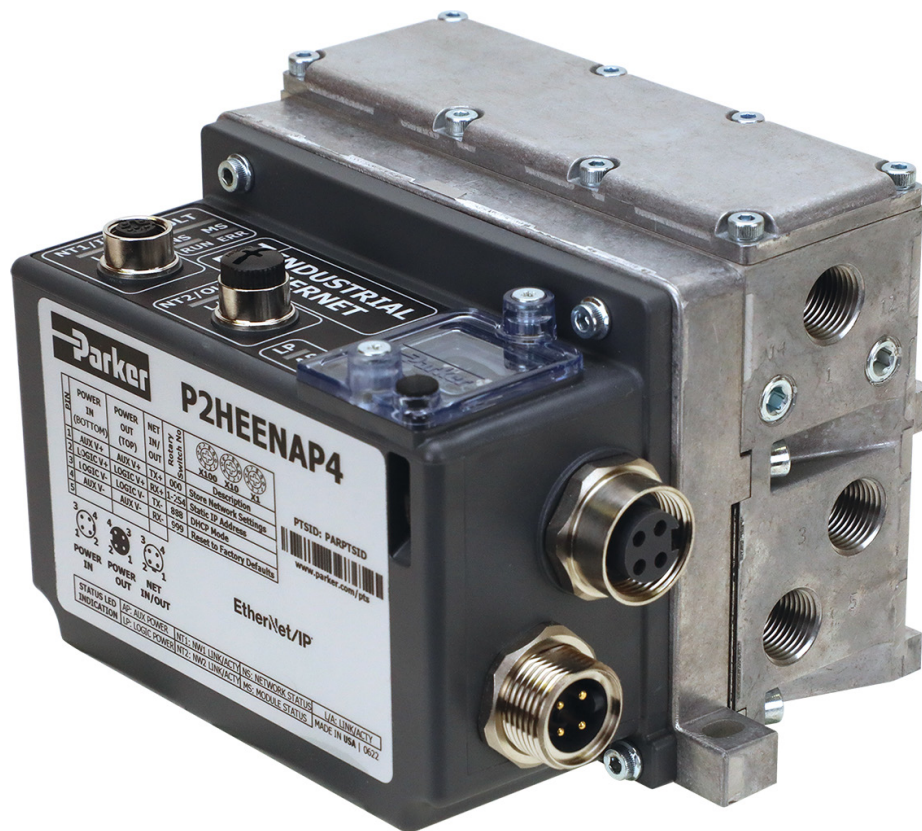




Pneumatic Division North America
Richland, Michigan 49083

VAL-SIF-163
Title: P2H Ethernet Node 32 DO
EtherCAT User Manual
ISSUED: April, 2022

P2H Ethernet Node 32 DO USER MANUAL



EtherCAT®

Trademark Information

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

Intended Use

The P2H Node 32DO must be only used as follows:

- As intended for industrial environments and conditions as compliant with the regulatory agencies of the region.
- In the original status 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 limit values that are specified for pressure, temperature, electrical data, torques, etc. must be observed.

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.

Service Information

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



Important!

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



NB!

All technical data in this catalogue is typical only.

The air quality is decisive for the valve life: see ISO 8573.



WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice. © Copyright 2016, 2013 Parker Hannifin Corporation. All Rights Reserved

SALE CONDITIONS

The items described in this document are available for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. Any sale contract entered into by Parker will be governed by the provisions stated in Parker's standard terms and conditions of sale (copy available upon request).

Important User Information

Please read and follow all safety information for the P2H Node 32DO, including the warning and caution statements in this guide, before installing or operating the system.

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

The user, through their own analysis and testing, are 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 catalogue 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 and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Safety Information

**WARNING:**

The P2H Node 32DO 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 P2H Node 32DO are not intended for any use in systems, machines, or applications where failure or fault of any kind 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. High Risk Use is STRICTLY PROHIBITED.

**WARNING:**

The P2H Node 32DO 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 damages.

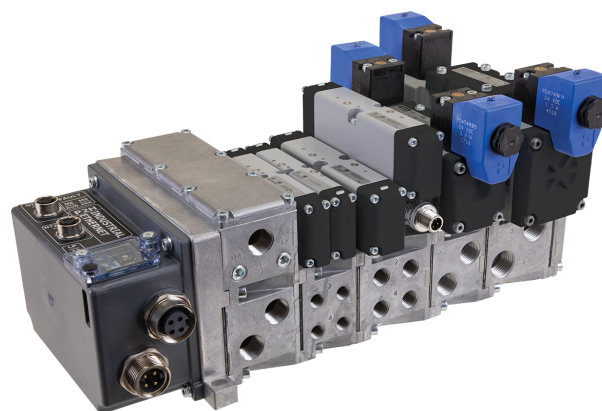
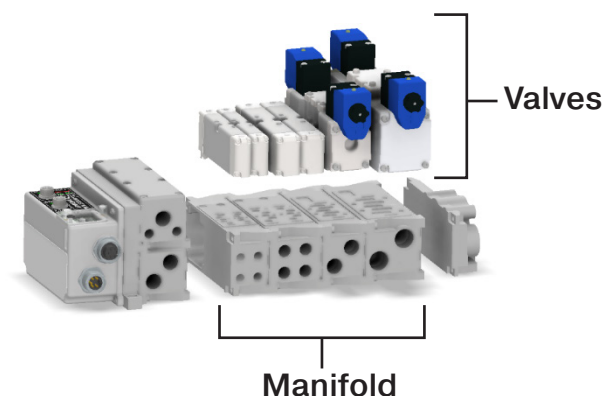
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Product General Overview

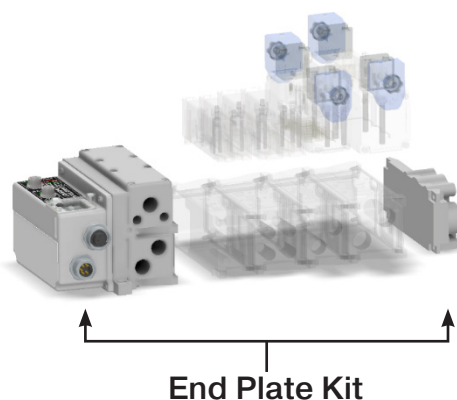
The P2H Node 32DO has been designed to be connected to an EtherCAT Network. It can be used with Parker's H Universal ISO 15407-2 (size 02 & 01) and 5599-2 (sizes 1, 2 & 3) valve series. It can control up to 32 pilot solenoid addresses with different power configuration options available and provides local visual and remote diagnostic through the Network. Designed for industrial environments, the P2H Node 32DO is constructed of PBT material, which is glass filled, and offers weld splatter resistance, UV stability and has significant flame-retardant properties making it suitable for the durability required in industrial applications with high heat, and welding applications.



H ISO 15407-2 & 5599-2 Valves

With H Universal Manifold

Up to 32 coils



M12 Communication Ports

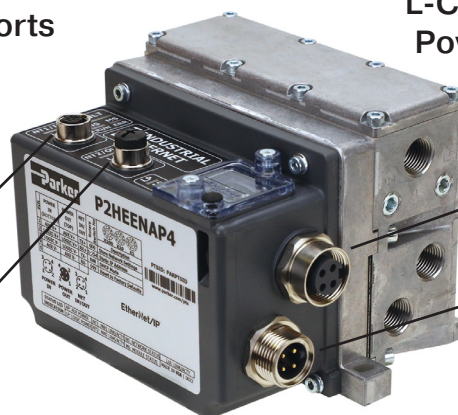
**7/8" or
L-Coded M12
Power Ports**

Comm. In

Comm. Out

Power Out

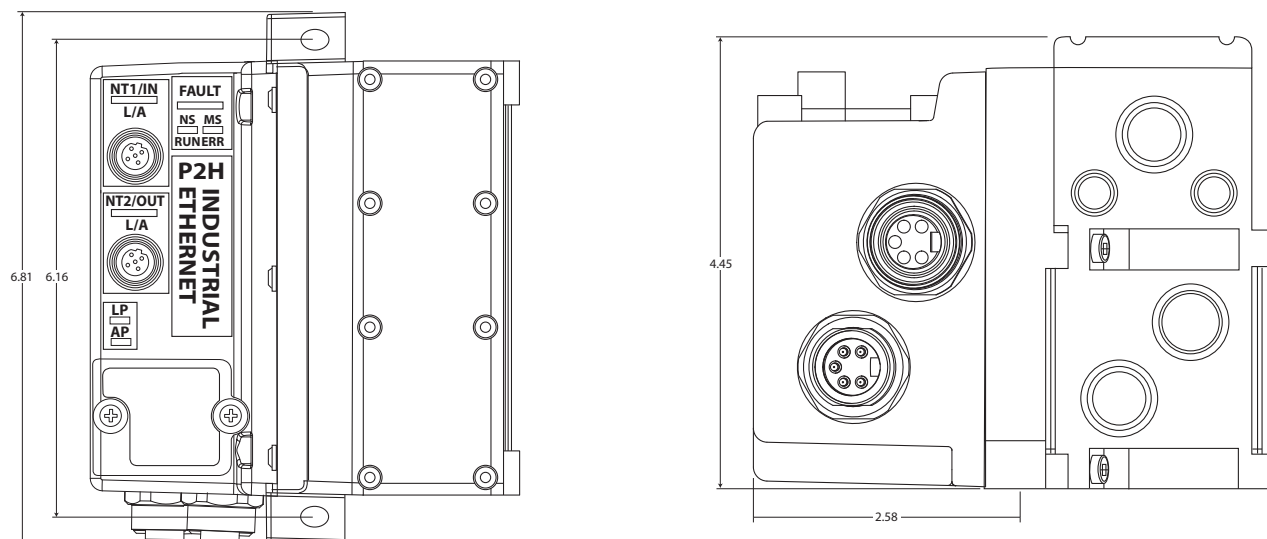
Power In



**P2H Node 32DO
Communication Module**

P2H Node 32DO Technical Specifications

Mechanical Dimensions

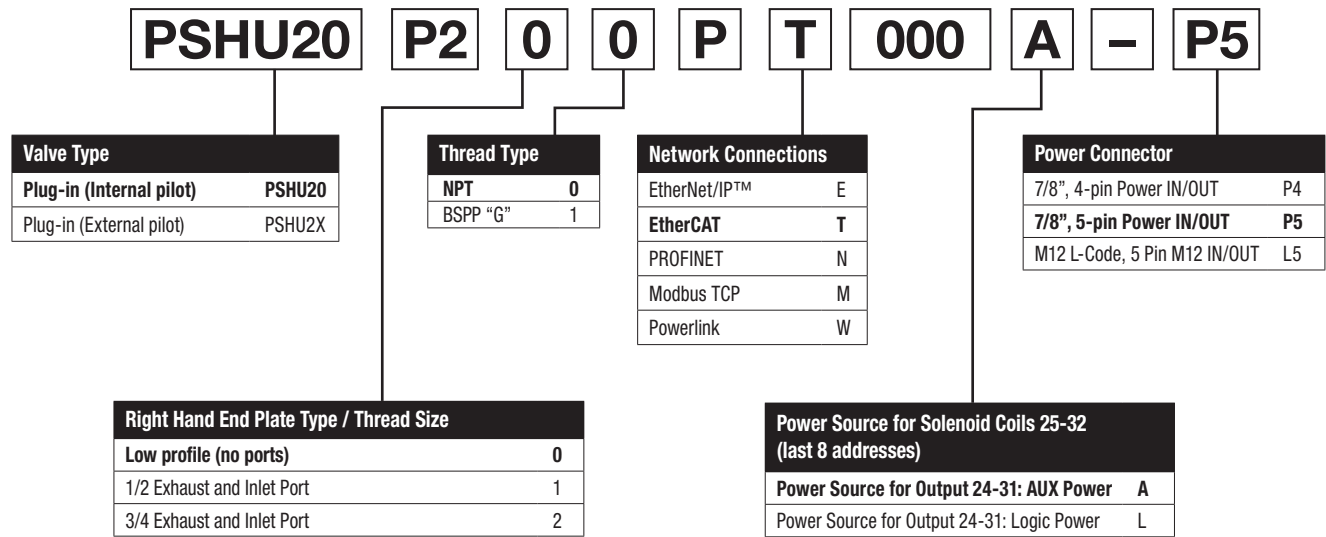


Parameters	Details
Housing material	Housing /Enclosure: PBT with 33% GF and UL94-V0 Base Cover (plate): Aluminium 380
Enclosure rating	IP65 (only when plugged-in and threaded-in)
Supply Voltage	7/8" 4 pin or 7/8" 5 pin or L-Coded M12 5-pin male and female pin connector
Input ports/ Output ports	N/A
Dimensions (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

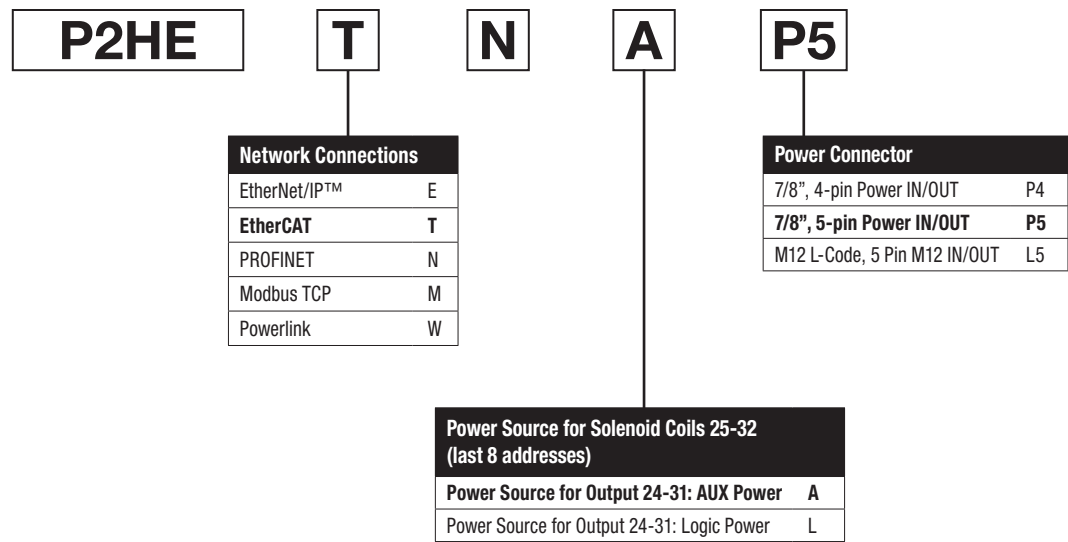
Description	Value
Network power supply	According to EtherCAT standard
Speed communication	According to EtherCAT standard
Auxiliary power supply Voltage	20.4 Vdc to 26.4 Vdc
Current limit per channel	150 mA
Max. current limit	5.2 A
Polarity inversion protection	YES
Short circuit protection	YES
Operating temperature	0°C to +55°C
Storage temperature	-25°C to +70°C
Shock	According to IEC 60068-2-27:2008
Vibration	According to IEC 60068-2-6:2007
EMC	According to EN 55011 & EN 61000-4-2 up to -4-6

Part Numbering

The P2H Node 32DO is ordered as a full endplate part number detailed below:



NOTE: The part number on the label of unit cannot be ordered on its own; however, it can be used to determine the network module characteristics



Part Numbering continued

Note: An optional intermediate air supply module must be installed to the manifold for expansion from, 25 – 32 solenoids, 24 to 31 addresses.

PSHU115A

E

1


P

Mounting Style / Port Size	
Intermediate Air Supply, NPT / Internal Pilot	PSHU115A
Intermediate Air Supply, BSPP / Internal Pilot	PSHU115B*
Intermediate Air Supply, NPT / External Pilot	PSHU115C
Intermediate Air Supply, BSPP / External Pilot	PSHU115D*

* BSPP conforms to ISO 1179-1 w 228-1 threads.

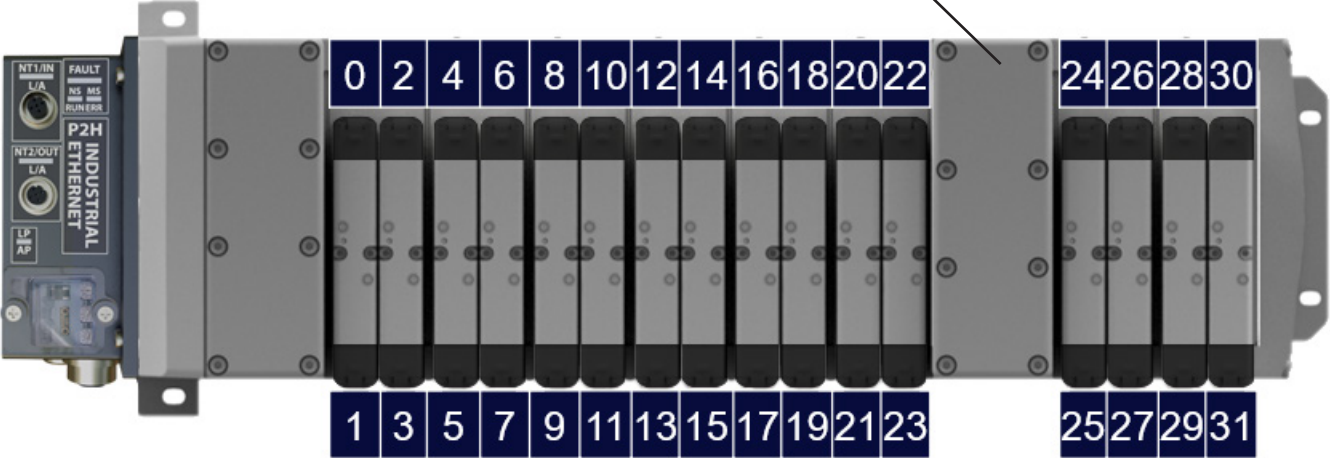
Gasket Options	
1	1,3,5 Ports Open And Pilots Open
2	1,3,5 Ports Closed And Pilots Open
3	1 Closed, 3,5 Ports Open And Pilots Open
4	1 Port Open, 3,5 Ports Closed And Pilots Open
5	1,3,5 Ports Open And Pilots Closed
6	1,3,5 Ports Closed And Pilots Closed
7	1 Closed, 3,5 Ports Open And Pilots Closed
8	1 Port Open, 3,5 Ports Closed And Pilots Closed

Circuit Board Address Configuration	
E	With Electrical Expansion To 25th Address



Intermediate air supply module shown

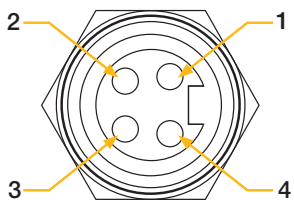
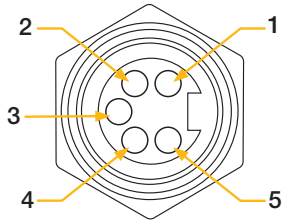
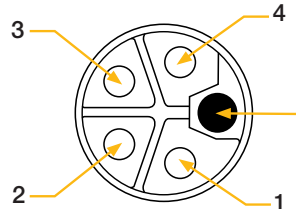
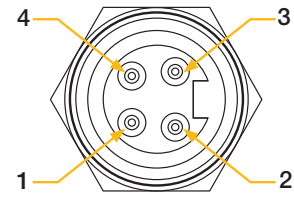
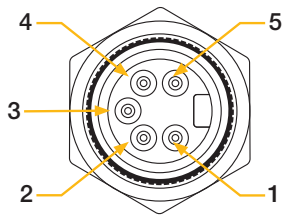
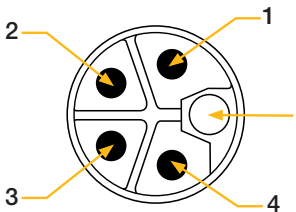
Address Numbers



The main manifold unit is shown with address numbers 0 through 31. The numbers are arranged in two rows: the top row contains 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and the bottom row contains 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23. The unit also features a 'P2H INDUSTRIAL ETHERNET' label and various ports.

Power Supply

The following three types of power connectors are available based on the end user's requirement. Current considerations should be used in the power connection selection process. Each power connection type can support a maximum of 12A of current on each channel (VAUX and VLOG). When power daisy chain is used, care must be taken in knowing the downstream current draw in order not to overload the maximum current rating of the pins.

TOP CONNECTOR	P4 - 7/8", 4-pin			P5 - 7/8", 5-pin			L5 - L-Coded, M12		
	Power OUT			Power OUT			Power OUT		
									
	Pin	Function	Description	Pin	Function	Description	Pin	Function	Description
	1	+ 24 V	V2 (VAUX)	1	0 V	GND V2 (VAUX)	1	+ 24 V	V1 (VLOG)
	2	+ 24 V	V1 (VLOG)	2	0 V	GND V1 (VLOG)	2	0 V	GND V2 (VAUX)
BOTTOM CONNECTOR	3	0 V	GND V1 (VLOG)	3	PE	Protective Earth	3	0 V	GND V1 (VLOG)
	4	0 V	GND V2 (VAUX)	4	+ 24 V	V1 (VLOG)	4	+ 24 V	V2 (VAUX)
				5	+ 24 V	V2 (VAUX)	5	PE	Protective Earth
	Power IN			Power IN			Power IN		
									
	Pin	Function	Description	Pin	Function	Description	Pin	Function	Description
	1	+ 24 V	V2 (VAUX)	1	0 V	GND V2 (VAUX)	1	+ 24 V	V1 (VLOG)
	2	+ 24 V	V1 (VLOG)	2	0 V	GND V1 (VLOG)	2	0 V	GND V2 (VAUX)
	3	0 V	GND V1 (VLOG)	3	PE	Protective Earth	3	0 V	GND V1 (VLOG)
	4	0 V	GND V2 (VAUX)	4	+ 24 V	V1 (VLOG)	4	+ 24 V	V2 (VAUX)
				5	+ 24 V	V2 (VAUX)	5	PE	Protective Earth

*PE – Protective Earth

Auxiliary Power Consumption Calculation

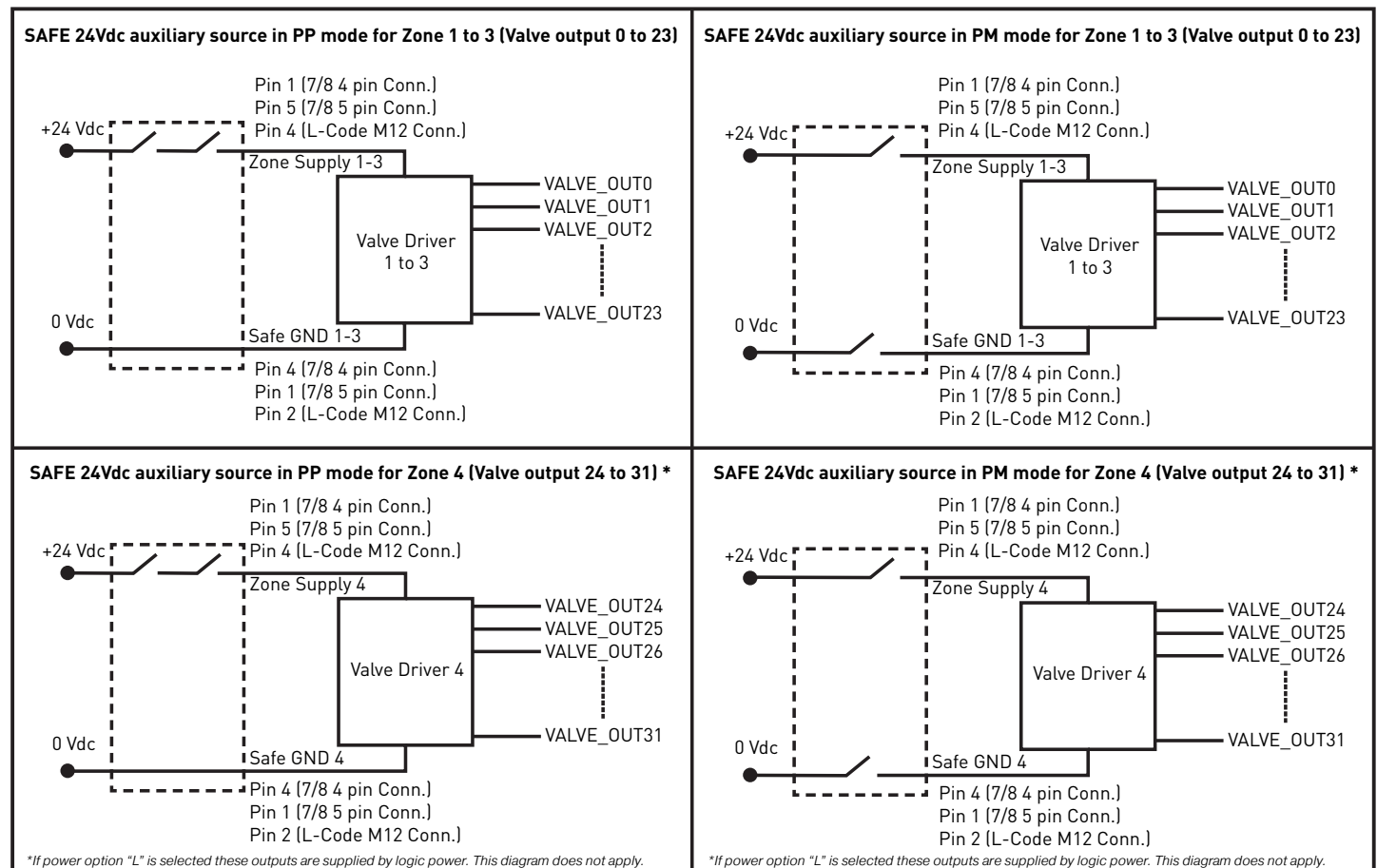
The P2H Node 32DO auxiliary power consumption calculation depends on the combination of the valves selected and the number of coils used. The table below can be used for power consumption calculation by valve type and the number of each type used. Take note that there are two types of coils for sizes 1,2,3. An energy efficient coil and standard coil.

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

Safe Power Supply

P2H Node 32DO connected to SAFE power supply for Auxiliary Power

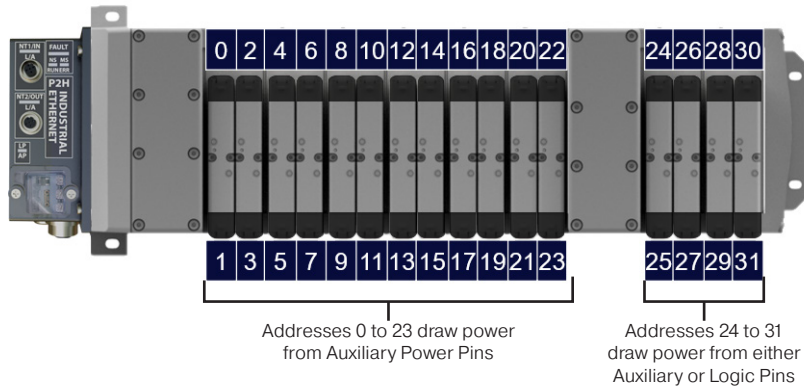
The P2H Node 32DO Auxiliary Power for valves can be supplied from a SAFE 24 VDC auxiliary source in PP (plus plus) or PM (plus minus) mode, as well as from Output Switching Signals Device Failsafe Digital Outputs (OSSD FDO). The connection diagram is below.



Note: Please check max. power available from the source. Refer to the [“Auxiliary power consumption calculation”](#) section.

Power Selection

The P2H Node 32DO has two available power sources for coils 24 to 31. Addresses 24 to 31 can draw their power from Auxiliary Power Pins (Power Source Option A) or Logic Power Pins (Power Source Option L)



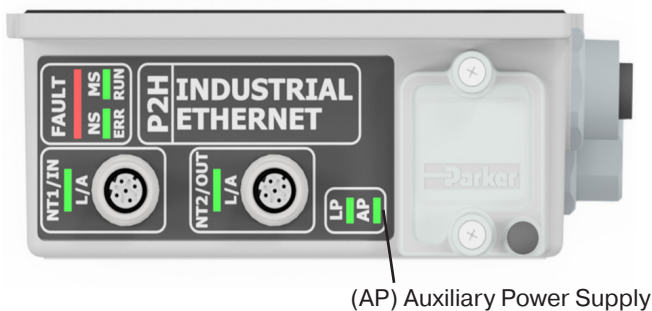
PSHU*****	A	***
Power Source for Solenoid Coils 25-32 (last 8 addresses)		
Power Source for Output 25-32: AUX Power	A	
Power Source for Output 25-32: Logic Power	L	

Auxiliary Power Supply Diagnostics

Auxiliary Power Supply Diagnostic through LED

The P2H Node 32DO monitors the auxiliary power supply voltage and manages two levels of diagnostics; warning and error range. The normal range can be modified through parameter data.

To restore default value (factory setting), refer to [“Factory Reset” section](#).



LED function details:

- “Auxiliary power” error is active from 9.6 to 19.4 VDC or above 28.5 VDC
- When “Auxiliary power error” is active, LED is solid red

AP Aux Power (Green / Yellow) LEDs		
LED Status	Description	Troubleshooting
OFF	Aux lines not powered	Check power supply (i.e. pin's 1 & 4 on 7/8" 4 pin)
ON (Green)	AUX Voltage in normal range	N/A
ON (Red)	Aux Voltage in error range (too low or too high)	Check power supply (i.e. pin's 1 & 4 on 7/8" 5 pin)
Blinking (Red)	AUX voltage in warning range (out of normal range, not in error range)	Check power supply (i.e. pin's 1 & 4 on 7/8" 5 pin)
Blinking (Red/Green)	Reset to factory operation complete	N/A
Blinking (Yellow)	Invalid rotary switch setting	Check rotary switch setting
Blinking (Red / Yellow)	Firmware version error	Contact technical support

Power Supply Diagnostics through Network and Process Data Mapping

Diagnostics are available in Process Input data (byte 0) to indicate whether Logic and Auxiliary voltages are within range. There is a warning range (normal operation with fault indication) and an error range (module enters Failsafe state).

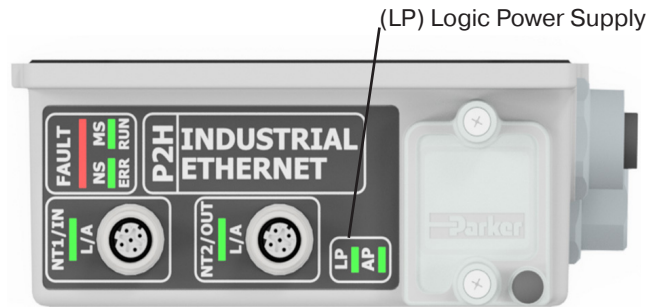
The default warning range is set as 20.4 VDC < power supply < 26.4 VDC. These limits can be modified via acyclic data, Indexes 0x200B and 0x200C. The error range is set as 19.4 VDC < power supply < 28.5 VDC. The error range limits cannot be modified. The voltage measured by the module, both Logic and Auxiliary, can be accessed via acyclic data, in Index 0x2004. The displayed value is in mV.

Logic Power Supply Diagnostics

Logic Power Supply Diagnostic through LED

The P2H Node 32DO monitors the auxiliary power supply voltage and manages two levels of diagnostics; warning and error range. The normal range can be modified through parameter data.

To restore default value (factory setting), refer to “[Factory Reset](#)” section.



LED function details:

- “Logic power” error is active from 9.6 to 19.4 VDC or above 28.5 VDC
- When “Logic power error” is active, LED is solid red

LP Logic Power (Green / Yellow) LEDs		
LED Status	Description	Troubleshooting
OFF	Logic lines not powered	Check power supply (i.e. pin's 1 & 4 on 7/8" 4 pin)
ON (Green)	Logic Voltage in normal range	N/A
ON (Red)	Logic Voltage in error range (too low or too high)	Check power supply (i.e. pin's 1 & 4 on pm 7/8" 4 pin)
Blinking (Red)	Logic voltage in warning range (out of normal range, not in error range)	Check power supply (i.e. pin's 1 & 4 on pm 7/8" 4 pin)
Blinking (Red/Green)	Reset to factory operation complete	N/A
Blinking (Yellow)	Invalid rotary switch setting	Check rotary switch setting
Blinking (Red / Yellow)	Firmware version error	Contact technical support

Power Supply Diagnostics through Network and Process Data Mapping

Diagnostics are available in Process Input data (byte 0) to indicate whether Logic and Auxiliary voltages are within range. There is a warning range (normal operation with fault indication) and an error range (module enters Failsafe state).

The default warning range is set as 20.4 VDC < power supply < 26.4 VDC. These limits can be modified via acyclic data, Indexes 0x200B and 0x200C. The error range is set as 19.4 VDC < power supply < 28.5 VDC. The error range limits cannot be modified.

The voltage measured by the module, both Logic and Auxiliary, can be accessed via acyclic data, in Index 0x2004. The displayed value is in mV.

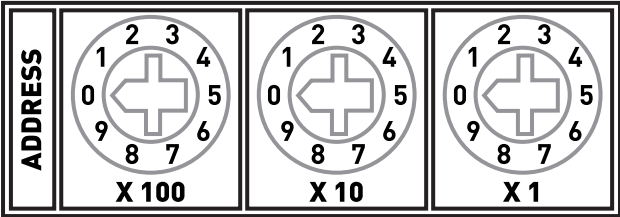
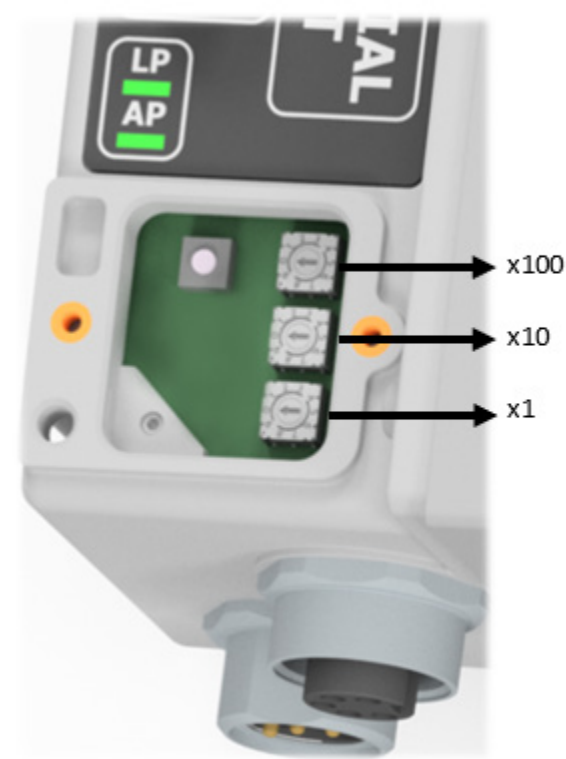
Network Interface

The P2H Node 32DO allows connection to the EtherCAT network via two M-12 D-Coded connectors (NT1 and NT2). An embedded switch allows for daisy-chaining ethernet communications. The connectors pin assignments are as follows:

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

IP-Address Setting

The P2H Node 32DO supports the following rotary switch settings listed in the table below only. The recommended setting is “000”.



IP Switch Setting	Description
000	Recommended default setting
999	Reset to Factory Default. Resets the following: Cycle Counters, Warning levels, Output State behaviors

Reset to Factory Default (Rotary Switch Position ‘999’)

“Reset to Factory Default” mode restores all the parameters, counters, password and configurations to their default values. “Reset to Factory Default” mode can be accessed in one of two ways: either via a button on the “Parameter” tab of the embedded web page, or via rotary switch setting “999”. Once the reset is completed and all the values are restored to default values, the module signals the completed operation by quickly flashing red/green the “Logic Status” LED. If the reset is performed via hardware, a valid IP-Address must be set using one of the methods stated in this manual, and a power cycle is required to resume normal operations.


Default Password (Case Sensitive)	
Username	PARKER
Password	PARKER

P2H Node 32 DO Configuration Files

The configuration files and integration tools are available for download from the [Parker Network Connectivity Site \(click here\)](#).



Parker Network
Connectivity Site



Parker Valve
Catalog



Parker FRL
Catalog

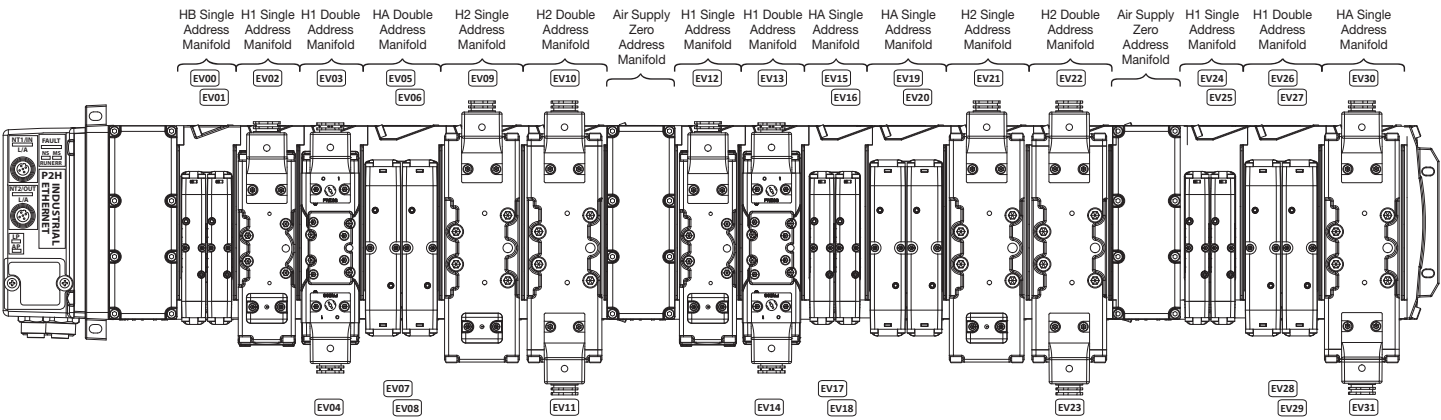


Parker Actuator
Catalog

Solenoid Pilots Addressing

The P2H Node 32DO used with H ISO Series – 15407-2 – sizes 02 & 01 and 5599-2 – sizes 1, 2 & 3 – can handle up to 32 pilot solenoid valves. Addressing is as shown below (on H Universal manifold).

For PLC addressing see [Process Data Mapping](#) | [Output Data](#).



PLC Process Output Data Mapping (Reference the Process Data section for details)								
	Bit							
	7	6	5	4	3	2	1	0
Byte 0	System Command							
Byte 1	EV07	EV06	EV05	EV04	EV03	EV02	EV01	EV00
Byte 2	EV15	EV14	EV13	EV12	EV11	EV10	EV09	EV08
Byte 3	EV23	EV22	EV21	EV20	EV19	EV18	EV17	EV16
Byte 4	EV31	EV30	EV29	EV28	EV27	EV26	EV25	EV24

Local Visual Diagnostic LEDs

The P2H Node 32DO module offers local diagnostics through 7 LED's status described in the table below:

NT1/IN & NT2/OUT (Green / Yellow)		
LED Status	Description	Troubleshooting
OFF	Not link, no activity	Check connection to the Network
ON (Green)	Link 100Mbit/s established	N/A
FLASHING (Green)	Ongoing activity 100Mbit/s	N/A
ON (Yellow)	Link 10Mbit/s established	N/A
FLASHING (Yellow)	Ongoing activity 10 Mbit/s	N/A

LP Logic Power (Green / Yellow)		
LED Status	Description	Troubleshooting
OFF	Logic lines not powered	Check power supply (pin's 2 & 3 on 7/8" 5 pin)
ON (Green)	LOGIC voltage in normal range	N/A
ON (Red)	LOGIC voltage in error range (way too high or way too low)	Check power supply (pin's 2 & 3 on 7/8" 5 pin)
BLINKING (Red)	Logic voltage in warning range (out of normal range, not in error range)	Check power supply (pin's 2 & 3 on 7/8" 5 pin)
BLINKING (Yellow)	Invalid rotary switch setting	Check rotary switch setting
BLINKING (Red & Green)	Firmware version error or Completed "Reset to Factory"	If switches setting different from "999" and no "Reset to Factory" performed via webpage, then contact technical support

AP Aux Power (Green / Yellow)		
LED Status	Description	Troubleshooting
OFF	Aux lines not powered	Check power supply (pin's 1 & 4 on 7/8" 5 pin)
ON (Green)	AUX Voltage in normal range	N/A
ON (Red)	Aux Voltage in error range (too low or too high)	Check power supply (pin's 1 & 4 on 7/8" 5 pin)
BLINKING (Red)	AUX voltage in warning range (out of normal range, not in error range)	Check power supply (pin's 1 & 4 on 7/8" 5 pin)
BLINKING (Yellow)	Invalid rotary switch setting	Check rotary switch setting
BLINKING (Red & Green)	Firmware version error or Completed "Reset to Factory"	If switches setting different from "999" and no "Reset to Factory" performed via webpage, then contact technical support



LED's Status "OFF" refers to a LED unilluminated

LED's Status "ON" refers to a LED illuminated uninterruptedly

The term "Blinking" means LED turning on/off every 500ms

The term "Flashing" means LED turning on/off irregularly or unpredictably

Fault (Red / Yellow)		
LED Status	Description	Troubleshooting
OFF	No Fault	
ON (Red)	Presence of any fault requiring acknowledgment	N/A
FLASHING (Red)	Recoverable error.	Remove fault condition. If problem persists consult the factory
BLINKING (Red)	Output Drivers error, typically a short-wired output channel.	Look at Index 0x2006 – Channel Error
BLINKING (Yellow)	Invalid rotary switch setting	Check rotary switch setting
BLINKING (Red & Yellow)	Firmware version error or Completed "Reset to Factory"	If switches setting different from "999" and no "Reset to Factory" performed via webpage, then contact technical support
BLINKING (Red & Green)	Resetting to factory defaults	N/A

NS / RUN (Red / Green)		
LED Status	Description	Troubleshooting
OFF	INIT	Check power supply and connection to the Network. Check IP address setting
ON (Green)	OPERATIONAL	N/A
1-Flash (Green)	SAFE-OPERATIONAL	N/A
BLINKING (Green)	PRE-OPERATIONAL	N/A
FLASHING (Green)	BOOT	Change the module
ON (Red)	FATAL EVENT	If NS/RUN and MS/ERR turn red, this indicates a fatal event, forcing the bus interface to a physically passive state.

MS / ERR (Red / Green)		
LED Status	Description	Troubleshooting
OFF	No Error	
ON (Red)	FATAL EVENT	If NS/RUN and MS/ERR turn red, this indicates a fatal event, forcing the bus interface to a physically passive state.
Blinking (Red)	Invalid Configuration	State change received from master is not possible due to invalid register or object settings
1-Flash (Green)	Unsolicited state change	Slave device application has changed the EtherCAT state autonomously.
2-Flash (Green)	Sync Manager watchdog timeout	Reset module (power OFF/ON)
FLASHING (Red)	Bootling error detected	Firmware exception. Change the module.

Mapping of I/O Process Data

Process Output Data Mapping

The P2H Node 32DO device RPDO has 5 mapped objects of output data

RPDO byte	Mapped object (Index.Subindex) Hex	Name of mapped object
0	0x2008.00	System Command - Reference table below for definition
1	0x2001.01	Solenoids (Channel 00 to 07) – EV00 is Bit 0
2	0x2001.02	Solenoids (Channel 08 to 15) – EV08 is bit 0
3	0x2001.03	Solenoids (Channel 16 to 23) – EV16 is bit 0
4	0x2001.04	Solenoids (Channel 24 to 31) – EV24 is Bit 0

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

System Command Value	System Command Name	Description
0X02	Store Switching Cycle Counters	When this command is executed, the current values of the switching cycle counters are stored into EEPROM. This command is intended to be used before powering off the device.
0X03	Store Diagnostic Log	When this command is executed, the diagnostic log is stored to the EEPROM.
0X04	Delete Diagnostic Log	Removes all diagnostic log entries in EEPROM (required by webpage).

PLC Process Output Data Mapping								
	Bit							
	7	6	5	4	3	2	1	0
Byte 0	System Command							
Byte 1	EV07	EV06	EV05	EV04	EV03	EV02	EV01	EV00
Byte 2	EV15	EV14	EV13	EV12	EV11	EV10	EV09	EV08
Byte 3	EV23	EV22	EV21	EV20	EV19	EV18	EV17	EV16
Byte 4	EV31	EV30	EV29	EV28	EV27	EV26	EV25	EV24

Process Data Outputs (Acyclic Access Parameters)

Note: The data in this section is available through Acyclic access and is also readily available in the PLC in the Process data map area. Care must be taken not to overwrite data being used in the PLC.

Index 0x2001 - Solenoids

Index 0x2001 contains the process output data to the valves. A value of 1 assigned to a bit in the Index indicates that the associated solenoid shall be energized, whereas zero indicates that the power at the solenoid shall be off.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2001	UINT8	4	Read / Write	OUT Data	0x00000000	0xFFFFFFFF	0x00000000

The 32 solenoids are represented by one bit each, where the LSB (Least Significant Bit) is associated with EV00 and the MSB (Most Significant Bit) is associated with EV31.

Example of Output Process Data usage:

Byte	4				3	2	1			
Bit #	31 (MSB)	30	29	...	...	...	...	2	1	0 (LSB)
Example Output Data	1	0	1	...	...	...	...	0	1	0
Controlled Output	Out_31 HIGH	Out_30 LOW	Out_29 HIGH	...	...	...	...	Out_2 LOW	Out_1 HIGH	Out_0 LOW
Solenoid (EV) Energized	EV31 ON	EV30 OFF	EV29 ON	...	...	...	...	EV02 OFF	EV01 ON	EV00 OFF

Index 0x2008 - System Commands

Index 0x2008 contains the “System Command Byte”. This byte is used for specific functions; such as “Store switching cycles” and others detailed in the table below. In order to execute the desired function, the specific value associated with the command has to be written to Index 0x2008.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2008	UINT8	1	Read / Write	System Command	0	0xFF	0

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

Command Value	Command Name	Description
0X02	Store Switching Cycle Counters	When this command is executed, the current values of the switching cycle counters are stored into EEPROM. This command is intended to be used before powering off the device.
0X03	Store Diagnostic Log	When this command is executed, the diagnostic log is stored to the EEPROM.
0X04	Delete Diagnostic Log	Removes all diagnostic log entries in EEPROM (required by webpage).

Process Input Data Mapping

The P2H Node 32DO device TPDO has 6 mapped objects of output data.

TPDO byte	Mapped object (Index.Subindex) Hex	Name of mapped object	
0	0x2009.00	Module Error Input (LSB)	Reference Table below
1		Module Error Input (MSB)	
2	0x2006.01	Channel Error – EV07.....EV00	Error occurred in the output stage (e.g.: short circuit or over-temperature)
3	0x2006.02	Channel Error – EV15.....EV08	
4	0x2006.03	Channel Error – EV23.....EV16	
5	0x2006.04	Channel Error – EV31.....EV24	
6	0x2007.00	Module Info Flags (LSB)	Reference Table below
7		Module Info Flags (MSB)	

Module Error - Definition

Command Value	Command Name	Description
Diag 0	AUX Voltage Warning	Set if Auxiliary Voltage is in the warning range. Module keeps normal operation
Diag 1	AUX Voltage Error	Auxiliary Voltage in Error range. Outputs are switched OFF
Diag 2	Logic Voltage Warning	Set if Logic Voltage is in the warning range. Module keeps normal operation
Diag 3	Logic Voltage Error	Set if Logic voltage is out of range for error. Outputs are switched OFF
Diag 4	Temperature Warning	Set if a temperature increase above warning levels is detected by the output drivers
Diag 5	Output Driver Channel Error	Set if a major fault is detected at the output stage – solenoid short circuit. Outputs are switched OFF
Diag 6	Module Error	Set if an internal communication error is active
Diag 7	Auxiliary Power Not Available	Auxiliary Power is off
Diag 8-15	Reserved	These bits will always be set as 0

Module Info Flags - Definition

Command Value	Command Name	Description
Diag 0	Heartbeat not toggling AUX 1	Heartbeat is currently not toggling
Diag 1	Heartbeat not toggling AUX 2	
Diag 2	SPI COM Error AUX 1	Error in SPI Communication between AUX and Logic. Outputs are switched off
Diag 3	SPI COM Error AUX 2	
Diag 4	SPI COM Lost AUX 1	Communication not possible. Outputs are switched off
Diag 5	SPI COM Lost AUX 2	
Diag 6	Output Interconnect Error	Short circuit between outputs detected. Affected outputs switched off.
Diag 7	Comm Module Error	Error in communication between Logic and Comm
Diag 8	Comm Module Version Error	Comm Module Version error. Outputs are switched off
Diag 9-15	Reserved	These bits will be always set as 0

Process Data Inputs (Acyclic Access Parameters)

Note: The data in this section is available through Acyclic access and is also readily available in the PLC in the Process data map area.

Index 0x2006 – Channel Error

In case an error occurs in the outputs stage (e.g.: short circuit or over-temperature), Index 0x2006 provides information about which channel caused the error. The bits corresponding to the outputs that caused the fault are set to 1 in Index 0x2006.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2006	UINT8	4	Read	Channel Error	0x000000	0xFFFFFFFF	0x000000

Index 0x2007 – Module Info Flags

The Index 0x2007 contains information about possible module states and faults/errors that might affect the module. If possible, the device will try to recover from these errors. If recovery is not possible, the device may need to be replaced. The message headers and flag definitions associated with each bit in the Index are detailed in the table (see next page). For further details, consult factory.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2007	UINT16	1	Read	Module Info Flags	0	0xFFFF	0

Bit #	Error Name	Error Description
Diag 0	Heartbeat not toggling AUX 1	Heartbeat is currently not toggling
Diag 1	Heartbeat not toggling AUX 2	
Diag 2	SPI COM Error AUX 1	Error in SPI Communication between AUX and Logic. Outputs are switched off
Diag 3	SPI COM Error AUX 2	
Diag 4	SPI COM Lost AUX 1	Communication not possible. Outputs are switched off
Diag 5	SPI COM Lost AUX 2	
Diag 6	Output Interconnect Error	Short circuit between outputs detected. Affected outputs switched off.
Diag 7	Comm Module Error	Error in communication between Logic and Comm
Diag 8	Comm Module Version Error	Comm Module Version error. Outputs are switched off
Diag 9-15	Reserved	These bits will be always set as 0

Index 0x2009 – Module Error Input

The Index 0x2009 contains user-friendly diagnostics (in case of errors or faults) provided as Process Data Input.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2009	UINT16	1	Read	Module Error Input	0	0xFFFF	0

Bit #	Error Name	Error Description
Diag 0	AUX Voltage Warning	Set if Auxiliary Voltage is in the warning range. Module keeps normal operation
Diag 1	AUX Voltage Error	Auxiliary Voltage in Error range. Outputs are switched OFF
Diag 2	Logic Voltage Warning	Set if Logic Voltage is in the warning range. Module keeps normal operation
Diag 3	Logic Voltage Error	Set if Logic voltage is out of range for error. Outputs are switched OFF
Diag 4	Temperature Warning	Set if a temperature increase above warning levels is detected by the output drivers
Diag 5	Output Driver Channel Error	Set if a major fault is detected at the output stage – solenoid short circuit. Outputs are switched OFF
Diag 6	Module Error	Set if an internal communication error is active
Diag 7	Auxiliary Power Not Available	Auxiliary Power is off
Diag 8-15	Reserved	These bits will always be set as 0

Status/Diagnostic Data and Parameters

Note: Acyclic access only (not in Process data)

Index 0x2002 – Switching Cycle Counters

The Index 0x2002 contains the 32 switching cycle counters for the valves. The counter values are automatically stored by the module every 5 minutes.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
#02	Array of UINT32	32	Read	Switching Cycle Counters	0	***	0

*** Max value for Index 0x2002 is circa 4.3 billion (UINT32 max representable value). Once that the max value is reached, this is held in memory and additional cycles are not counted.

Index 0x2003 – Clear Switching Cycles Counters

The Index 0x2003 allows the switching cycle counter for the solenoids to be reset to zero. The counter for each solenoid can be reset individually by setting the associated bit on the Index 0x2003 – i.e.: for each bit set to 1 in the Index 0x2003, the associated counter is set to zero.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
#0x2003	Array of UINT8	4	Read */ Write	Clear Switching Cycle Counters	0	0xFF 0xFF 0xFF 0xFF	0

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

Index 0x2004 – AUX and Logic Voltage Values

The Index 0x2004 contains the measured values of the Auxiliary and Logic Voltages.

Index	Data Type	N° of Elements	Access	Name	Array Item	Voltage	Min Value	Max Value	Default
0x2004	Array of UINT16	2	Read	AUX Voltage	0	AUX	0	36300	24000
					1	Logic			

Index 0x200B – AUX and Logic Voltage Warning Low Limit

The Index 0x200B contains the values for the AUX and Logic Voltage Warning Low Limits – i.e.: the (low) AUX Voltage value (shown in mV) that will trigger the AUX Voltage Warning diagnostic.

NOTE: Both Aux and Logic values must be written simultaneously.

Index	Data Type	N° of Elements	Access	Name	Array Item	Voltage	Min Value	Max Value	Default
0x200B	Array of UINT16	2	Read/Write	AUX and Logic Voltage Warning Low Limit	0	AUX	19400	24000	20400
					1	Logic			

Index 0x200C – AUX and Logic Voltage Warning High Limit

The Index 0x200C contains the values for the AUX and Logic Voltage Warning High Limits, in millivolts – i.e.: the (high) Logic Voltage value that will trigger the Logic Voltage Warning diagnostic.

NOTE: Both Aux and Logic values must be written simultaneously.

Index	Data Type	N° of Elements	Access	Name	Array Item	Voltage	Min Value	Max Value	Default
0x200C	Array of UINT16	2	Read/Write	AUX and Logic Voltage Warning High Limit	0	AUX	24000	28500	26400
					1	Logic			

Index 0x200D – Output State Behaviour

The Index 0x200D applies in case of communication lost (between Controller and P2H Node 32DO) and determines the outputs behavior in case of loss of communication, as follows:

Index 0x200D = 0 → Outputs are set to “0”

Index 0x200D = 1 → Outputs are held to last valid state

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x200D	UINT8	1	Read/Write	Output State Behavior	0	1	0

Index 0x200E – Open Load Detection

The Index 0x200E applies in case an open load or missing coil is detected on an Output during startup, the specific bit is set. The module checks all outputs once during startup for missing coils. If no load is detected on an output, the specific bit in this bitmap is set. Open load is not considered as an error.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x200E	Array of UINT8	4	Read	Open Load Detection	0x00	0xFF 0xFF 0xFF 0xFF	0x00

Index 0x200F – Firmware Versions

The Index 0x200F provides the major firmware versions of various microcontrollers on the module. For additional info consult the factory.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x200F	Array of UINT32	4	Read	FW Versions	See table below		

Array Item	Bit 31..24 (MSbyte)	Bit 23..16	Bit 15..8	Bit 7..0 (LSbyte)
0	AUX1_FW Major	AUX1_FW Minor	(not used)	(not used)
1	AUX2_FW Major	AUX2_FW Minor		
2	Logic_FW Major	Logic_FW Minor		
3	Comm Module_FW Major	Comm Module_FW Minor	Comm Module_FW Build	

Index 0x2011 – LED States

The Index 0x2011 contains status of the LEDs on the unit.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2011	Array of UINT8	7	Read	LED States	See table below		

Array Item	LED
0	AP
1	LP
2	Fault
3	NS/RUN
4	MS/ERROR
5	Link1
6	Link2

For the webpage to show the current state of the P2H Node 32DO module's LEDs, information about the "Logic Power", "AUX Power" and "Fault" LED, as well as the comm-module LEDs are made accessible via this Index. This Index is an array with one entry for each LED. The table to the right shows the encoding of the LED colors and blinking patterns. The blinking frequency is 1 Hz.

Value	Meaning
0	State Unknown
1	OFF
2	Solid Green
3	Blinking Green
4	Solid Red
5	Blinking Red
6	Solid Yellow
7	Blinking Yellow
8	Blinking Red/Yellow

Index 0x2012 – Run/Idle Status

The Index 0x2012 and the P2H Node 32DO webpage does not allow the user to write settings or parameters during an active PLC connection. This Index offers the required information for this task to the webpage.

- “Idle” signals there is currently no PLC connection. This also includes pre-operational or error states.
- “Running” signals that there is at least one ongoing PLC connection. User cannot make changes to process data or other parameters via webpage.

Index	Data Type	N° of Elements	Access	Name	Value(s)
0x2012	UINT8	1	Read	Run/Idle Status	0: Idle 1: Running

Index 0x2013 – System Time

The Index 0x2013 contains the system time. System time format is compliant to the Unix Timestamp. The time is only used to timestamp the entries of the Diagnostic event log (see Index 0x201E to Index 0x2045 – Diagnostic Log). The System Time can be set in the following manner:

- System Time can be explicitly written to Index 0x2014 via the PLC. This value will then be automatically transferred to Index 0x2013.
- In case time setting is unavailable in Index 0x2014, System Time will be automatically transferred from Index 0x2015.
- In the unlikely event that time settings aren't available in Index 0x2014 or Index 0x2015, the System Time will be set to a standard recovery value January 1st, 2020, 12:00 am

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2013	UINT32	1	Read	System Time	Unix Time in seconds since 1970-01-01, 12:00 am		

Index 0x2014 – System Time PLC

The Index 0x2014 allows system time to be set explicitly via the PLC. Value should be Unix Time in seconds since 1970-01-01, 12:00 am.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2014	UINT32	1	Read/Write	System Time PLC	0	4,294,967,295	-

Index 0x2015 – System Time Web

The Index 0x2015 can write the system time to the P2H Node 32DO device to be in sync with web browser's time. Index 0x2015 is updated automatically when device is accessed via embedded web page. This value will be transferred to Index 0x2013 if no value is available in Index 0x2014. Value should be Unix Time in seconds since 1970-01-01, 12:00 am.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2015	UINT32	1	Read/Write	System Time Web	0	4,294,967,295	-

Index 0x2016 – Inter-Output Short Circuits

The Index 0x2016 detects inter-output short circuits at the factory. Value should always be zero. If not, consult factory.

Index	Data Type	N° of Elements	Access	Name	Min Value	Max Value	Default
0x2016	UINT8	4	Read	Inter-Output Short Circuits	0	0xFF 0xFF 0xFF 0xFF	-

Index 0x201E to Index 0x2045 – Diagnostic Log

The diagnostic log populates a set of 40 Indexes with a similar structure. This way, it is easier for the user to request and interpret specific logging entries. The entries are sorted in the order of occurrence, Index 0x201E being the most recent entry and Index 0x2045 the oldest. The information contained in the Diagnostic Log includes errors as defined in the "Module Info Flags" and "Module Error Input" Indexes.

Index	Data Type	N° of Elements	Access	Name	Value(s)
0x201E to 0x2045	Structure (see below table)	3 Structure items	Read	Diagnostic Log	(not applicable)

The webpage offers an export function for the user to save the log as a CSV file. As the log only has 40 entries, the oldest entries are overwritten with new ones if the log is full (First In, First Out). The Diagnostic Log is non-volatile and is stored in the host's EEPROM every 30 minutes or by user interaction (see Index 0x2008 – System Commands). The following table lists all implemented Event IDs. The 'Errors' range from 0x0000 to 0x3FFF. The 'Warnings' range from 0x4000 to 0x7FFF. The 'Notifications' range from 0x8000 to 0xFFFF. 'Complementary events' (appearing/disappearing) differ by offset 0x1000.

Index 0x201E to Index 0x2045 – Diagnostic Log Event IDs

Event ID (hex)	Meaning	Additional Event Data
Errors		
0x 0001	Driver channel error / Short-circuit state detected	Index 0x2006 – Channel Error
0x 1001	Driver channel error / Short-circuit state removed	Index 0x2006 – Channel Error
0x 0002	Inter-Output short-circuit detected	Index 0x2016 – Inter-Output Short Circuits
0x 1002	Inter-Output short-circuit removed	Index 0x2016 – Inter-Output Short Circuits
0x 0003	AUX voltage entered low error range	AUX Voltage in mV (Index 0x2004)
0x 1003	AUX voltage left low error range	AUX Voltage in mV (Index 0x2004)
0x 0004	AUX voltage entered high error range	AUX Voltage in mV (Index 0x2004)
0x 1004	AUX voltage left high error range	AUX Voltage in mV (Index 0x2004)
0x 0005	LOGIC voltage entered low error range	LOGIC Voltage in mV (Index 0x2004)
0x 1005	LOGIC voltage left low error range	LOGIC Voltage in mV (Index 0x2004)
0x 0006	LOGIC voltage entered high error range	LOGIC Voltage in mV (Index 0x2004)
0x 1006	LOGIC voltage left high error range	LOGIC Voltage in mV (Index 0x2004)
0x 0007	AUX power not available	-
0x 1007	AUX power available again	-
0x 0008	Module Error occurred or changed	Index 0x2009 – Module Error Input
0x 0009	Comm Module occurred	-
0x 1008	All Module Errors resolved	Index 0x2009 – Module Error Input
Warnings		
0x 4000	AUX voltage entered low warning range	AUX Voltage in mV (Index 0x2004)
0x 5000	AUX voltage left low warning range	AUX Voltage in mV (Index 0x2004)
0x 4001	AUX voltage entered high warning range	AUX Voltage in mV (Index 0x2004)
0x 5001	AUX voltage entered high warning range	AUX Voltage in mV (Index 0x2004)
0x 4002	LOGIC voltage entered low warning range	LOGIC Voltage in mV (Index 0x2004)
0x 5002	LOGIC voltage left low warning range	LOGIC Voltage in mV (Index 0x2004)
0x 4003	LOGIC voltage entered high warning range	LOGIC Voltage in mV (Index 0x2004)
0x 5003	LOGIC voltage left high warning range	LOGIC Voltage in mV (Index 0x2004)
0x 4004	Temperature Warning on Output Drivers detected	0 = AUX1; 1 = AUX2
0x 5004	Temperature Warning on Output Drivers removed	0 = AUX1; 1 = AUX2
0x 4005	Open Load detected	Index 0x200E – Open Load Detection
Notifications		
0x 8000	P2H Node 32DO startup in normal mode	-
0x 8001	P2H Node 32DO startup in Self-Test Mode	-
0x 8002	P2H Node 32DO restarted by watchdog	-
0x 8003	System Time change by PLC	Index 0x2014 – System Time PLC
0x 8004	System Time change by Webpage	Index 0x2015 – System Time Web
0x 8005	Diagnostic Log deleted (via Index 0x2008)	-
0x 8006	Diagnostic Log stored manually (via Index 0x2008)	-
0x 8007	Switching Cycles counter(s) cleared (via Index 0x2003)	Index 0x2003 – Clear Switching Cycles
0x 8008	Switching Cycles counters stored (via Index 0x2008)	-
0x 800A	Low Voltage warning level changed (via Index 0x200B)	Index 0x200B – Voltage Warning Low Limits; bits 16..31: Logic, bits 0..15: AUX
0x 800B	High Voltage warning level changed (via Index 0x200C)	Index 0x200C – Voltage Warning High Limits; bits 16..31: Logic, bits 0..15: AUX
0x 800C	Output State Behavior changed (via Index 0x200D)	Index 0x200D – Output State Behavior
0x 800E	P2H Node 32DO parameters reset to factory defaults. Or: EEPROM was corrupted. This event is executed at next startup.	-
0x 8FFF	Corrupt Log entry (EEPROM load error)	-

Manufacturer specific objects

The P2H Node 32DO provides the following manufacturer specific entries in the Object Dictionary:

Index (hex)	Subindex (hex)	Type	Access	Name
0x 2001	00	USINT	RO	Number of entries (constant: 0x04)
0x 2001	01	USINT	RW	Solenoids (EV00 – EV07) **
0x 2001	02	USINT	RW	Solenoids (EV08 – EV15) **
0x 2001	03	USINT	RW	Solenoids (EV16 – EV23) **
0x 2001	04	USINT	RW	Solenoids (EV24 – EV31) **
0x 2002	00	USINT	RO	Number of entries (constant: 0x20)
0x 2002	01	UDINT	RO	Switching Cycle Counters: Solenoid - EV00
0x 2002	02	UDINT	RO	Switching Cycle Counters: Solenoid - EV01
0x 2002	03	UDINT	RO	Switching Cycle Counters: Solenoid - EV02
0x 2002	04 . . . 20	UDINT	RO	Switching Cycles: Solenoid - EV03 . . . Switching Cycles: Solenoid – EV31
0x 2003	00	USINT	RO	Number of entries (constant: 0x04)
0x 2003	01	USINT	RW	Clear Switching Cycle Counters (EV00 – EV07)
0x 2003	02	USINT	RW	Clear Switching Cycle Counters (EV08 – EV15)
0x 2003	03	USINT	RW	Clear Switching Cycle Counters (EV16 – EV23)
0x 2003	04	USINT	RW	Clear Switching Cycle Counters (EV24 – EV31)
0x 2004	00	USINT	RO	Number of entries (constant: 0x02)
0x 2004	01	UINT	RO	AUX Voltage Reading
0x 2004	02	UINT	RO	Logic Voltage Reading
0x 2006	00	USINT	RO	Number of entries (constant: 0x02)
0x 2006	01	USINT	RO	Channel Error (EV00 – EV07) **
0x 2006	02	USINT	RO	Channel Error (EV08 – EV15) **
0x 2006	03	USINT	RO	Channel Error (EV16 – EV23) **
0x 2006	04	USINT	RO	Channel Error (EV24 – EV31) **
0x 2007	00	UINT	RO	Module Info Flags **
0x 2008	00	USINT	RW	System Commands **
0x 2009	00	UINT	RO	Module Error Input **
0x 200B	00	USINT	RO	Number of entries (constant: 0x02)
0x 200B	01	UINT	RW	AUX Voltage Warning Limit – LOW (LSB)
0x 200B	02	UINT	RW	AUX Voltage Warning Limit – LOW (MSB)
0x 200C	00	USINT	RO	Number of entries (constant: 0x02)
0x 200C	01	UINT	RW	AUX Voltage Warning Limit – HIGH (LSB)
0x 200C	02	UINT	RW	AUX Voltage Warning Limit – HIGH (MSB)
0x 200D	00	USINT	RW	Output State Behavior
0x 200E	00	USINT	RO	Number of entries (constant: 0x04)
0x 200E	01	USINT	RO	Open Load Detection (EV00 – EV07)
0x 200E	02	USINT	RO	Open Load Detection (EV08 – EV15)
0x 200E	03	USINT	RO	Open Load Detection (EV16 – EV23)
0x 200E	04	USINT	RO	Open Load Detection (EV24 – EV31)
0x 200F	00	UDINT	RO	Number of entries (constant: 0x04)
0x 200F	01	UDINT	RO	Not Used (Bits 0 – 15) Firmware Version – AUX1_FW Minor (Bits 16 – 23) Firmware Version – AUX1_FW Major (Bits 24 - 31)
0x 200F	02	UDINT	RO	Not Used (Bits 0 – 15) Firmware Version – AUX2_FW Minor (Bits 16 – 23) Firmware Version – AUX2_FW Major (Bits 24 - 31)
0x 200F	03	UDINT	RO	Not Used (Bits 0 – 15) Logic Firmware Version Minor (Bits 16 -23) Logic Firmware Version Major (Bits 24 - 31)

Index (hex)	Subindex (hex)	Type	Access	Name
0x 200F	04	UDINT	RO	Not Used (Bits 0 – 7) Comm Module Firmware Version Minor (Bits 08 - 15) Comm Module Firmware Version Major (Bits 16 - 23) Comm Module Firmware Build (Bits 24 - 31)
0x 2011	00	USINT	RO	Number of entries (constant: 0x07)
0x 2011	01	USINT	RO	LED States - AUX Power LED (Reference Index 0x2011 for more info)
0x 2011	02	USINT	RO	LED States - Logic Power LED
0x 2011	03	USINT	RO	LED States - FAULT LED
0x 2011	04	USINT	RO	LED States - Network State LED
0x 2011	05	USINT	RO	LED States - Module State LED
0x 2011	06	USINT	RO	LED States - Link/Activity LED 1
0x 2011	07	USINT	RO	LED States - Link/Activity LED 2
0x 2012	00	USINT	RO	RUN / IDLE Status
0x 2013	00	UDINT	RO	System Time
0x 2014	00	UDINT	RW	System Time PLC
0x 2015	00	UDINT	RW	System Time Web
0x 2016	00	USINT	RO	Inter-Outer Short Circuits
Reference Index 0x201E – 0x2045 for additional information on each of the following Diagnostic Events				
0x 201E	00	USINT	RO	Number of entries (constant: 0x03)
0x 201E	01	UDINT	RO	Driver Channel Error / Short Circuit State Detected 1: Timestamp
0x 201E	02	UINT	RO	Driver Channel Error / Short Circuit State Detected 1: Event-ID
0x 201E	03	UDINT	RO	Driver Channel Error / Short Circuit State Detected 1: Data
0x 201F	00	USINT	RO	Number of entries (constant: 0x03)
0x 201F	01	UDINT	RO	Driver Channel Error / Short Circuit State Removed 2: Timestamp
0x 201F	02	UINT	RO	Driver Channel Error / Short Circuit State Removed 2: Event-ID
0x 201F	03	UDINT	RO	Driver Channel Error / Short Circuit State Removed 2: Data
0x 2020			RO	Diagnostic Log – structure same as 0x 201F above
0x 2021			RO	Diagnostic Log – structure same as 0x 201F above
0x 2022			RO	Diagnostic Log – structure same as 0x 201F above
0x 2023			RO	Diagnostic Log – structure same as 0x 201F above
0x 2024			RO	Diagnostic Log – structure same as 0x 201F above
0x 2025			RO	Diagnostic Log – structure same as 0x 201F above
0x 2026			RO	Diagnostic Log – structure same as 0x 201F above
0x 2027			RO	Diagnostic Log – structure same as 0x 201F above
0x 2028			RO	Diagnostic Log – structure same as 0x 201F above
0x 2029			RO	Diagnostic Log – structure same as 0x 201F above
0x 202A			RO	Diagnostic Log – structure same as 0x 201F above
0x 202B			RO	Diagnostic Log – structure same as 0x 201F above
0x 202C			RO	Diagnostic Log – structure same as 0x 201F above
0x 202D			RO	Diagnostic Log – structure same as 0x 201F above
0x 202E			RO	Diagnostic Log – structure same as 0x 201F above
0x 202F			RO	Diagnostic Log – structure same as 0x 201F above
0x 2030			RO	Diagnostic Log – structure same as 0x 201F above
0x 2031			RO	Diagnostic Log – structure same as 0x 201F above
0x 2032			RO	Diagnostic Log – structure same as 0x 201F above
0x 2033			RO	Diagnostic Log – structure same as 0x 201F above
0x 2034			RO	Diagnostic Log – structure same as 0x 201F above
0x 2035			RO	Diagnostic Log – structure same as 0x 201F above
0x 2036			RO	Diagnostic Log – structure same as 0x 201F above

Index (hex)	Subindex (hex)	Type	Access	Name
0x 2037			RO	Diagnostic Log – structure same as 0x 201F above
0x 2038			RO	Diagnostic Log – structure same as 0x 201F above
0x 2039			RO	Diagnostic Log – structure same as 0x 201F above
0x 203A			RO	Diagnostic Log – structure same as 0x 201F above
0x 203B			RO	Diagnostic Log – structure same as 0x 201F above
0x 203C			RO	Diagnostic Log – structure same as 0x 201F above
0x 203D			RO	Diagnostic Log – structure same as 0x 201F above
0x 203E			RO	Diagnostic Log – structure same as 0x 201F above
0x 203F			RO	Diagnostic Log – structure same as 0x 201F above
0x 2040			RO	Diagnostic Log – structure same as 0x 201F above
0x 2041			RO	Diagnostic Log – structure same as 0x 201F above
0x 2042			RO	Diagnostic Log – structure same as 0x 201F above
0x 2043			RO	Diagnostic Log – structure same as 0x 201F above
0x 2044			RO	Diagnostic Log – structure same as 0x 201F above
0x 2045			RO	Diagnostic Log – structure same as 0x 201F above
0x 2046			RO	Diagnostic Log – structure same as 0x 201F above
0x 2047			RO	Diagnostic Log – structure same as 0x 201F above

*** These objects are available as Process Data Inputs or Outputs*

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