aux (A)
AAA	8.000	0.000	12.000	4.256	7.744			
AAB	6.000	2.000	14.000	9.056	2.944			
AAC	7.500	0.500	12.500	8.656	3.344			
AAN	6.000	2.000	14.000	4.256	7.744			
ABB	4.000	4.000	16.000	12.000	0.000			
ABC	6.000	2.000	14.000	12.000	0.000			
ABN	5.000	3.000	15.000	9.056	2.944			
ACC	7.000	1.000	13.000	12.000	0.000			
ACN	5.500	2.500	14.500	8.656	3.344			
BBB	5.000	3.000	15.000	12.000	0.000			
BBC	3.500	4.500	16.500	12.000	0.000			
BBN	2.000	6.000	18.000	12.000	0.000			
BCC	4.000	4.000	16.000	12.000	0.000			
BCN	2.500	5.500	17.500	12.000	0.000			
CCC	4.500	3.500	15.500	12.000	0.000			
CCN	3.000	5.000	17.000	12.000	0.000			

NOTE: “To obtain ‘Power Available for PCH Network Portal’, subtract ‘Valve Power Draw’ from ‘Power Available after Module Draw’. To obtain ‘Power Available for Pass Through’, subtract 20 A by ‘Power Available for PCH Network Portal’”.

8.3 Ordering information

The part number written on the label for the PCH Network Portal can be understood using the below model number structure. **IMPORTANT**: This part number **cannot** be purchased from the factory. In order to purchase a PCH Network Portal, refer to the published catalog of the PCH Network Portal for the full end plate kit part number. This can be found at the product landing page:
https://ph.parker.com/us/17571/en/pch-network-portal/pch-portal
For any questions, please contact pdnapps@parker.com.

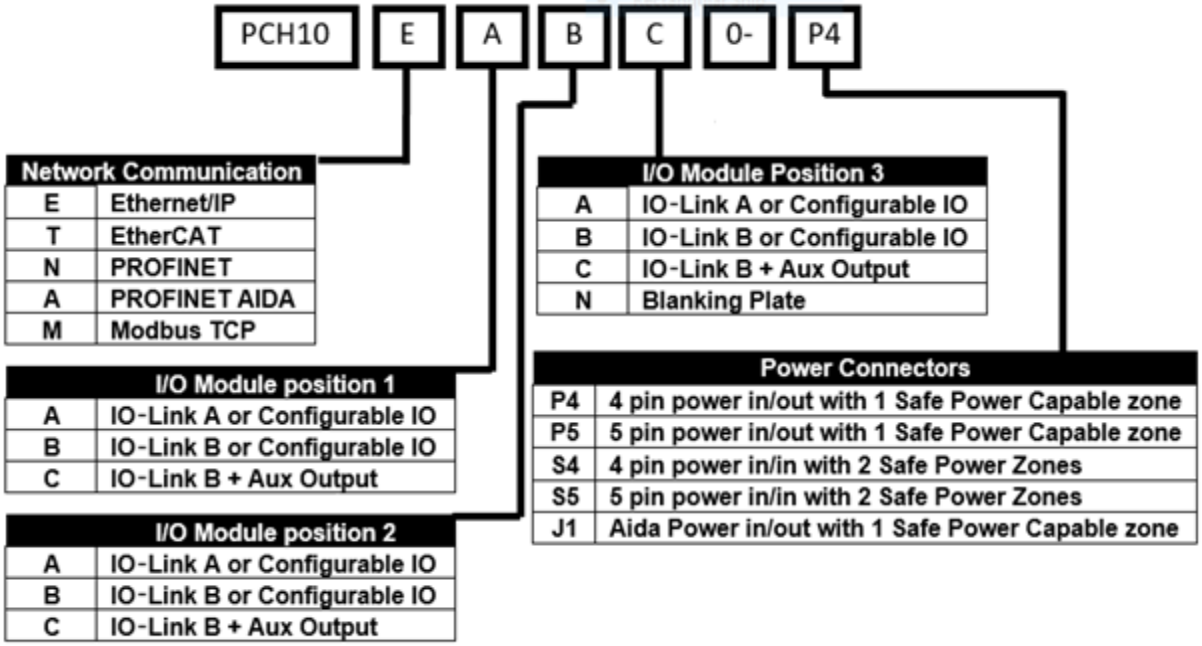


Figure 56 — Ordering Information

8.4 Connectivity and Integration Support

Network Connectivity Site
https://promo.parker.com/promotionsite/network-connectivity/us/en/home

Network Connectivity – Resource Library
http://solutions.parker.com/PDN_NetworkConnectivityResourceLibrary

Network Connectivity – Software Files
http://solutions.parker.com/PDN_softwarefiles

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