

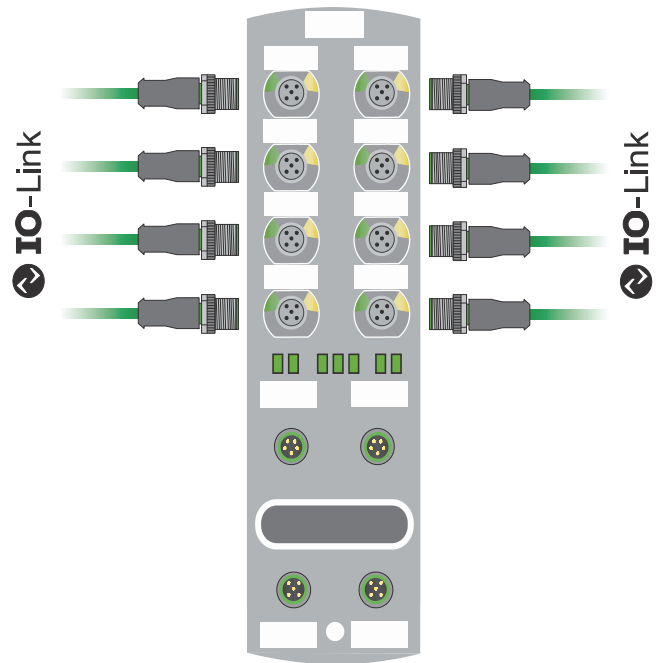
# IO-Link Field I/O

## IO-Link Overview

IO-Link is a standardized protocol that enables connection of intelligent devices (sensors and actuators) to an automation system.

Communication takes place between an IO-Link master and one or more IO-Link devices. IO-Link is a point-to-point communication system and is not a fieldbus. A master module has one or more ports and one device can be connected to each port.

The IO-Link master module is the interface between the controller and the IO-Link system, using EtherNet/IP.



## Features

- No field wiring typically required. IO-Link devices plug into M12 ports.
- Rich sensor data can add diagnostics, history, and engineering units automatically, all delivered over one cable.
- Automatic device configuration can speed and simplify field replacement.
- IO-Link Masters support daisy-chaining for easy installation of many devices.
- Integrates with Productivity PLCs using task library for quick configuration and deployment.

IO-Link Masters		
Part Number	Description	Price
<a href="#"><u>SIOL-EI8B</u></a>	STRIDE Basic EtherNet/IP IO-Link master, (8) IO-Link capable I/O points, up to (16) discrete I/O points, IO-Link v1.1, 8A, 1A/port, IP65 and IP67.	\$290.00
<a href="#"><u>54631</u></a>	Murrelektronik Premium EtherNet/IP IO-Link master, (8) IO-Link capable I/O points, up to (16) discrete I/O points, IO-Link v1.1, 16A, 2A/port, IP65 and IP67.	\$385.00

IO-Link Hubs		
Part Number	Description	Price
<a href="#"><u>59507</u></a>	Murrelektronik IO-Link hub, up to (8) discrete I/O points, (8) 3-pin M8 ports, 24 VDC, IO-Link v1.1.2 (compatible with v1.1.3), IO-Link Class A Device, 4A, 0.5A/port, IP68. Requires IO-Link master.	\$195.00
<a href="#"><u>59710</u></a>	Murrelektronik IO-Link hub, up to (16) discrete input points, (8) 5-pin M12 A-coded ports, 24 VDC, IO-Link v1.1.2 (compatible with v1.1.3), IO-Link Class A Device, IP68. Requires IO-Link master.	\$180.00
<a href="#"><u>59719</u></a>	Murrelektronik IO-Link hub, up to (16) discrete I/O points, (8) 5-pin M12 A-coded ports, 24 VDC, IO-Link v1.1.2 (compatible with v1.1.3), IO-Link Class A Device, 4A, 0.5A/port, IP68. Requires IO-Link master.	\$215.00

# IO-Link Hubs

## Features

- IO-Link V1.1.2 (compatible with IO-Link 1.1.3)
- 8 I/O ports (8 or 16 inputs/outputs)
- IP68 rating
- M8 & M12 I/O ports
- M12 IO-Link port



59507



59710



59719

IO-Link Hubs			
<b>Part Number</b>	<b>59507</b>	<b>59710</b>	<b>59719</b>
<b>Housing</b>	plastic, 30mm wide	plastic, 50mm wide	
<b>IO-Link</b>	1 x M12 IO-Link Class A	1 x M12 IO-Link Class A	
<b>Digital I/O</b>	8 x M8 I/O ports	8 x M12 I/O ports	
	8 configurable digital inputs/outputs	16 digital inputs	16 configurable digital inputs/outputs

Module Power Supply			
<b>Part Number</b>	<b>59507</b>	<b>59710</b>	<b>59719</b>
<b>Operating voltage US</b>	24VDC		
<b>Operating voltage range US</b>	18–30V		
<b>Total current US</b>	≤4A at ≤50°C (see Derating)		
<b>Current consumption when idling</b>	≤40mA		
<b>Galvanic isolation</b>	No		

IO-Link			
<b>Part Number</b>	<b>59507</b>	<b>59710</b>	<b>59719</b>
<b>Communication speed</b>	COM3		
<b>Transfer rate</b>	230.4 kbit/s		
<b>Bus protocol</b>	IO-Link V1.1.2, compatible with IO-Link 1.1.3		
<b>IO-Link cycle time</b>	≥1 ms		
<b>VendorID</b>	0x012F		
<b>DeviceID</b>	0x0C0005	0x0C000F	0x0C0009
<b>Process data</b>	2 byte (inputs), 2 byte (outputs)	2 byte (inputs), 0 byte (outputs)	2 byte (inputs), 2 byte (outputs)

Sensor Power Supply			
<b>Part Number</b>	<b>59507</b>	<b>59710</b>	<b>59719</b>
<b>Connector (female)</b>	M8	M12	
<b>Operating voltage</b>	24VDC		
<b>Current supply</b>	≤1A per 2 ports (X0+X1, X2+X3, X4+X5, X6+X7)	≤0.5 A per port	

Input (DI)			
<b>Part Number</b>	<b>59507</b>	<b>59710</b>	<b>59719</b>
<b>Connector (female)</b>	M8	M12	
<b>Cable cross section</b>	≤0.75 mm <sup>2</sup>		
<b>Cable length</b>	≤30m [98ft]		
<b>Input characteristic</b>	EN 61131-2: Type 1 + Type 3		
<b>Input filter</b>	1 ms		

Output (DO)			
<b>Part Number</b>	<b>59507</b>	<b>59710</b>	<b>59719</b>
<b>Connector (female)</b>	M8	Not Applicable	M12
<b>Cable cross section</b>	≤0.75 mm <sup>2</sup>		≤0.75 mm <sup>2</sup>
<b>Cable length</b>	≤30m [98ft]		≤30m [98ft]
<b>Output current</b>	≤0.5 A per pin		≤0.5 A per pin
<b>Switching frequency (resistive load)</b>	≤25 Hz	≤25 Hz	

# IO-Link Hubs

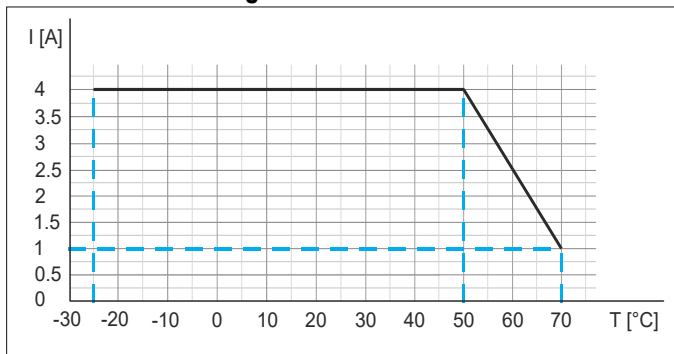
Environmental	
<b>Operating temperature</b>	-25°C to +70°C [-13°F to +158°F]
<b>Storage temperature</b>	-40°C to +85°C [-40°F to +185°F]
<b>Relative humidity</b>	≤95%
<b>Installation altitude</b>	≤3000m above sea level

Mechanical	
<b>Vibration test</b>	EN 60068 Part 2-6: 5–500 Hz, constant amplitude 1mm, acceleration 15 g
<b>Shock test</b>	EN 60068 Part 2-27: 50 g, duration 11 ms

EMC Safety	
<b>Protection degree</b>	IP68
<b>Protection class</b>	III
<b>Pollution degree</b>	2

Assembly data			
<b>Part Number</b>	<a href="#">59507</a>	<a href="#">59710</a>	<a href="#">59719</a>
<b>Weight (net)</b>	129g [4.55 oz]	200g [7.05 oz]	
<b>Dimensions (L x W x H)</b>	126 x 30 x 34.5 mm [4.96 x 1.2 x 1.36 in]	126 x 50 x 34.5 mm [4.96 x 2.0 x 1.36 in]	
<b>Drawing</b>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>

Total Current Derating Chart




Electrical Inteference	
<b>Radio interference field strength</b>	EN 61000-6-4 Emission: QP: 40 dBμ V/m @ 30–230 MHz QP: 47 dBμ V/m @ 230–1000 MHz

EMC Immunity	
<b>Electrostatic discharge (housing)</b>	EN 61000-4-2: ±4kV @ contact, ±8kV @ air
<b>Electromagnetic high-frequency fields (housing)</b>	EN 61000-4-3 RF field: 10V/m
<b>Rapid transient electric disturbances (burst) DC inputs/outputs</b>	EN 61000-4-4: ±2kV I.O supply, ±1kV data line, ±1kV I/O line
<b>Magnetic field</b>	EN 61000-4-8: 30A/m @ 50 Hz
<b>Conducted interferences, high frequency fields</b>	EN 61000-4-6, asymmetric: 10V

Device Protection	
<b>Overvoltage protection</b>	Yes
<b>Overload protection module supply</b>	Yes. To be ensured through load circuit monitoring
<b>Reverse polarity protection of module supply</b>	Yes
<b>Short-circuit protection, sensor supply</b>	Electronically
<b>Short-circuit protection, output (DO)</b>	Electronically
<b>Protective circuit for input</b>	Suppressor diode, internal

Conformity, Approvals	
<b>Product standard</b>	EN 61131-2, Programmable logic controllers: Compliant
<b>CE</b>	2014/30/EU, 2011/65/EU: Compliant
<b>UKCA</b>	Compliant
<b>EMC</b>	2014/30/EU: Compliant
<b>REACH</b>	No. 1907/2006: SVHC List
<b>WEEE</b>	2012/19/EU: Compliant
<b>ULus</b>	E201820
<b>RoHS</b>	2011/65/EU & 2015/863: Exception 6c&7a
<b>China RoHS</b>	SJ/T 11364-2014, 25 EPUP

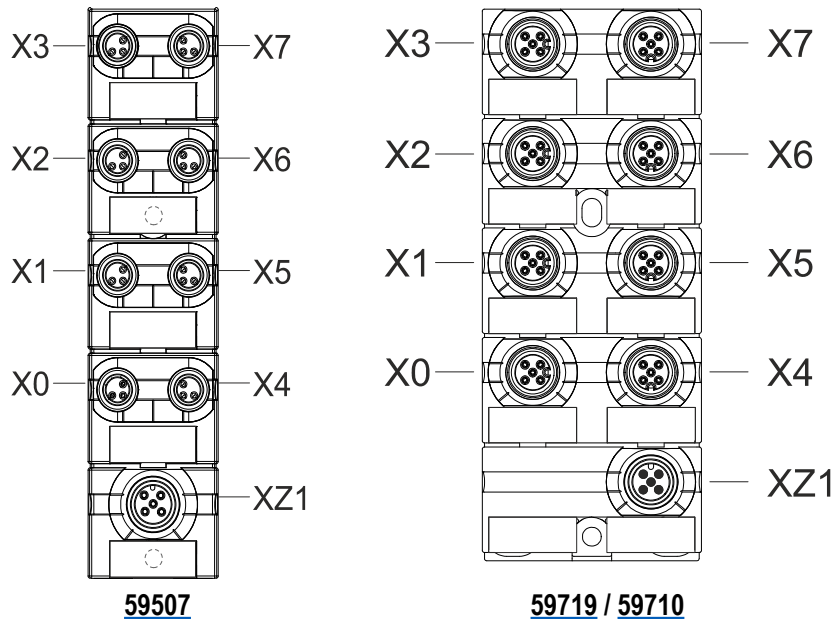
Hazardous Substances						
 Part Name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr (VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
	<b>Component part PCB</b>	X	O	O	O	O
<b>Connection Terminal/Screws</b>	X	O	O	O	O	O

O: Indicates that the content of the harmful substance in all homogeneous materials of the component part is below the limit defined in GB/T 26572.  
X: Indicates that the content of the harmful substance in at least one homogeneous material of the component part exceeds the limit defined in GB/T 26572.



# IO-Link Hubs

## Module Port Designations and Pinouts



Port Designations		
X0-X7	59507	Digital inputs and outputs, US
	59719	
	59710	
XZ1	Module supply, IO-Link Class A	

Pin Assignments		
IO-Link	XZ1 (M12 A-coded male connectors)	
	Pin 1	24VDC --- US (L+)
	Pin 2	n.c.
	Pin 3	0V US (L-)
	Pin 4	C/Q IO-Link
	Pin 5	n.c.
59507 DIO	X0-X7 (M8 A-coded female connectors)	
	Pin 1	24VDC --- US
	Pin 2	0V US
	Pin 3	DIO US
59719 DIO 59710 DI	X0-X7 (M12 A-coded female connectors)	
	Pin 1	24VDC --- US
	Pin 2	59719: DIO US 59710: DI US
	Pin 3	0V US
	Pin 4	59719: DIO US 59710: DI US
	Pin 5	FE

## LED Indicators

The IO-Link hub modules are equipped with the following separate LED indicators:

- LED indication for inputs/outputs
- LED indication for IO-Link and US sensor supply

The device has a combined LED for the IO-Link status and the status of the US sensor supply. The IO-Link status is indicated by a green LED chip, and the US status by a red LED chip. This can give rise to a mixture of green and red flashing codes (or orange flashing code in case of overlap).

# IO-Link Hubs

## IO-Link Object Directory

IO-Link Object Directory (DPP)							
ISDU index	DPP index	Object name	Access	Length in bytes	Meaning / default value		
<b>Part Number</b>					<b>59507</b>	<b>59719</b>	<b>59710</b>
<b>Identification</b>							
0x0000	0x00	MasterCommand	W	1			
	0x01	MasterCycleTime	R/W	1			
	0x02	MinCycleTime	R	1			
	0x03	M-sequenceCapability	R	1			
	0x04	RevisionID	R/W	1			
	0x05	ProcessDataIn	R	1			
	0x06	ProcessDataOut	R	1			
	0x07	VendorID 1 (MSB)	R	1	0x012F		
	0x08	VendorID 2 (MSB)	R	1			
	0x09	DeviceID 1 (octet 2, MSB)	R/W	1	0x0C		
	0x0A	DeviceID 1 (octet 1, MSB)		1	0x00		
	0x0B	DeviceID 1 (octet 0, LSB)		1	0x05	0x09	0x0F
	0x0C	FunctionID 1 (MSB)	R	1			
	0x0D	FunctionID 2 (LSB)		1			
	0x0E	Reserved	R	1			
0x0F	SystemCommand	W	1				
0x0002		SystemCommand	R	1			
0x0003		DataStorageIndex	R	variable			
0x000D		ProfileCharacteristic	R	variable			
0x000E		PDInputDescriptor	R	variable			
0x000F		PDOOutputDescriptor	R	variable			
0x0010		VendorName	R	64	Murrelektronik GmbH		
0x0011		VendorText	R	64	www.murrelektronik.com.		
0x0012		ProductName	R	64	MVP8-P3 DIO8 8xM8-3 IOLA12 B0	MVP12-P6 DIO16 8xM12A IO-LA12 B0	MVP12-P6 DI16 8xM12A IO-LA12 B0
0x0013		ProductID	R	64	59507	59719	59710
0x0014		ProductText	R	64	Digital I/O hub MVP8-P30 - IO-Link Class A DIO8 8xM8-3P Basic Firmware Edition: 2 bytes IN / 1 byte Out	Digital I/O hub, MVP12-P60 - IO-Link Class A DIO16 8xM12A Basic Firmware Edition: 2 bytes IN / 2 byte Out	Digital I/O hub MVP12-P60 - IO-Link Class A DI16 8xM12A Basic Firmware Edition: 2 Byte IN / 0 Byte Out
0x0015		SerialNumber	R	16	Running serial number set during production		
0x0016		HardwareRevision	R	64	e.g. "01.00"		
0x0017		FirmwareRevision	R	64	e.g. "V.1.00.00"		
0x0018		ApplicationSpecificTag	R	16–32	User-specific designation e.g. "System 3 / Port 4"		
0x0019		FunctionTag	R	32			
0x001A		LocationTag	R	32			
<b>Diagnosis</b>							
0x0020		Error Count	R	2			
0x0024		DeviceStatus	R	1	0: Device is operating properly 1: Maintenance Required 2: Out of Specification	3: Functional Check 4: Failure 5–255: Reserved	
0x0025		DetailedDeviceStatus	R	variable	6 x (octet 1: EventQualifier octet 2,3: EventCode)		
0x0028		ProcessDataInput	R	PD length			
0x0029		ProcessDataOutput	R	PD length			
0x0031–0x003F		Reserved for profiles					

# IO-Link Hubs

## Pin-Based Bitmapping

Input Process Data	
Bit	Contact/Description
<b>Byte 0 Inputs (X0–X7)</b>	
0	Pin4_X0
1	Pin4_X1
2	Pin4_X2
3	Pin4_X3
4	Pin4_X4
5	Pin4_X5
6	Pin4_X6
7	Pin4_X7
<b>Byte 1 Inputs (X0–X7)</b>	
0	Pin2_X0
1	Pin2_X1
2	Pin2_X2
3	Pin2_X3
4	Pin2_X4
5	Pin2_X5
6	Pin2_X6
7	Pin2_X7
<b>Byte 2 Diagnostics</b>	
0	Error/Warning at power supply (too low or high)
1	Error/Warning because of temperature rating (threshold can be defined inside object)
2	Error/Warning at Input/Output (short-circuit or overload)
3	DIA at channel X
4	0 = channel 1
5	...
6	15 = channel 16
7	Global status 0 = no diagnostic 1 = fault detected
<b>Byte 3 Module Identification</b>	
0–7	User defined module identification bits, e. g. for tool change applications; 0 = not used 1–255 = ID value is read out from object

Output Process Data	
Bit	Contact
<b>Byte 0 Outputs (X0–X3)</b>	
0	Pin4_X0
1	Pin2_X0
2	Pin4_X1
3	Pin2_X1
4	Pin4_X2
5	Pin2_X2
6	Pin4_X3
7	Pin2_X3
<b>Byte 1 Outputs (X4–X7)</b>	
0	Pin4_X4
1	Pin2_X4
2	Pin4_X5
3	Pin2_X5
4	Pin4_X6
5	Pin2_X6
6	Pin4_X7
7	Pin2_X7

## Diagnostic IO-Link Events



**NOTE:** In addition to the vendor-specific IO-Link events listed here, the standard events of the IO-Link specification also apply.

Vendor-Specific IO-Link Events		
Event Code	Event Type	Description
0x4000	Error	The device shows a temperature fault - overload.
0x4210	Warning	The device shows a temperature over-run.
0x4220	Warning	The device shows a temperature under-run.
0xFF91	Notification	The device requests a data storage upload from the master.
0x5100	Error	General power supply fault (US) - below shutdown voltage.
0x5110	Warning	Primary sensor supply voltage (US) is over-run.
0x5111	Warning	Primary sensor supply voltage (US) is under-run.
0x1830	Warning	Secondary sensor supply voltage (UA) is over-run.
0x1831	Warning	Secondary sensor supply voltage (UA) is under-run.
0x1832	Error	Secondary power supply fault (UA) - below shutdown voltage.
0x7710	Error	Short-circuit detected on a specific channel.
0x8CA0	Error	DIO pin current overload/ shortcircuit - Port 0 Pin 4.
0x8CA1	Error	DIO pin current overload/ shortcircuit - Port 0 Pin 2.
0x8CA2	Error	DIO pin current overload/ shortcircuit - Port 1 Pin 4.
0x8CA3	Error	DIO pin current overload/ shortcircuit - Port 1 Pin 2.
0x8CA4	Error	DIO pin current overload/ shortcircuit - Port 2 Pin 4.
0x8CA5	Error	DIO pin current overload/ shortcircuit - Port 2 Pin 2.
0x8CA6	Error	DIO pin current overload/ shortcircuit - Port 3 Pin 4.
0x8CA7	Error	DIO pin current overload/ shortcircuit - Port 3 Pin 2.
0x8CA8	Error	DIO pin current overload/ shortcircuit - Port 4 Pin 4.
0x8CA9	Error	DIO pin current overload/ shortcircuit - Port 4 Pin 2.
0x8CAA	Error	DIO pin current overload/ shortcircuit - Port 5 Pin 4.
0x8CAB	Error	DIO pin current overload/ shortcircuit - Port 5 Pin 2.
0x8CAC	Error	DIO pin current overload/ shortcircuit - Port 6 Pin 4.
0x8CAD	Error	DIO pin current overload/ shortcircuit - Port 6 Pin 2.
0x8CAE	Error	DIO pin current overload/ shortcircuit - Port 7 Pin 4.
0x8CAF	Error	DIO pin current overload/ shortcircuit - Port 7 Pin 2.
0x8CD0	Error	Power pin current overload/ shortcircuit - Port 0 Pin 1.
0x8CD1	Error	Power pin current overload/ shortcircuit - Port 1 Pin 1.
0x8CD2	Error	Power pin current overload/ shortcircuit - Port 2 Pin 1.
0x8CD3	Error	Power pin current overload/ shortcircuit - Port 3 Pin 1.
0x8CD4	Error	Power pin current overload/ shortcircuit - Port 4 Pin 1.
0x8CD5	Error	Power pin current overload/ shortcircuit - Port 5 Pin 1.
0x8CD6	Error	Power pin current overload/ shortcircuit - Port 6 Pin 1.
0x8CD7	Error	Power pin current overload/ shortcircuit - Port 7 Pin 1.