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User's Manual

IO-Link M12 Digital Hubs

Brad® from Molex

Version 1.2
October 04th, 2018

Revision History

Date	Authors	Changes	Revision
February 13th 2017	SS	First release	1.0
March 22nd 2017	JCD	Ratings update	1.1
October 04th 2017	OL	Adding TEDIO-8B4P-808-1	1.2

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Table of contents

1. General Safety Instructions

General information

The current documentation is intended for persons technically qualified to install, use and service the products described herein. It contains the necessary information for proper use of the products. However, for advanced use of our products, please contact your nearest dealer for additional information.

The content of this documentation is not binding and cannot extend or limit warranties.

Personnel qualifications

Only qualified persons are authorized to install, use and service the products. Use by unqualified persons or failure to follow the safety instructions of this document, the manuals and/or those affixed to the devices, can result in irremediable harm or damage to persons and equipment. The following personnel are deemed to be **qualified persons** for:

- *Equipment operation*: Personnel who operates the machines and/or processes connected to the Brad products. Brad product must be used by persons who have received training and have been informed of the major risks involved in working in an industrial environment.

- *Preventive and corrective maintenance*: Persons who modify Brad products hardware and software configuration and install the product updates supplied by the manufacturer. These persons must:
    - be trained in Brad products and operation and
    - have the experience and technical knowledge required to be aware of the risks (electrical hazards in particular) involved in their job and the ways of reducing these risks for themselves, third parties and the equipment being used.

Preventive messages

Preventive messages are designed to identify the particular risks likely to affect personnel and/or hardware. Different message types, both in the documentation and on the products, indicate different degrees of risk:

Danger messages indicate immediate hazards that could result in death or serious injury if not averted.

Warning messages indicate situations that could result in death, serious injury or material damage.

Caution messages indicate potentially dangerous situations that could cause bodily harm or material damage.

Usage compliance

The products described in the current documentation **comply with currently applicable European Directives** (EC marking). However, they can only operate correctly with the applications for which they were intended as described in the documentation, and with approved products.

As a general rule, if all the handling, transportation, and storage recommendations and installation, operation and maintenance instructions are followed, the products will operate correctly without risk for personnel or hardware.

Device installation and set-up

It is important to follow the rules below when installing and setting up the Brad product. If system installation includes products more than thirty meters away from each other, the basic cabling rules must be closely followed.

- Strict compliance with the safety instructions provided in this documentation or on the equipment to be installed and implemented, is absolutely essential.

- Make sure that the installation is carried out in compliance with regulations of the user country,

- Install the equipment in a suitable environment. As a closed equipment, the Brad product may be installed in two ways:
  - o In a casing (cabinet, chest) or,
  - o Directly without any additional protection, if the associated systems (power supply, cables, sensors, etc.) already carry a protection index equivalent to IP67 or higher.

Always connect the Brad product to the functional earth (FE) in compliance with existing standards.
- LV (Low Voltage) circuits must have a functional earth connection to ensure dangerous voltage detection.
- Check that the power voltages are within the tolerance ranges defined in the technical specifications for the devices.
- Always ensure that power restoration (immediate, hot or cold) will not create a hazard for personnel or equipment.
- Ensure that emergency stop devices remain effective in any equipment operation mode, even when abnormal (for example, in the event of a wire cut). Resetting these devices should not result in uncontrolled or undefined restarts.
- Position the signal cables so that the automation functions will not be disrupted by any capacitive, inductive or electromagnetic influences, etc.
- Install the automation devices and their controlling devices so that they are protected against any adverse incident.
- Adequate safety precautions must be applied to inputs and outputs to prevent the lack of signals from causing undefined states in the automation devices.

Device operation

Because Brad product devices are components of a control system, the safety of the entire automated system, including that of the installation and the application, cannot be dealt with in this document. For further information, see IEC 61131-2, describing risk reduction measures for PLC users.

See the documentation of the specific products involved for more information on operation safety.

Preventive and corrective maintenance

Servicing

- When replacing parts or components, only use factory approved parts.
- In all cases, before servicing a Brad product, disconnect the power supply from the device (unplug the power cord or open the power cut-out device) or the M12 IO link cable.
- Before servicing an onsite mechanical Brad product, disconnect its power supply and mechanically lock the moving parts.
- On positive logic outputs or negative logic inputs, take all the necessary precautions to prevent any disconnected wires from coming into contact with the mechanical ground (risk of unwanted commands).

Product end-of-life

Contact your local dealer for information on how to dispose of used products in compliance with current regulations.

Introduction

Brad® IO-Link M12 Digital Hubs is a reliable solution for connecting any compliant IO-Link master and digital sensors or actuators in harsh duty environments. Contained in an IP67 rated housing, the hubs can be machine mounted and are able to withstand areas where liquids, dust or vibration may be present. This makes them ideally suited for many applications including material handling and automated assembly.

IO-Link digital hubs includes advanced diagnostic features. Each hub embeds visible LEDs to provide maintenance personnel the ability to easily determine power, I/O and IO-Link status.

IO-Link digital hubs main features:
- Digital hub is housed in an IP67 rated enclosure that when properly installed – according to IEC 60529 – provides protection against the ingress of dust and temporary water immersion.
- 1x IO-Link connector + 16 digital I/O channels
- Compliance with *IO-Link Interface and System Specification* v1.1.2
- Digital input and output short circuit protection
- Declarations
  - CE according to EMC directive
- Certifications:
  - c-UL-us
  - FCC Part 15 Emissions; Class A
- Compliant with
  - RoHS and RoHS China
  - REACH
  - CSA C22.2

Overview

The IO-Link digital hubs are available in 3 versions.

SAP No	Material No	Description
112103-5000	TEDIO-8D0P-808	IO-Link Digital Hub 16x inputs
112103-5001	TEDIO-8B4P-808	IO-Link Digital Hub 12x inputs + 4x outputs
112103-5002	TEDIO-8B4P-808-1	IO-Link Digital Hub 12x inputs + 4x outputs grounded
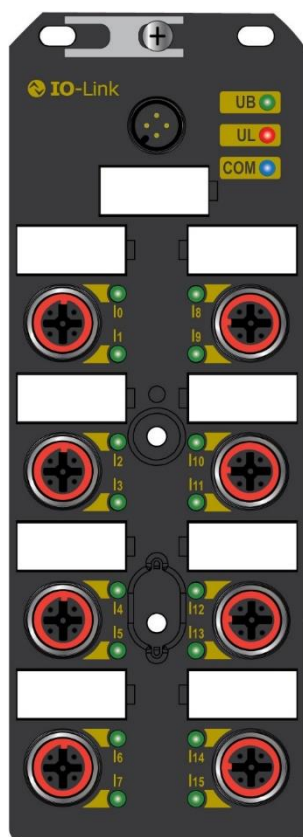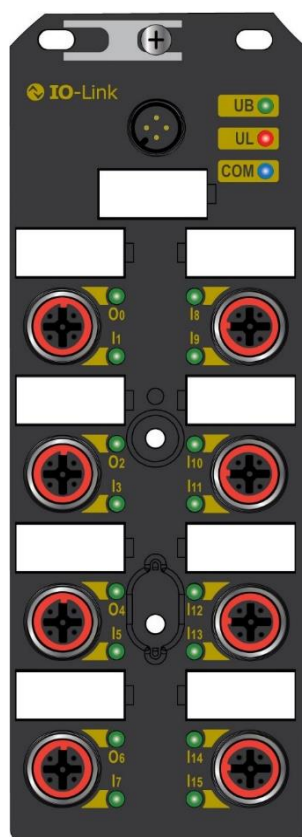
TEDIO-8D0P-808   TEDIO-8B4P-808   TEDIO-8B4P-808-1
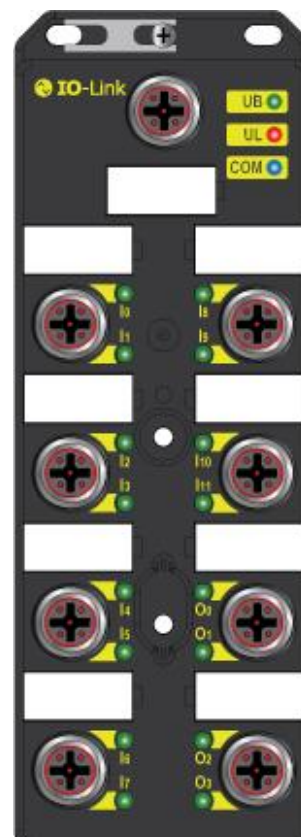
Physical & System description

Mounting screw (Functional Earth - FE)

Shield Plate

3 LEDs indicators

Mounting hole

IO-Link connector

UB

UL

COM

I/O Connectors

Plastic label

Port 0

O0
I1

I8
I9

Port 4

Port 1

O2
I3

I10
I11

Port 5

Port 2

O4
I5

I12
I13

Port 6

Port 3

O6
I7

I14
I15

Port 7

2 Mounting holes
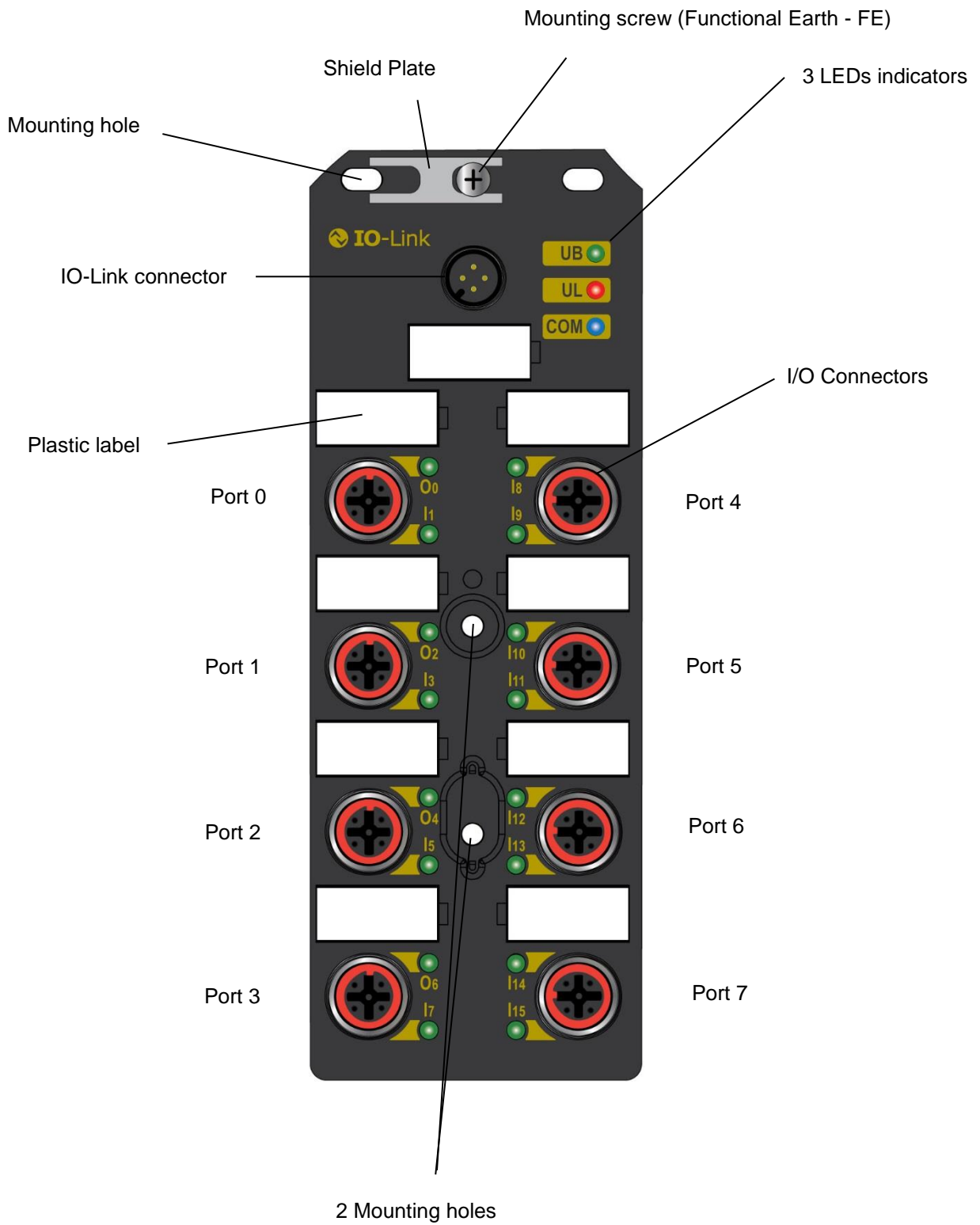
IO-Link & Power supply connector

Pinout and Orientation

The digital hubs have an IO-Link connector that provides the IO-Link communication and the power for the digital sensors and actuators.

Pin	5 pins Power Connector - Description
1	L+: 24VDC - Input and hub power supply
2	UL+: 24VDC - Output power supply Optional for TEDIO-8B4P-808 except if outputs are used. Optional for TEDIO-8B4P-808 / TEDIO-8D0P-808 except if additional Sensor Power (software configuration dependent) is required.
3	Common L-/UL- (0V)
4	C/Q: IO-Link data transmission cable
5	Shell - FE (Functional Earth)
LEDs	
6	Bi-color red/green LED indicator for input & hub power supply L
7	Bi-color red/green LED indicator for output power supply UL (or Sensor Power)
8	Blue LED indicator for IO-Link communication

The IO-Link connector is oriented such as the IO-Link cable leaves the hub on the top (see picture below).
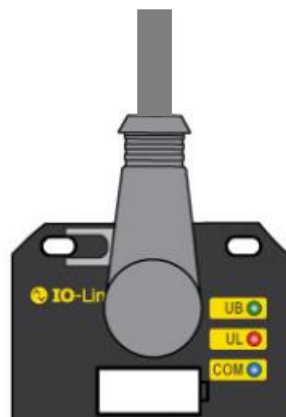
Note

The IO-Link digital hubs can be connected to the IO-Link master via 3, 4 or 5-wire cables **with a maximum length of 20 m**.

LEDs indicators

LEDs	Color State	State & Power supply voltages
UL	Fixed Green	Voltage present (18 - 30V)
	Fixed Red	Voltage between 8V < UL < 18V
		Voltage over 30V
		Voltage between 0V < UL < 18V (if UL powers the sensors)
		Overload (3.5A) or short circuit
	Off	Voltage not present or below 8V
UB	Fixed Green	Voltage present (18 - 30V)
	Fixed Red	Voltage between 9.5V < L < 18V
		Voltage over > 30V
		Overload (1.6A) or short circuit
	Off	Voltage not present or below 9.5V
COM	Fixed Blue	Operate mode
	Blinking Blue	Pre-operate mode
	Off	No IO-Link communication

Note

In case of overvoltage on L, all energized outputs will be shutdown
If L drops below 18V but UL remains, all energized outputs will be shutdown.

Note

Digital sensor/actuator cable are made of AWG22 wires (0.34 mm²). Take in account the voltage drop across the connecting cable when preparing your cabling.

In case of maximal current consumption, 4A may flow through pin 3. To reduce the voltage drop, contact Molex for cordsets with larger wire gauge.

IO-Link Master power supply

The Molex IO-Link IP67 master modules (TCIEP-888P-D1U for PROFINET and TCIEI-888P-DYU / TCIEI-888P-D1U for EtherNet/IP) provide 1.6A on Pin1 (L) of the IO-Link Hub connector. It means that you can cover the maximum draw current in total (800mA).

IO Ports

The digital hubs support up to 8 I/O ports offering 3 different types of fixed I/O configuration
- Input only
- Input / Output
- Dual output

Input only
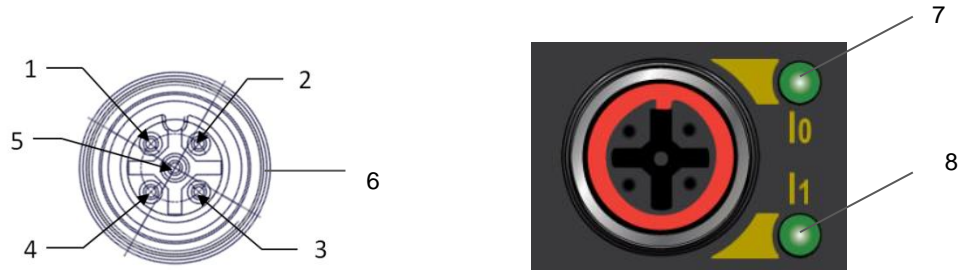
Pin	I/O Connector - Description	Powered by
1	+24VDC	L or UL
2	Digital Input (DI) – Odd number	
3	0V	
4	Digital Input (DI) – Even number	
5	Not connected	
6	FE (Functional Earth)	
LEDs		
7	Bi-color red/green LED for even channel indicator – Pin4	
8	Bi-color red/green LED for odd channel indicator – Pin2	

Input / Output

Pin	I/O Connector - Description	Powered by
1	+24VDC	L or UL
2	Digital Input (DI) – Odd number	
3	0V	
4	Digital Output (DO) – Even number	UL
5	Not connected	
6	FE (Functional Earth)	
LEDs		
7	Bi-color red/green LED for even channel indicator – Pin4	
8	Bi-color red/green LED for odd channel indicator – Pin2	

Dual Output
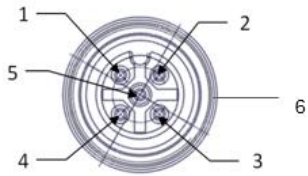
Pin	I/O Connector - Description	Powered by
1	N/C	
2	Digital Output (DO) – Odd number	UL
3	0V	
4	Digital Output (DO) – Even number	UL
5	Not connected	
6	FE (Functional Earth)	
LEDs		
7	Bi-color red/green LED for even channel indicator – Pin4	
8	Bi-color red/green LED for odd channel indicator – Pin2	

Note

M12 accessories (cordsets, plugs …) connected to the hub I/O and network connectors shall be screwed with a torque of 2.0 Nm to ensure a correct sealing to achieve IP67 rating.

The I/O ports are oriented as follows:
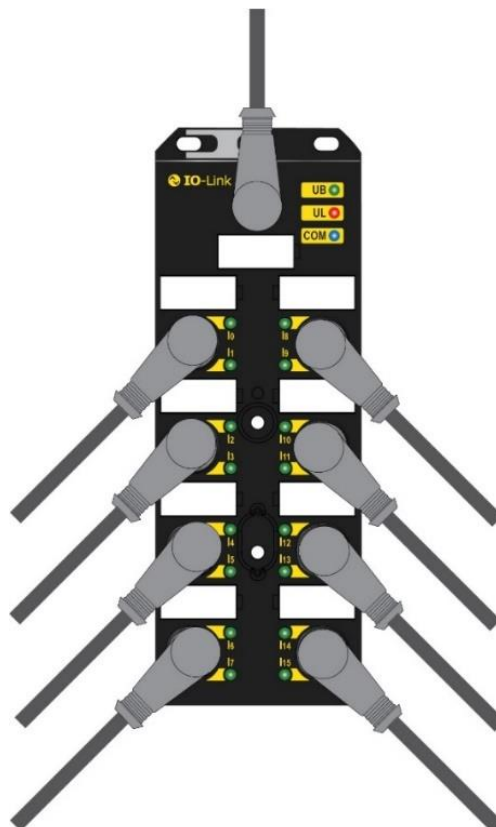
LEDs indicators

The table below shows the LEDs meanings and the I/O state

LEDs	Color State	I/O State
Ix	Fixed Green	DI is set to 1
	Fixed Red	When Pin1 (L+) is shorted to ground
		When overload detected on Pin 1
		When L > 32V
	Off	DI is set to 0

	Color State	I/O State
Ox	Fixed Green	DO is energized
	Fixed Red	DO: when energized and shorted to ground
		DO: when not energized and shorted to 24V
		DO: when overload detected
		DO: when energized and UL is over voltage (UL > 30V)
		DO: when energized and UL is under voltage (0V < UL < 18V)
	Off	DO is not energized

DI: Digital input on Pin2/Pin4
DO: Digital output on Pin2/Pin4

Functional Earth Connection

The functional earth (FE) shall always be connected to ground to ensure proper operation of the hub.

Functional Earth (FE)
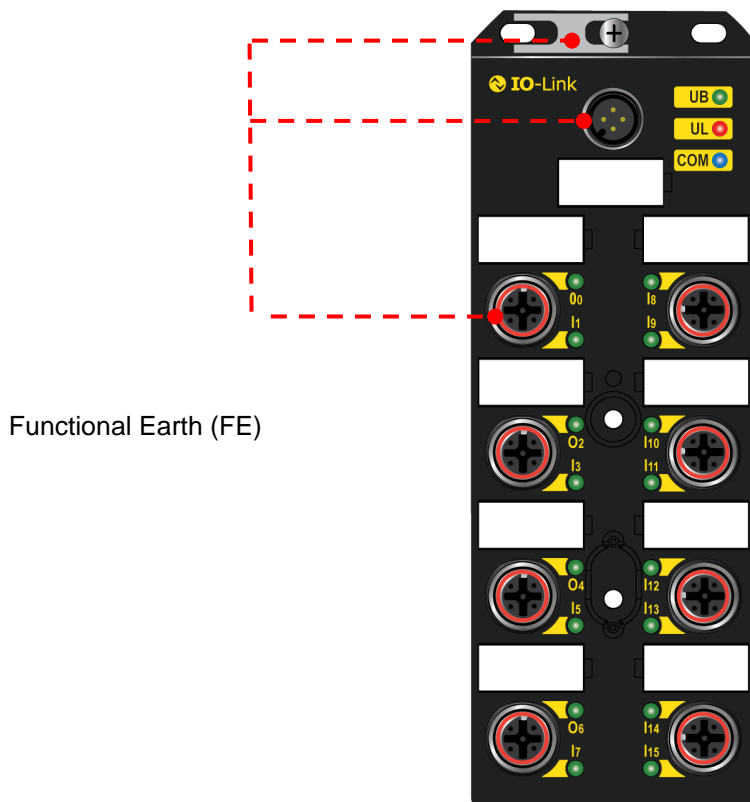
Dimensions

All dimensions are in millimeters.

Mechanical and Environmental Data

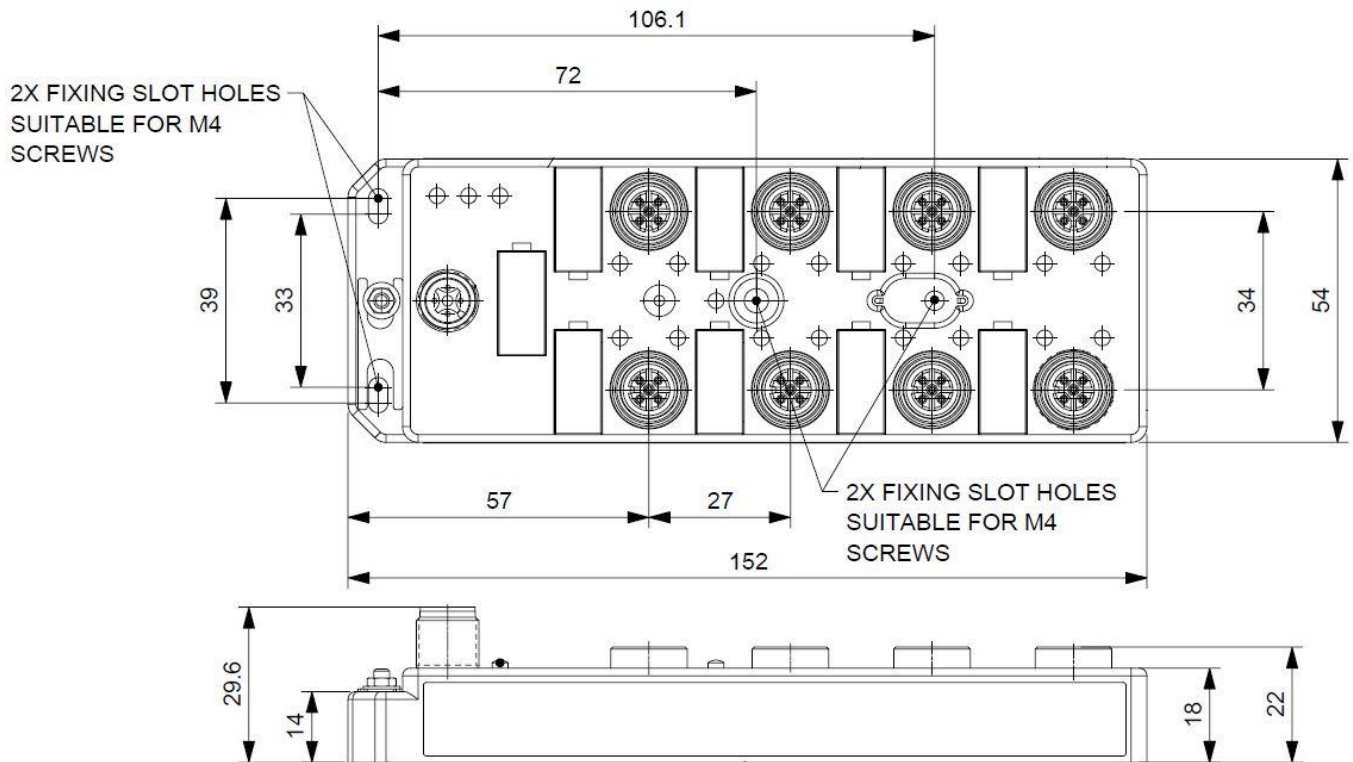| Mechanical	
Housing dimensions	152 x 54 x 29.6 mm (5.98" x 2.12" x 1.16")
Product weight	260 g
Housing material	PBT VALOX 420 SEO Black 7701
Mounting holes	2 oblong holes on top and 2 circular holes suitable for M4 screws
Ground stud	Yes (allows the continuity of the ground when the hub is mounted on the chassis machine)
Operating temperature	0°C to +70°C
Storage temperature	-40°C to +90°C
Shock resistance	Operating: 15g, 11ms, 3 axis Non-operating: 50g, 6ms, 3 axis
Electro-magnetic compatibility	EN 61000-6-2 / EN 61000-6-4
Relative humidity	5% to 95 %, non-condensing
Protection Class	IP67[*1]
Operating altitude	0 to 2000m
Overvoltage category	II or less
Pollution degree	2 or less
Approval	CE (according IEC 61131-2), cULus
Environmental	RoHS / RoHS China / REACH

*1   Only when all necessary waterproof connectors and caps have been installed.

IO-Link & Power Supply Electrical Data

Hub versions	TEDIO-8D0P-808	TEDIO-8B4P-808 TEDIO-8B4P-808-1
IO-Link connector & port type	M12, 4-pin, Male, A-Coded - Port class A	
Protocol	Compliant with IO-Link specifications v1.1	
Transmission mode	COM3	
Minimum cycle time	1ms	
Hub Logic & Input power (L)	24VDC (Allowable voltage range: 18 to 30VDC) (Reverse polarity protected) Warning, a voltage over 32VDC may destroy the product	
Logic Operating current (L)	40mA	
Max current supported (L)	0.8A	
Output power (UL)	24VDC (Allowable voltage range: 18 to 30VDC) (Reverse polarity protected) Warning, a voltage over 30VDC may destroy the product	
Operating current (UL)	10mA (without load)	
Max current supported (UL)	2.8A	
Functional Earth	1 screw terminal	

Warning!

For compliance with UL mark, the power supply used with this product shall fulfill the requirements for Safety Extra Low Voltage (SELV) and Limited Energy to IEC/EN/UL 61010-2-201.

Note

L and UL are both returning via PIN3. The total current of L and UL shall not exceed 4A based on the limitations of M12 connector specifications.

I/O Connector Electrical Data

Hub versions	TEDIO-8D0P-808	TEDIO-8B4P-808 TEDIO-8B4P-808-1
I/O connector	M12, 5-pin, female, A-Coded	
Maximum current per port on Pin 1	100mA	
Max draw current per I/O connector	100mA (if input only - TEDIO-8D0P-808) 0.6 A (if input / output combined - TEDIO-8B4P-808) 1A(if 2 output combined - TEDIO-8B4P-808-1)	
Max draw current in total	800mA (if input only - TEDIO-8D0P-808) 2.8 A (if input / output combined - TEDIO-8B4P-808) 2.8 A (if input / output combined - TEDIO-8B4P-808-1)	
Sensors draw current from	L (optionally UL)	
Channels	Pin 2	Pin 4
Digital Inputs		
Configuration	16 channels	12 channels
Input type	PNP sinking only, compliant to IEC 61131-2 Type 3	
On-state current (typical)	2.5 mA	
Off-state current (max.)	1 mA	
Input channel voltage ("1")	11 V … 30 V	
Input channel voltage ("0")	-5 V … 5 V	
Input filter	User configurable: 0, 1, 3 and 5ms (1ms by default)	
Digital Outputs		
Number of Channels		4 channels
Output type		PNP, current sourcing
Max output current (per channel)		0.5 A
Max output current (Total)		2 A at 25°C

4. Input /Output Process Data

Input Process Data

TEDIO-8D0P-808 (16 inputs)

Name	Process Data In (3 bytes)							
	Bit							
Byte	7	6	5	4	3	2	1	0
0	DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0
1	DI15	DI14	DI13	DI12	DI11	DI10	DI9	DI8
2	GST	OCUL	OVUL	UVUL	0	OCL	OVL	UVL

DIx: Digital Input data (x = Channel number)
  1: sensor / input activated
  0: sensor / input deactivated
The above statement is inverted if the input inversion parameter is set to 1.

UVx: Undervoltage (x = L or UL)
  1: Undervoltage detected
  0: No default

OVx: Overvoltage (x = L or UL)
  1: Overvoltage detected
  0: No default

OCx: Overcurrent (x = L or UL)
  1: Overcurrent detected
  0: No default

GST: Global Status
  1: if any of the above faults is detected
  0: No default

TEDIO-8B4P-808 (12 inputs + 4 outputs)

Name	Process Data In (3 bytes)							
	Bit							
Byte	7	6	5	4	3	2	1	0
0	DI7	X	DI5	X	DI3	X	DI1	X
1	DI15	DI14	DI13	DI12	DI11	DI10	DI9	DI8
2	GST	OCUL	OVUL	UVUL	0	OCL	OVL	UVL

TEDIO-8B4P-808-1 (12 inputs + 4 outputs grounded)

Name	Process Data In (3 bytes)							
	Bit							
Byte	7	6	5	4	3	2	1	0
0	DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0
1	X	X	X	X	DI11	DI10	DI9	DI8
2	GST	OCUL	OVUL	UVUL	0	OCB	OVB	UVB

> **Note**
>
> If UL is not enabled to power sensor (see below "Power Supply Configuration" SSV bit =1) and if UL is below 8 V then UVUL and GST will not be set to 1.

Output Process Data

TEDIO-8D0P-808 (16 inputs)

No output data

TEDIO-8B4P-808 (12 inputs + 4 outputs)

Name	Process Data Out (1 byte)							
	Bit							
Byte	7	6	5	4	3	2	1	0
0	X	DO6	X	DO4	X	DO2	X	DO0
1	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X

DOx: Digital Output data (x = Channel number)
      1: output energized
      0: output not energized

TEDIO-8B4P-808-1 (12 inputs + 4 outputs grounded)

Name	Process Data Out (1 byte)							
	Bit							
Byte	7	6	5	4	3	2	1	0
0	X	X	X	X	DO3	DO2	DO1	DO0
1	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X

DOx: Digital Output data (x = Channel number)
      1: output energized
      0: output not energized

5. Identification & Device Parameters

IODD file

Before proceeding to the product commissioning, the IO-Link hubs require a description file (also called IODD file) that has to be imported in the library of the IO-Link master configuration tool (ex: TIA Portal or Step7)

The IODD file can also be downloaded from the Molex web site.

http://www.molex.com/molex/mysst/DownloadCenter.action

Select the following options below and click on Go!

Direct parameters Page 1

Index	SubIndex	Parameter Name	Access	Value
0x0000	0x03	MinCycleTime	R	Minimum cycle duration supported by the Device Value = 0x0A (10 x 0.1ms)
	0x04	M-sequence Capability	R	Information about implemented options related to M-sequences and physical configuration Value = 0x2B (PreOperate OD_LENGTH_8 | Operate OD_LENGTH_2 | ISDU)
	0x05	RevisionID	R/W	ID of the used protocol version Value = 0x11
	0x06	ProcessDataIn	R	Number and structure of input data (Process Data from Device to Master) Value = 0x82 (Byte unit | no SIO | 3 bytes)
	0x07	ProcessDataOut	R	Number and structure of output data (Process Data from Master to Device) TEDIO-8B4P-808-01: Value = 0x82 (Byte unit | 3 bytes)
	0x08	VendorID 1 (MSB)	R	Value = 0x0127
	0x09	VendorID 2 (LSB)		VendorID 0 (MSB) = 0x01 (1 dec) VendorID 1 (LSB) = 0x27 (39 dec)
	0x0A	DeviceID 1 (Octet 2, MSB)	R	Unique device identification
	0x0B	DeviceID 2 (Octet 1)		• TEDIO-8D0P-808: DeviceID = 0x243000
	0x0C	DeviceID 3 (Octet 0, LSB)		• TEDIO-8B4P-808: DeviceID = 0x252980 • TEDIO-8B4P-808-01: DeviceID = 0x252989 For TEDIO-8B4P-808: DeviceID 0 (MSB)= 0x25 (37 dec) DeviceID 1 = 0x29 (41 dec) DeviceID 2 = 0x80 (128 dec)
	0x0D	FunctionID 1 (MSB)	R	Reserved
	0x0E	FunctionID 2 (LSB)		

R : Read access
R/W: Read / Write access

ISDU* Identification Parameters

Index	Sub Index	Parameter Name	Access	Value
0x10	0x00	Vendor Name	R	"Molex Inc"
0x11		Vendor Text	R	"www.molex.com"
0x12		Product Name	R	• TEDIO-8D0P-808: "TEDIO-8D0P-808" • TEDIO-8B4P-808: "TEDIO-8B4P-808" • TEDIO-8D0P-808-1: "TEDIO-8D0P-808-1"
0x13		Product ID	R	Unique device identification • TEDIO-8D0P-808: ProductID = 0x243000 • TEDIO-8B4P-808: ProductID = 0x252980 • TEDIO-8B4P-808-1: ProductID = 0x252989
0x14		Product Text	R	• TEDIO-8D0P-808: "HarshIO IO-Link Digital Hub 16x inputs" • TEDIO-8B4P-808: "HarshIO IO-Link Digital Hub 12x inputs/4x outputs" • TEDIO-8B4P-808-1: "HarshIO IO-Link Digital Hub 12x inputs/4x outputs Grounded"
0x15		Serial Number	R	
0x16		H/W Revision	R	"1.0"
0x17		F/W Revision	R	"1.0"
0x18		Application Specific Tag	R/W	See Application Specific Tag

R: Read only access
R/W: Read / Write access
(*): Index Service Data Unit are used for acyclic transmission of parameters

Application Specific Tag

In case there is a need to verify the remote I/O configuration, you can name your device using your own numbering procedure and check at every start that this particular device is really connected to the designated port of the designated master. The default value is « *** ».

Name	Identification Parameter (32 bytes)									
Index	Sub Index	Bit								
		7	6	5	4	3	2	1	0
0x18	0x01	Identification byte 0								
	0x02	Identification byte 1								
	…	…								
	0x20	Identification byte 31								

ISDU Device Parameters

Index	Sub Index	Parameter Name	Access	Value
0x28		Input Process Data	R	Last valid Process Data Read
0x29		Output Process Data	R	Last valid Process Data Read
0x40		Fail-State	R/W	See Fail-State Parameter
0x41		Input Invert	R/W	See Input Inversion Parameter
0x42		Input Filter Delay	R/W	See Input Filter Delay Parameter
0x44	0x00	Power Configuration	R/W	See Power Supply Configuration Parameter
0x45		Clear Current Limit	W	See Clear Current Limit Parameter
0x46		L Voltage	R	See L Voltage Value
0x47		UL Voltage	R	See UL Voltage Value
0x48		Output Status	R	See Output Status Value
0x49		Sensor Power Status	R	See Sensor Power Status

R: Read access only
R/W: Read / Write access

Fail-State Parameter

The Fail-State parameter defines the predetermined state of each output in case of communication failure. The Fail-State parameter only applies to the TEDIO-8B4P-808/ TEDIO-8B4P-808-1 product variant as it refers to the digital output behavior.

The following fail-states have been defined:
- Zero or not energized state: This is the default and most usual fail-state.
- Hold value: When the communication failure happens, the discrete output remains in the last state sent by the PLC.

The fail-state parameter defines the fail-state of each discrete output independently.

Name	Fail-state				Default value: 00h			
Index	Bit							
	7	6	5	4	3	2	1	0
0x0040	FS3		FS2		FS1		FS0	

Bit 1	Bit 0	Description
0	0	Zero (not energized) (default)
0	1	Hold value
1	0	Not used
1	1	

FSx: fail-state value (x = Channel number)

Input Inversion Parameter

This parameter sets the input polarity of the digital inputs. As a consequence, the Input Process Data will also report this inversion.

It could be used to treat normally close sensors in positive logic.

Name	Input Inversion							Default value: 0000h								
Index	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0x0041	INV15	INV14	INV13	INV12	INV11	INV10	INV9	INV8	INV7	INV6	INV5	INV4	INV3	INV2	INV1	INV0

INVx: inversion value (x= Channel number)
  1: Inverted
  0: Not inverted (Default)

This parameter is persistent and is included in the data storage mechanism.
This inversion is applicable as soon as INVx=1. No reboot needed.

Note

If UL is not enabled to power sensor (see below "Power Supply Configuration" SSV bit =1) and if UL is below 8V then UVUL and GST will not be set to 1.

Note

The behavior of the I/O status LED is not affected by this parameter. The status of the I/O LED is only dependent of the voltage applied to the corresponding channel

Input Filter Delay Parameter

This parameter applies debounce filtering to all inputs and prevents the processing of fast input state changes, like those caused by contact bouncing. Signal changes are ignored according to the filter time applied.

The digital hub has implemented "Steady state" filtering. In that mode, a signal change is only registered when the changed polarity has remained fully stable over a given window time (every new change resets the filter timer). As a consequence, the Input Process Data will also report this filtering.

Name	Input Delay				Default value: 0x00			
	Bit							
Index	7	6	5	4	3	2	1	0
0x0042	Reserved (0)						FV	

Bit 1	Bit0	Filter value
0	0	0 ms
0	1	1 ms (default)
1	0	3 ms
1	1	5 ms

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Power Supply Configuration Parameter

There are 3 specific parameters dedicated to HUB power supply management.

Name	Power Configuration				Default value: 0x00		
	Bit						
Index	7	6	5	4	3	2	1	0
0x0044	Reserved (0)					UCM	LCL	SSV

- SSV: Sensor power supply
  Per default, L (L+ on pin 1) provides the power to the sensors. In case of limited power supply capabilities from the IO-Link Master port, UL (pin 2) can be configured to supply the power to the sensors.
      0: UL feeds sensors
      1: L feed sensors [default]

Note

Molex IO-Link Master Port can supply up to 1.6Amps on L+

- LCL: L Current limit
  IO-Link specification defines the IO-Link Master Port should at least be able to deliver 200mA current on L+ (pin 1). This parameter can limit the total current used by the sensors and make sure the IO-Link communication of the HUB will stay active.
  By default, no current limitation is set.

      0: Remove current limit [default]
      1: Limit current to 200 mA (IO-Link compatible)

- UCM: UL Current limit Mode
  If UL current limit is reached (3.5A), as example in case of short circuits, the overcurrent protection will be activated and the IO-Link master is informed through the "UL current limit" Event.
  In such case, overcurrent protection can be automatically or manually cleared.

      0: UL Current limit is automatically cleared after 1s (auto retry) [default]
      1: User has to manually clear trip (overcurrent protection) through the UCL bit (see below)

Clear Current Limit Parameter

When the UL Current Limit Mode is set to "manual mode" (see UCM bit in the Power Configuration Parameter), the user has to manually release the overcurrent protection.

Name	Clear Current Limit				Default value: 0x00		
	Bit						
Index	7	6	5	4	3	2	1	0
0x0045	Reserved (0)							UCL

    UCL: UL Current Limit Clear
    0: No effect [default]
    1: Clear UL current limit condition

L Voltage Value

This parameter returns the L voltage measured by the Hub. This value may help to diagnose voltage drop along the IO-Link cable. Updated every 10ms.

Name	L Voltage															
Index	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0x0046	0	0	0	0	0	0	0	Voltage value is tenth of volts								

Example: 225 → 22.5V

UL Voltage Value

This parameter returns the UL voltage measured by the Hub input. This value may help to diagnose voltage drop along the IO-Link cable. Updated every 10ms.

Name	UL Voltage															
Index	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0x0047	0	0	0	0	0	0	0	Voltage value is tenth of volts								

Example: 178 → 17.8V

Output Status

This parameter returns an indication of current overload on outputs (Pin 4).
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Name	Output Status								
Index	Bit							
	7	6	5	4	3	2	1	0
0x0048	0	STS6	0	STS4	0	STS2	0	STS0

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Name	Output Status								
Index	Bit							
	7	6	5	4	3	2	1	0
0x0048	0	0	0	0	STS3	STS2	STS1	STS0

STSx: Status on output Ox (x= Channel number)
    1: Status available (overload detected > 0.5 A)
    0: No status available (Default)

Sensor Power Status

This parameter returns an indication of current overload on the Pin1 of the I/O connectors, used to power the sensors.
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Name	Sensor Power Status							
Index	Bit							
	7	6	5	4	3	2	1	0
0x0049	SPS7	SPS6	SPS5	SPS4	SPS3	SPS2	SPS1	SPS0

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Name	Sensor Power Status							
Index	Bit							
	7	6	5	4	3	2	1	0
0x0049	X	X	SPS5	SPS4	SPS3	SPS2	SPS1	SPS0

SPSx: Status on Pin1 (x= Channel number)
      1: Status available (current overload detected (>100mA))
      0: No status available (Default)

ISDU Error type

Errors

Error Codes	Description
0x8000	Device application error – no details
0x8011	Index not available
0x8012	Sub index not available
0x8022	Service Temporarily not available
0x8023	Write Access Denied
0x8030	Parameter value out of range
0x8033	Parameter length overrun
0x8034	Parameter length underrun

Events

| Event Codes	Description
0x5111	L under voltage
0x1811	UL under voltage
0x5110	L over voltage
0x1810	UL over voltage
0x1840	L current limit
0x1841	UL current limit
0x7710 Error (Short circuit – Check installation)	Sensor power overcurrent (P0-P7)

Technical Support

Please ensure that you have the following information available before calling for technical support:

- Hub type, serial number & product version

- Details of the problem you are experiencing and circumstances that may have caused the problem

Note

Your product identification is located on the side of the device.

Hub Type & Serial number

Product Version
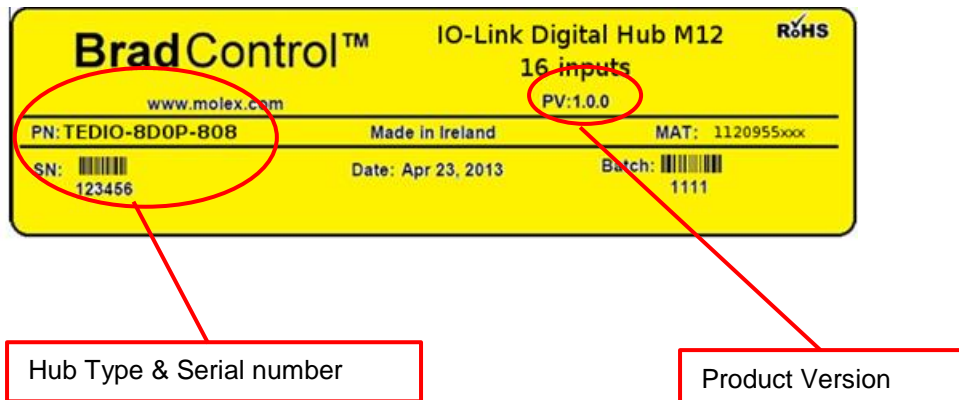
Web Site

To assist users in using the products, Molex provides technical information on its web site:

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185 H Voie Romaine
27370 LE THUIT ANGER
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