# 11.2 IO-Link Master (6ES7148-6JD00-0AB0)

## Article number

6ES7148-6JD00-0AB0

## Properties

The IO-Link Master 4 IO-L 4×M12 has the following technical specifications:

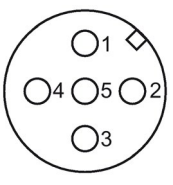
- IO-Link Master according to IO-Link specification V1.1
- Dimensions 30 x 200 mm
- 4 IO-Link ports (Port Class B)
- IO-Link ports can be used optionally as:
  - 4 IO-Link devices (Port Class A oder Class B) with variable address area up to 32 byte inputs/32 byte outputs per port
  - 4 standard actuators/encoders (SIO mode)
- Data transfer rates COM1 (4.8 kBaud), COM2 (38.4 kBaud), COM3 (230.4 kBaud)
- Configurable diagnostics can be set per port (in IO-Link mode)
- Parameterization of IO-Link parameters per S7-PCT V3.4 and higher **or**
- Autostart (without S7-PCT)
- Hardware interrupts (in IO-Link mode)

The module supports the following functions:

- Master backup
- Firmware update
- Media redundancy
- Identification and maintenance data I&M0 to I&M3

## General pin assignment

Table 11- 4 Pin assignment of sockets X1 to X4 for IO-Link master

| Pin | Assignment | | | | View of socket (front view) |
|---|---|---|---|---|---|
| | Socket X1 | Socket X2 | Socket X3 | Socket X4 | |
| 1 | 24 V sensor supply $1U_S$(derived from 1L+ non-switched) | | | |  |
| 2 | 24 V actuator supply $2U_A$ (derived from 2L+ switched) | | | | |
| 3 | Sensor supply ground 1M | | | | |
| 4 | IO-Link port 1 | IO-Link port 2 | IO-Link port 3 | IO-Link port 4 | |
| 5 | Actuator supply ground 2M | | | | |

Additional information on pin assignment including wiring examples for the 3- and 5-conductor connection (Port Class A or Class B) is available in the chapter Pin assignment for IO-Link Masters (Page 49).

## Block diagram

The figure below shows the block diagram of the IO-Link master 4 IO-L 4×M12.

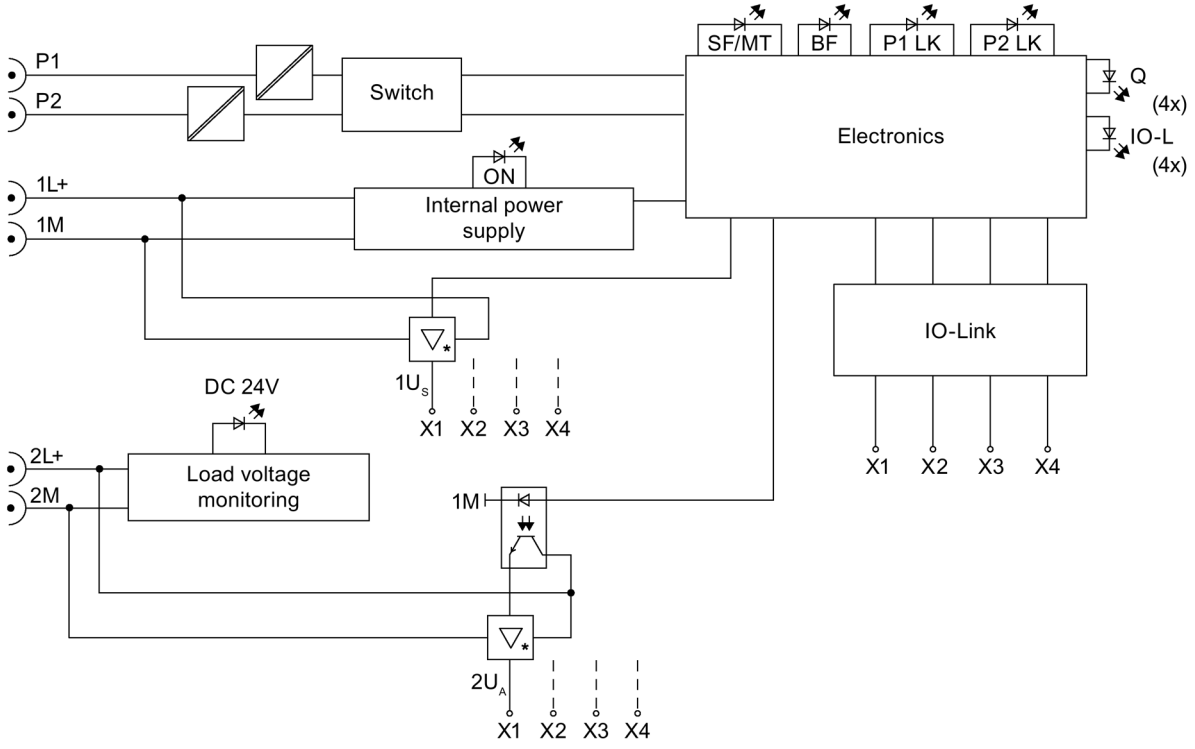



Figure 11-2 Block diagram of the IO-Link Master 4 IO-L 4×M12

## Technical data of the IO-Link Master

| Technical data | |
|---|---|
| **Dimensions and weight** | |
| Dimensions W x H x D (mm) | 30 x 200 x 49 |
| Weight | Approx. 550 g |
| **Module-specific data** | |
| Transmission rate | 100 Mbps full duplex |
| Transmission mode | 100BASE-TX |
| Autonegotiation | Yes |
| Bus protocol | PROFINET IO<br>• IRT |
| Supported Ethernet services | PROFINET IO (Device)<br>• ping<br>• arp<br>• LLDP<br>• Network diagnostics (SNMP)<br>• DCP<br>• Port diagnostics<br>• Media redundancy<br>• I&M0-3<br>• Resetting to factory settings |
| PROFINET interface | |
| • Connection socket | 2 × M12 d-coded |
| • Switch function | Yes, internal |
| • Autocrossing | Yes; if autonegotiation is enabled |
| Manufacturer ID (Vendor ID) | $002A_H$ |
| Device ID (DeviceID) | $0306_H$ |
| **Voltages and currents** | |
| Supply voltage 1L+ | DC 24 V |
| • Reverse polarity protection | Yes, against destruction; encoder supply outputs are connected with reverse polarity |
| • Infeed current 1L+ | Max. 4 A |
| Load voltage 2L+ | DC 24 V |
| • Reverse polarity protection | Yes |
| • Infeed current 2L+ | Max. 4 A |
| **Current consumption** | |
| From supply voltage (1L+) | Typ. 100 mA |
| From supply voltage (2L+) | Typ. 15 mA |
| Power loss of the device | Typ. 4.8 W |

| Technical data | |
|---|---|
| **Insulation** | |
| Insulation test voltage | |
| • Ethernet interface | 1500 $V_{rms}$ (IEEE802.3) |
| • All other circuit elements | 707 V DC (type test) |
| **Electrical isolation** | |
| • Electrical isolation / between the load voltages | Yes |
| • between load voltage and all other circuit elements | No |
| • Between Ethernet and electronic components | Yes |
| **Status, interrupts, diagnostics** | |
| Interrupts | Yes |
| • Hardware interrupt (device notification) | Yes |
| Diagnostics function | Yes |
| • Group error/maintenance | Yes; red/yellow LED "SF/MT" |
| • Bus monitoring PROFINET IO | Red "BF" LED |
| • Monitoring of supply voltage 1L+ | Green "ON" LED |
| • Monitoring of supply voltage 2L+ | Green "24 V DC" LED |
| • Existing connection to network | Green "P1 LK" and "P2 LK" LED for PROFINET IO infeed and loop-through |
| • IO-Link port<br>– Port in IO-Link mode<br>– Port in SIO mode | <br>green/red LED "IO-L"<br>Green LED "Q" |
| • Diagnostic information can be read | Yes |
| Monitoring for | |
| • Missing 2L+ | Yes |
| • Sensor supply short-circuit | Yes; device supply to ground |
| **Sensor supply** | |
| Number of outputs | 4 |
| Load current | 500 mA per output |
| Short-circuit protection | Yes, electronic |
| **IO-Link port** | |
| Number of ports | 4 |
| Number of ports that can be controlled simultaneously | 4, in all mounting positions |
| IO-Link protocol 1.0 | Yes |
| IO-Link protocol 1.1 | Yes |
| Transmission rate | 4.8 kBaud (COM1), 38.4 kBaud (COM2), 230.4 kBaud (COM3) |

| Technical data | |
|---|---|
| Size of the process data, input per port | 32 bytes + 1 byte PQI |
| Size of the process data, input per module | 128 bytes + 4 bytes PQI |
| Size of the process data, output per port | 32 bytes |
| Size of the process data, output per module | 128 bytes |
| Memory size for device parameters | 2 Kbytes; for each port |
| Master backup | optional; with IO_LINK_MASTER function block |
| Configuration without S7-PCT | supported; autostart function |
| **Data for selection of an IO-Link device** | |
| Cable length, unshielded | Max. 20 m |
| **Connection of IO-Link devices** | |
| Port type A | Yes; with 3-wire cable |
| Port type B | Yes; additional device supply: Max. 2 A per Port, max. 4 A per module |
| **Operating modes** | |
| IO-Link | Yes |
| DI | Yes |
| DQ | Yes; max. 100 mA |

## 11.2.1 Configuration

### Introduction

The IO-Link Master 4 IO-L 4×M12 has four ports. Each port is represented by a submodule.

### Configuration of the IO-Link port of the IO-Link Master 4 IO-L 4×M12

You specify the various operating modes of each IO-Link port by configuring a relevant submodule:

- as digital input by configuring a digital input submodule,
- as digital output by configuring a digital output submodule,
- as IO-Link device by configuring an IO-Link submodule.
- Port deactivated:
  - In STEP 7 V5.5 and higher and with GSD: By deleting the submodule,
  - in STEP 7 (TIA Portal): By deactivating the port enable.

The IO-Link ports are preconfigured as 2I + PQI.

When configuring IO-Link submodules, you can select address spaces for I/O data in the following byte scales:

- 1 I/1 O + PQI
- 2 I + PQI
- 2 I/2 O + PQI
- 4 I/4 O + PQI
- 8 I/8 O + PQI
- 16 I/16 O + PQI
- 32 I/32 O + PQI

**Note**

**Port Qualifier Information (PQI)**

The Port Qualifier Information (PQI) with the size of 1 byte is always transferred together with the input data of the IO-Link device. The PQI cannot be deactivated.
Additional information on the structure of the PQI byte is available in the appendix I/O address space (Page 250).

Various parameters are available depending on the operating mode.

More information on the parameters is available in the chapter Parameter (Page 223).