IO-Link Master

IO-Link

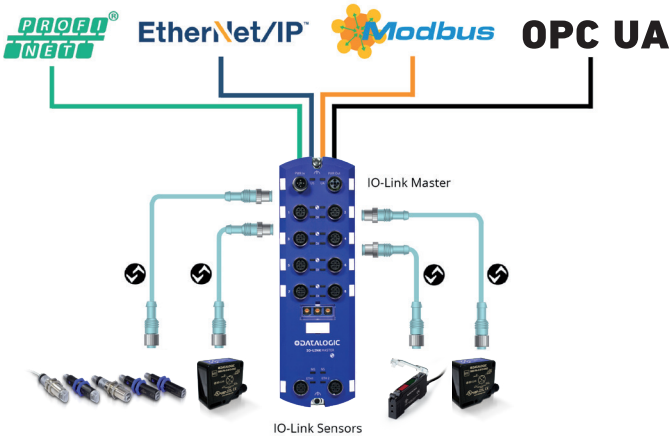
CBX-8IOL-xxxx

- Eight M12 IO-Link ports to PROFINET or Ethernet IP, which allows up to eight sensor or actuator connections on a single master
- L-Coded power connectors
- Rugged IP67 housing design for harsh environments
- Dual Ethernet ports
- Additional digital input on every port
- Power port sharing capability
- PLC access to IO-Link ISDU blocks without complex programming
- Supports the IOL_CALL function
- OPC-UA based technology
- Web server

APPLICATIONS

- Processing and Packaging machinery
- Conveyor lines, material handling
- Ceramics intralogistics
- Automated warehousing
- Industry 4.0 based applications

GENERAL VIEW



Web Server

The IO-Link Master is a very versatlie industrial standard device.
It provides the best solution about IO-Link gateway systems the embedded OPC-UA based technology.
This new device series combines all the IO-Link standard technology benefits with OPC-UA and Field busses like Ethernet-IP, Profinet and Modbus all together in one family with two different devices to select the appropriate bus technology.
The IO-Link Master is able to run simultaneously different technologies allowing the use of OPC-UA without the need of a PLC included in the system saving hardware and software cost. The IO-link data can be sent by an IO-Link sensor directly up to any SCADA or HMI software system.
The unique and integrated WEB server Technology allows to get connected with your sensor bank just with a ethernet based device and using any commercial internet browser, setting and reading sensor parameters in the most efficient and easy way.

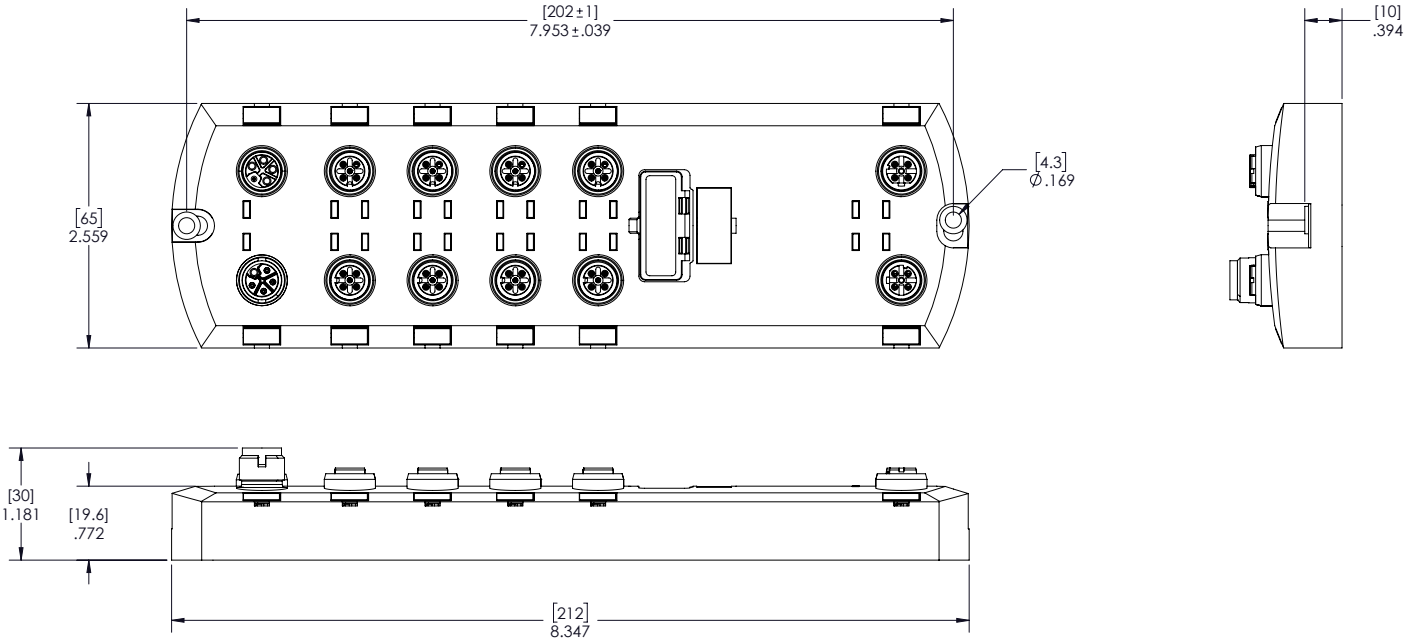
TECHNICAL DATA

SPECIFICATION	PROFINET	EIP
Hardware		
Network Interface	10/100BASE-TX	
Enclosure	Molded Polyamide 66 (potted)	
Ingress Protection Rating	IP67	
Installation and Grounding Method	Machine or panel mount Two-hole M4 or #8	
Network Protocols	PROFINET IO, Modbus/TCP (slave)	EtherNet/IP™, Modbus/TCP (slave)
Channels	8 x IO-Link / Digital I/O (configurable)	
	8 x Digital Input DI	
	2 x Ethernet	
LED Indicators	Power, Module Status, Network Status, IO-Link, DI and Ethernet Port Status	
Dimensions	212 x 65 x 30 mm (8.35 x 2.56 x 1.18)	
Product Weight	454g (1.0 lb)	
Electrical Specifications		
Power Connectors	1 x Power Input	
	1 x Power Output	
Connector type	M12, L-coded, 4 + FE	
Power Connector Pin-Out	Pin 1 – US+ (Master electronics & sensor supply)	
	Pin 2 – UA- (Actuator supply)	
	Pin 3 – US- (Master electronics & sensor supply)	
	Pin 4 – UA- (Actuator supply)	
	Pin 5 – FE	
DC Input Voltage Range	20 VDC – 30 VDC	
Power Supply In		
Module electronics and sensor (Us)	16A (max.)	
Actuator supply (UA)	16A (max.)	
Power Consumption (module electronics)	120mA @ 24VDC	
Power Supply Out		
US	16A (max.) *	
UA	16A (max.) **	
**** US output available is determined by subtracting the following from the available input current:***	Module electronics Total C/Q current for all IO-Link ports Total sensor supply current	
***** UA output available is the same as the available***	UA input current	
Environmental Specifications		
Operating Temperature	-25°C to +60°C	
Storage Temperature	-40°C to +70°C	
Operating Humidity (Non-Condensing)	10% to 95%	
Storage Humidity (Non-Condensing)	10% to 95%	
Ingress Protection	IP67 (EN / IEC 60529)	
Shock / Vibrations	EN60068-2-6	
	EN60068-2-27	
Environmental / Mechanical Approvals	IEC 61131-2	
Ethernet Interface Ports		
Number of Ports	2	
Connector Type	M12 D-coded, 4-pin	
Ethernet Specification	10/100BASE-TX	
Standards	IEEE 802.3: 10BASE-T	
	IEEE 802.3u: 100BASE-TX	
Auto-MD/MDI-X	Yes	
Auto-Negotiation	Yes	
Link Distance	100 m	
Cable Types	---	Unshielded or Shielded twisted pair (Cat 5 or higher)
IPv4 Addressing	---	Yes
IO-Link Ports Specifications		
IO-Link Version	Supports V1.0 and V1.1	
Connectors	8 (PORT 1 – 8)	
Connector type	M12, A-coded Female, 5-position	
Channels	8 x IO-Link / Digital I/O (configurable)	
	8 x DI	
Port Pinout	Pin 1 = L+	
	Pin 2 = DI	
	Pin 3 = L-	
	Pin 4 = C/Q	
	Pin 5 = no connect	

SPECIFICATION	PROFINET	EIP
IO-Link Ports Specifications		
Configurations per Port		
Pin 4 (configurable):	DI (SIO mode)	
	DO (SIO mode)	
Pin 3	DI	
Output Current L+/L- (sensor)	1.6 A (Port 1)	
	1.0 A (Port 3)	
	500 mA (Port 2, 4 – 8; each)	
Output Current C/Q	200 mA	
Output Current per Master (C/Q & L+/L-)	6.7 A (max.)	
IO-Link Mode Transfer Rates	4.8K (COM1)	
	38.4K (COM2)	
	230.4K (COM3)	
Baud Rate Recognition	Automatic	
Cable Length	20 m (max.)	
Protection	Overload and short circuit protection (Self recovers)	
Cable Length (Maximum)	20 m	
IO-Link Ports – Digital Input SIO Mode (Port Pin 4)		
Input Characteristics	IEC 61131-2 Type 1 and Type 3 Compliant	
Input Threshold	High: 10.5 – 13.0V	
	Low: 8.0 – 11.5V	
Typical Input Current	3 mA	
Cable length (max.)	30 m	
IO-Link Ports – Digital Output SIO Mode (Port Pin 4)		
Typical Output Voltage	24 VDC	
Output Current (max.)	200 mA	
Output Current per Master	1.6 A (max.)	
Lamp Load (max.)	4W	
Protection	Overload and short circuit protection	
Output Function	PNP/NPN (Push-Pull)	
Cable length (maximum)	30 m	
IO-Link Ports – Digital Input (Port Pin 3; dedicated)		
Input Characteristics	IEC 61131-2 Type 1 and Type 3 Compliant	
Typical Input Current	3 mA	
Input Threshold	High: 6.8 – 8.0V Low: 5.2 – 6.4V	
Reverse Polarity Protected	Yes (-40V to +40V)	
Cable length (maximum)	30 m	
PROFINET IO Specifications		
Web Page Configuration	PROFINET IO Device Name	---
	IOL_CALL Function Block Timeout (1-20)	---
Diagnostics	Yes	---
GSD Files	Yes	---
Diagnostics	Yes	---
EtherNet/IP Interface Specifications		
Supported PLCs		
Including but not limited to:	Control Logix	---
	Compact Logix	---
	RSLogix	---
	SLC 500	---
	PLC5	---
	MicroLogix	---
Other Class 1 or Class 3 EtherNet/IP PLCs may be supported		
ISDU Read & Writes	---	Up to 40 individual commands in one EtherNet/IP message
ISDU Commands	---	Selectable byte swapping (none, 16-bit, or 32-bit)
	---	Selectable payload sizes (4 to 232 bytes)
	---	ISDU block index
	---	ISDU sub-index
	---	Length of read or write
	---	Data payload
Web Page Configuration	Port configuration for ISDU Data, Process Data, Transfer Mode, Read/Write, Write PDI to Tag/File, Read PDO from Tag/File.	
	---	EtherNet/IP configuration
	---	Time to Live (TTL) Network Value
	---	Multicast IP Address Allocation Control
	---	User-Defined Number of Multicast IP Addresses
	---	User-Defined Multicast Starting IP Address
	---	Session Encapsulation Timeout
Diagnostics	---	Yes
Electronic Data Sheet (EDS)	---	Yes
Sample PLC Programs	---	Yes

SPECIFICATION	PROFINET	EIP
Modbus TCP		
Supported Controllers (Modbus TCP Masters)	PLC	
	HMI	
	SCADA	
	OPC Server	
Supported Clients	Any Modbus TCP Client	
	Applications on phones/tables	
Web Page Configuration	Port configuration for ISDU Response Timeout, Process Data, and Transfer Mode.	
Diagnostics	Yes	
IO-Link Master Features		
Configuration	Embedded web interface, IO-Link, EtherNet/IP, and Modbus TCP	
Data Storage	Automatic or Manual - Upload and/or Download	
Device Validation	Yes	
Data Validation	Yes	
Diagnostics	IO-Link, EtherNet/IP, and Modbus TCP	
Powerful Web Interface	**Provides the following capabilities:**	
	Password protected with Admin, Operator, and User accounts	
	ISDU batch handling	
	Load IODD files to configure the IO-Link device	
	IODD Handler parses xml files making them readable and configurable	
	Log files	
Remote Parameterization	Yes	
Export Information		
Packaged Shipping Weight	1.2 lb, 544.3 g	
Package Dimensions (L x W x H)	10.5 x 4.5 x 1.5 ; 267 x 114 x 38mm	
UPC Code	7-56727-99609-5	
Country of Origin	USA	
ECCN	5A992	
Schedule B Number	8517.62.0050	
Regulatory Approvals		
Immunity	European Standard EN 61000-6-2	
	International Standard IEC 61000-6-2	
EN/IEC 61131-2 and EN/IEC 61131-9	IEC 1000-4-2/EN 61000-4-2: Electrostatic Discharge (ESD)	
	IEC 1000-4-3/EN 61000-4-3: Radiated, Radio-Frequency (RF)	
	IEC 1000-4-4/EN 61000-4-4: Fast Transient/Burst	
	IEC 1000-4-5/EN 61000-4-5: Surge	
	IEC 1000-4-6/EN 61000-4-6: Conducted disturbance	
	IEC 1000-4-8/EN 61000-4-8: Magnetic field	
	IEC 1000-4-11/EN 61000-4-11: Dips and Voltage Variations	
Emission	European Standard EN 61000-6-4	
	International Standard IEC 61000-6-4	
	AS/NZS CISPR-11	
FCC Part15 Subpart B	Class A limit	
	Canadian EMC requirements ICES-001	
Safety	CSA C22.2 No. 61010-1-12 / CSA C22.2 No. 61010-1-201	
	UL 61010-1 / UL 61010-1-201	
	UL File # E360395	
Vibration	EN 60068-2-6/ IEC 60068-2-6	
Mechanical Shock	EN 60068-2-27/ IEC 60068-2-27	
Environmental / Mechanical Test Approvals	IEC 61131-2	
Other	The components of this product comply with the requirements of the EMC/EMI Directive 2014/30/EU, Directive 2011/65/EU on the Restriction of the use of certain Hazardous Substances (RoHS2).	
Regulatory Approval Symbols	CE FC c UL us LISTED	

DIMENSION



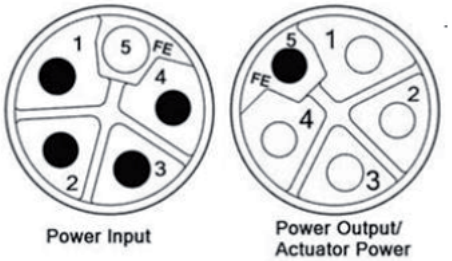
CONNECTIONS

CONNECTING THE POWER

The CBX-IOL-8-PNIO provides M12 (5-poles) L-coded input and output power connectors. Use a 24VDC power supply capable of the total output current required.

Note: Power connectors must have an approved cable or protective cover attached to the port for IP67 compliance.

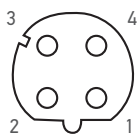
PIN	POWER INPUT (MALE)	POWER OUTPUT OR ACTUATOR POWER (FEMALE)	DESCRIPTION
1	US+	US+ or +V	IO-Link Master's system electronics and IO-Link devices
2	UA-	UA- or 0V	Actuator supply
3	US-	US- or 0V	IO-Link Master's system electronics and IO-Link devices
4	UA+	UA+ or +V	Actuator supply
5	FE		



CONNECTING THE NETWORK

The IOLM provides two Fast Ethernet (10/100BASE-TX) M12, 4-pin female D-coded connectors.

PIN	SIGNAL
1	Tx+
2	Rx+
3	Tx-
4	Tx-



You can use this procedure to connect the IOLM to the network.

1. Securely connect one end of a shielded twisted-pair (Cat 5 or higher) M12 Ethernet cable to either Ethernet port.
2. Connect the other end of the cable to the network.
3. Optionally, use the other Ethernet port to daisy-chain to another Ethernet device.
4. If you did not connect both Ethernet ports, make sure that the unused port is covered with a connector cap to keep dust and liquids from getting in the connector.

Note: Ethernet ports must have an approved cable or protective cover attached to the connector to guarantee IP67 integrity.

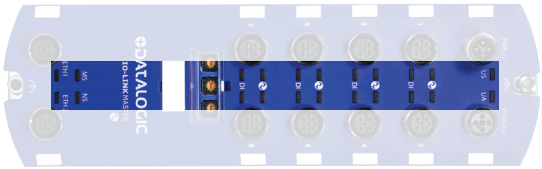
INDICATORS AND SETTINGS

SETTINGS

Follow these steps to change the default rotary switch settings:

1. Gently open the window using a small flathead screwdriver.
2. Gently swing open the switch window from the top to the bottom, allowing it to pivot on the hinge on the bottom of the window.
3. Turn each dial to the appropriate position using a small flathead screwdriver.
The default setting is 000 as shown above. The arrow points to the switch location. 0 is located at the 9:00 position.
Turn the dial clockwise to the appropriate setting.
4. Close the window and make sure that it snaps shut tightly.
Failure to close the configuration window properly may compromise IP67 integrity.

INDICATORS



CBX-IOL-8-xxx LEDs

The CBX-IOL-8-EIP (8-port IP67 model with an L-coded power connector) provides these LEDs.

LED Activity During Power On Sequence - CBX-IOL-8-xxx LEDs

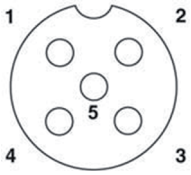
1. The **US** LED lights.
2. The **ETH1/ETH2** LED lights on the connected port.
3. The **MOD** and **NET** LEDs are lit.
4. The IO-Link LEDs flash (if no IO-Link device attached) or are lit if an IO-Link device is attached.
The **MOD** LED is solid green, the IO-Link Master is ready for operation.

CBX-IOL-8-EIP LEDs	
US	The **US** LED provides the following information: ▪ Green solid = The IO-Link Master is powered ▪ Red solid = Power input voltage below 18VDC
UA	The **UA** LED provides the following information: ▪ Green solid = The IO-Link Master is powered ▪ Red solid = Power input voltage below 18VDC
MOD (Module Status)	The **MOD** LED provides the following information: ▪ Off = No module status ▪ Green and red flashing = Self-test ▪ Green flashing = Standby – not configured ▪ Green solid = Operational ▪ Red flashing = Minor recoverable fault - check the **EtherNet/IP Diagnostics** page to locate the issue ▪ Red solid = Major unrecoverable fault
NET (Network)	The **NET** LED provides the following information: ▪ Off = No IP address ▪ Green and red flashing = Self-test ▪ Green flashing = An IP address is configured, but no CIP connections are established, and an Exclusive Owner connection has not timed out ▪ Green solid= Active EtherNet/IP or Modbus connection and no EtherNet/IP connection time-outs ▪ Red flashing = One or more EtherNet/IP connection time-outs ▪ Red solid = Duplicate IP address on network
1-8	This LED provides the following information about the IO-Link port ▪ Off = SIO mode - signal is low or disabled ▪ Yellow = SIO mode - signal is high ▪ Red flashing = Hardware fault - make sure that configured IO-Link settings on the port do not conflict with the device that is attached: - **Automatic Upload** and/or **Download** is enabled and it is not the same device - **Device Validation Mode** is enabled and it is not the correct device - **Data Validation Mode** is enabled but there is an error ▪ Red solid = PDI of the attached IO-Link device is invalid ▪ Green solid = An IO-Link device is connected and communicating ▪ Green flashing = Searching for IO-Link devices
Port 1-4 DI	The **DI** LED indicates digital input on DI (Pin 2) ▪ Off = DI signal is low or disconnected ▪ Yellow = DI signal is high
ETH1/ETH2	The **ETH1/ETH2** LEDs provide the following information: ▪ Green solid = Link ▪ Green flashing = Activity

IO-LINK SETTING AND CONNECTIONS

The CBX-IOL-8-EIP provides eight IO-Link ports with M12, 5-pin female/A coded connectors. Each port has robust over-current protection and short circuit protection on its L+/L- power output and C/Q IO-Link signal. The pin-out for each IO-Link port is per the IO-Link standard and is provided in the following table:
This table provides signal information for the IO-Link connectors.

PIN	SIGNAL	DESCRIPTION
1	L+	IO-Link device power supply (+24V)
2	DI	Digital input
3	L-	IO-Link device power supply (0V)
4	C/Q	Communication signal, which supports SDCI (IO- Link) or SIO (standard input/output) digital I/O
5	FE	Functional Earth (electronics wiring)

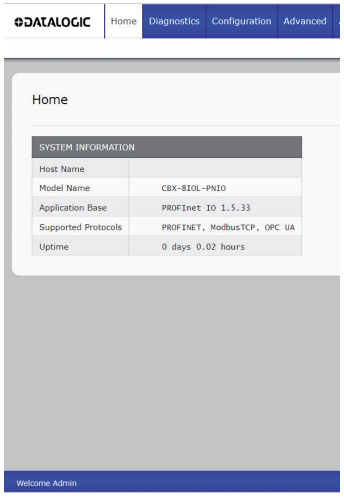


The standard SDCI (IO-Link) transmission rates are supported:

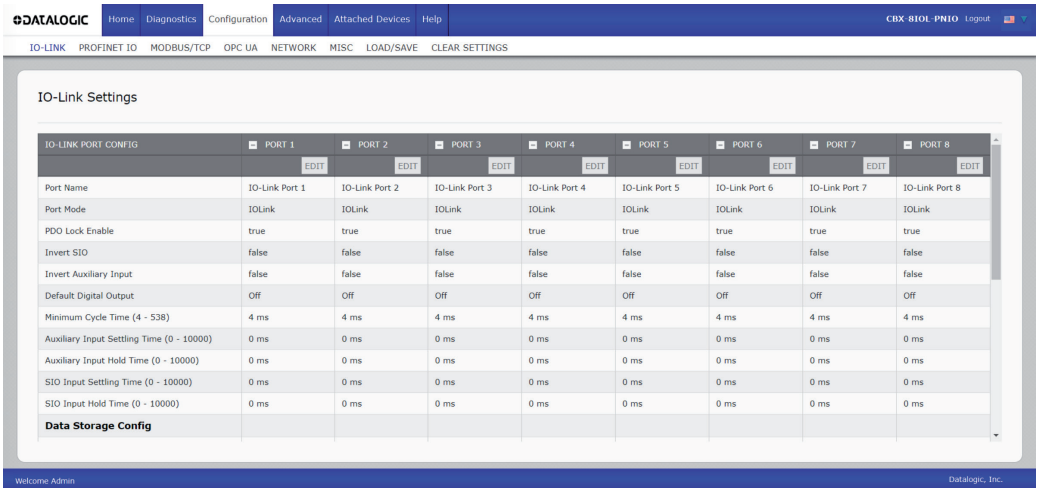
- COM1 at 4.8Kbps
- COM2 at 38.4Kbps
- COM3 at 230.4Kbps

There are active over-current limiter electronics for each port in the CBX-IOL-8-EIP that detects the overload/short-circuit condition within a few milliseconds and shuts off the output power to protect the port and the devices connected to it. The port's power output self-recovers and restores to normal immediately after the overload or short-circuit condition is removed.
When a port is affected by overload/short-circuit condition, it does not affect the operation of the other ports. All other ports will continue to operate normally without any glitch or interruption. The current output capacity, cutoff current, and power sharing/budgeting for L+/L- and C/Q signal for the ports on the CBX-IOL-8-EIP are as follows.

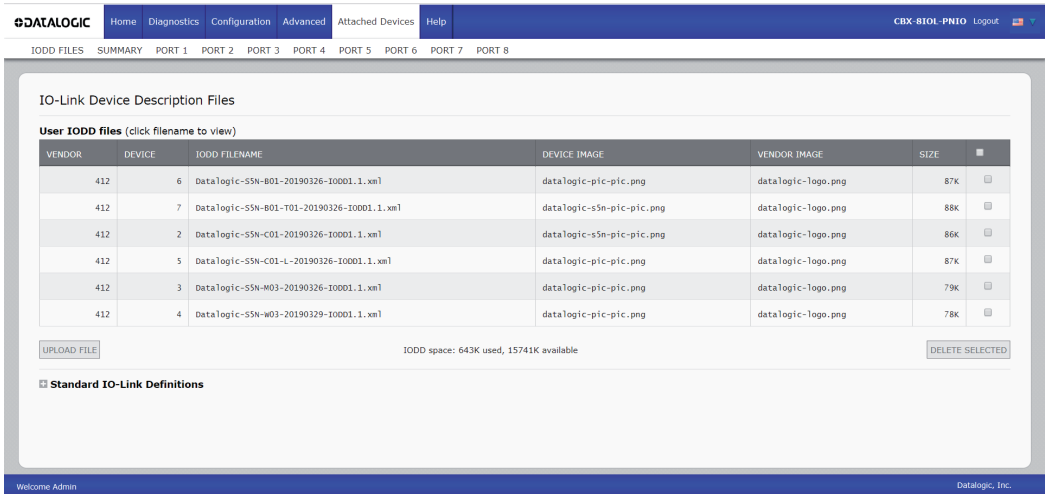
WEB SERVER GUI



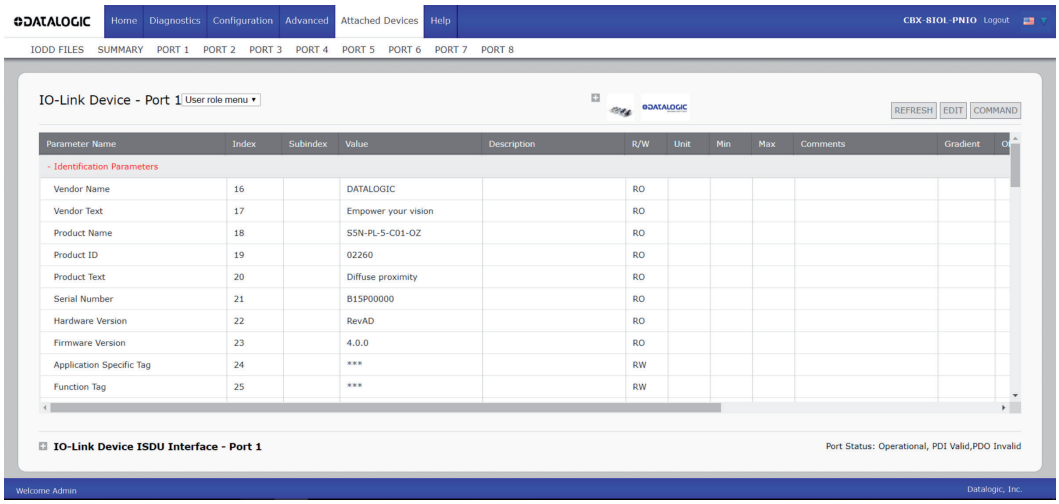
1 • Home



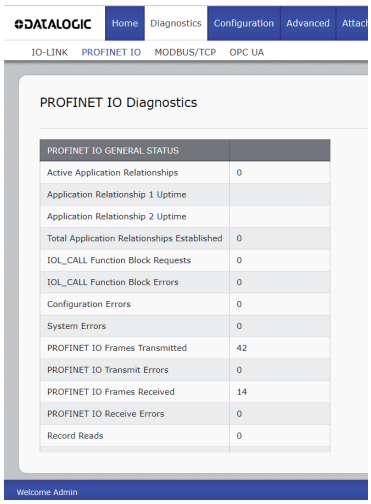
2 • IO-Link Settings



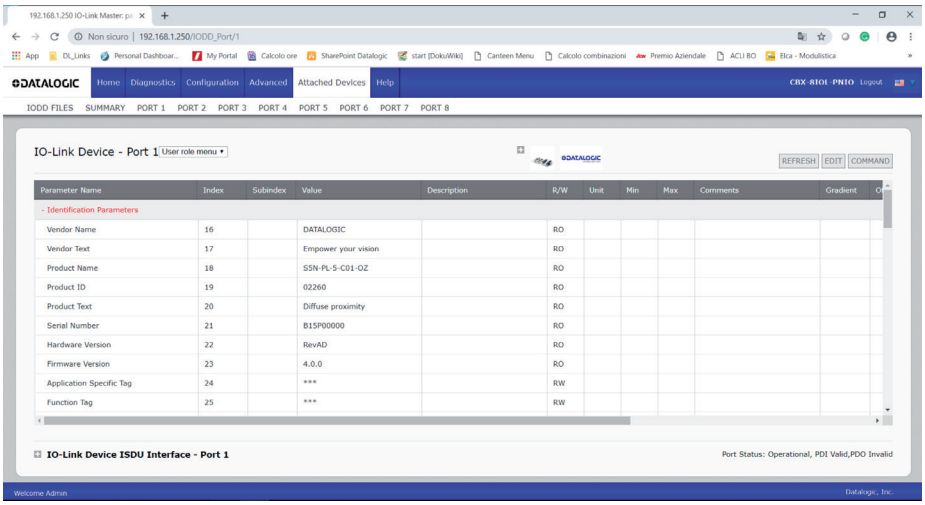
3 • IO-Link Device Description Files



4 • IO-Link Device - Port 1



5 • PROFINET IO Diagnostics



6 • IO-Link Device - Port 1

MODEL SELECTION AND ORDER INFORMATION

MODEL	DESCRIPTION	ORDER No.
CBX-8IOL-EIP	CBX-8IOL-EIP 8P IOL M12 EIP MASTER	95ACC8180
CBX-8IOL-PNIO	CBX-8IOL-PNIO 8P IOL M12 PROFINET MASTER	95ACC8190

CABLES

TYPE	DESCRIPTION	STYLES	LENGTH	MODEL	ORDER No.
M12 L-coded Axial	5-poles	PVC Grey	3m	CS-M1-02-B-03	95ACC0007
M12 Male/M8 Female double headed axial	4-poles	PVC Black	3m	CS-H1-02-B-03	95ACC0008
M12 Male/M12 Female double headed axial	4-poles	PVC Black	3m	CS-I1-02-B-03	95ACC0009