

13 12/24-Channel, 24 VDC F Discrete Input MTA

Part No. 6ES7650-1AK11-7XX0 or 6ES7650-1AK10-7XX0

13.1 Description

This section contains information and requirements to facilitate installation of Siemens Marshalled Termination Assembly (MTA) (6ES7650-1AK11-7XX0 or 6ES7650-1AK10-7XX0), designed to interface with the Siemens ET 200M 12/24-Channel, 24 VDC F Discrete Input module (6ES7 326-1BK02-0AB0, E-Stand 1 or higher).

Note: The only major difference between the two part numbers is the housing. The Anthracite Gray housing is the latest design. Functionality of both part numbers is the same.

13.2 Features

The following features have been incorporated into this MTA:

- Redundant power connections
- LED indication of redundant power supply condition
- Power monitor plug-in available (optional)
- Dual connectors for redundant I/O Module operation
- Per module power fusing
- LED indication of power supply to the field device on an individual channel basis
- Per channel fusing of field power
- Per channel disconnects
- Shield connections available for channel cabling
- Ground stud for connecting shield to earth ground
- Power input and field terminations are pluggable for easy maintenance

13.3 Operation

Power is supplied via the two removable power connectors which are retained by screws and marked **L+A, MA**, and **L+B, MB**. Each has a LED to indicate the presence of voltage over 15 VDC. The LEDs are marked **A POWER** and **B POWER**. There is also a connector (**J3**) for a Power Monitor board used to indicate the presence of both A and B power. See Section 19, *Power Monitor Board* (6ES7650-1BA02-0XX0).

Incoming power from **A** and **B** is diode OR'd, in **CR106**, to provide the MTA and the module power from either input source. The output from **CR106** is sent to the I/O modules via the module fuses and to the channels via the channel fuses. Module Fuse 1 (**F100**) supplies the I/O Module plugged into **J1** and Module Fuse 2 (**F101**) supplies power to the I/O Module plugged into **J2**.

Each channel has an LED to indicate the presence of power, fuse, and disconnect switch status. If there is no power, or the fuse or disconnect switch is open, then the LED remains off. If there is power and the fuse is good and the disconnect switch is closed, then the LEDs are illuminated.

Field Terminals, Channel + (**CHx+**), Channel – (**CHx-**), and Shield (**SHx**), connect to the field devices. **CHx+** is the +24 VDC power feed and is fused (.05A) on a channel-by-channel basis. The field termination connector is removable for ease of wiring maintenance and is retained by friction.

The **CHx-** connects to the I/O modules input via **J1** and **J2**. Redundant operation uses two modules with one each connected to **J1** and **J2**, while non-redundant systems have one module connected to either **J1** or **J2**.

13.4 Installation Requirements

See Section 2, *Installation*, before performing any installation and observe all warnings

Common interconnecting cables (6ES7922-3BD00-0AS0 and 6ES7922-3BJ00-0AS0 and 6ES7 326-1BK02-0AB0), supporting the Failsafe Discrete Input channels, interconnect the discrete input termination assembly to the 12/24-channel, 24 VDC Failsafe Discrete Input module (6ES7 326-1BK00-0AB0, or 6ES7 326-1BK01-0AB0, E-Stand 1 or higher).

Note

To disconnect the interconnecting cable shield from ground at the MTA only, cut and remove the shield disconnect jumper, **W100** and **W101**, for the associated cable

13.5 Maintenance

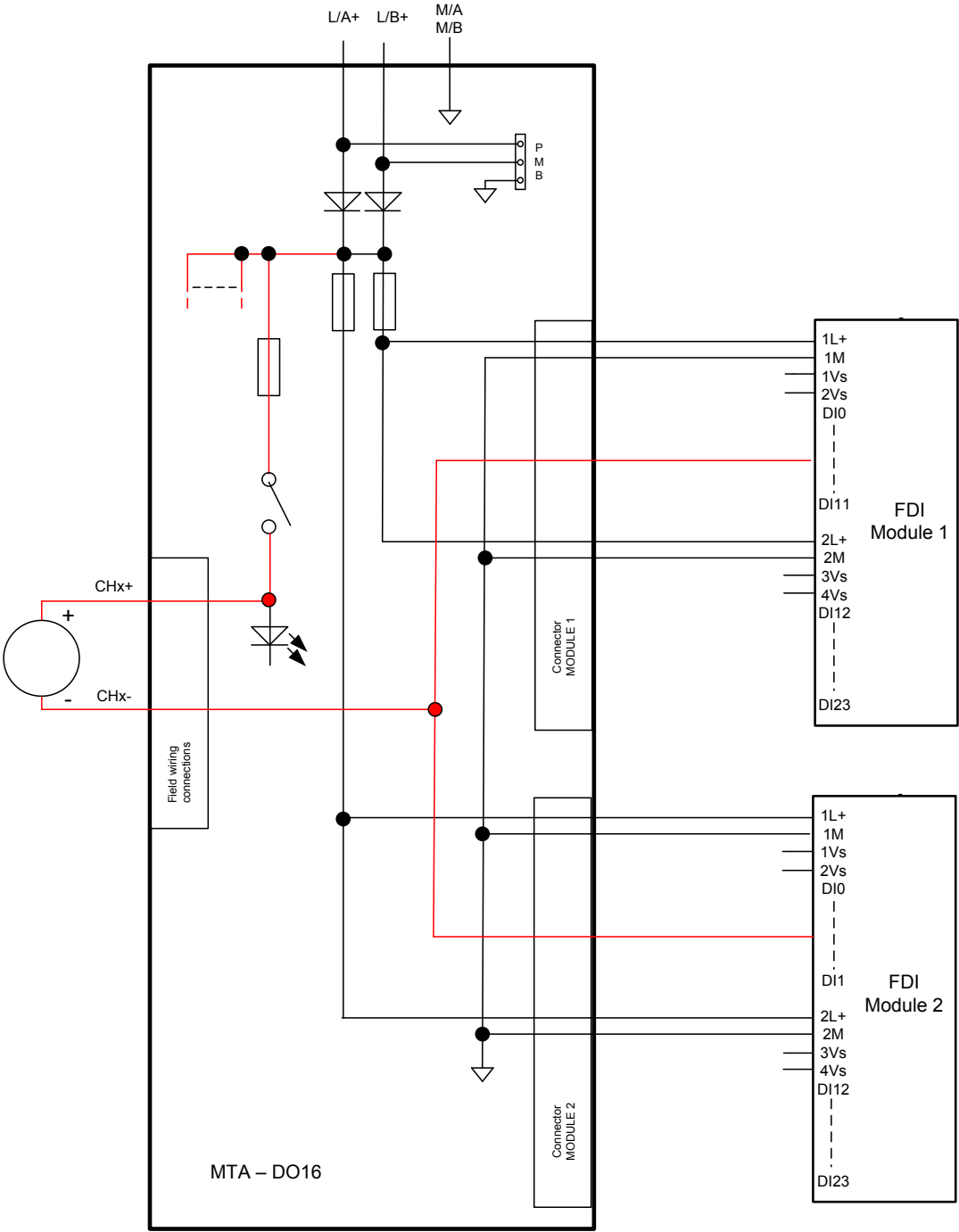
See Section 3, *Maintenance*, before performing any maintenance and observe all warnings

Under normal operation, the **A/B Power LED** and the **Module 1/2 Fuse LED** are on. If all are off, check the power supply to MTA. If the **A/B Power LED** is off,

check the power supply to the MTA. If the **Module 1/2 Fuse LED** is off, check the channel fuse and replace as necessary.

13.6 Simplified diagram

Figure 13–1 12/24-Channel, 24 VDC F Discrete Input Marshallled Termination Assembly (6ES7650-1AK11-7XX0 or 6ES7650-1AK10-7XX0)



Key to numbered items in Figure 13-:	
Item	Description
1	Input power connections
2	Input power indicators
3	Field wiring connections
4	I/O module connections
5	Shield disconnect jumpers (W100 & W101)
6	Module power fuses
7	Module power indicators
8	Channel power fuse (1 of 24)
9	Channel power indicator (1 of 24)
10	Channel power disconnect switches (SW1 & SW2)
11	Shield Ground Stud for connecting to earth ground

Switch **Off** the channel power disconnect switches to disconnect field power for the channel.

13.8 Technical Specifications

Technical Specifications: 12/24-Channel, 24 VDC F Discrete Input MTA (6ES7650-1AK10-7XX0)	
Dimensions - See Section 1, Figure 1.3, Long Version	
Mounting	
DIN Rail	35mm (deep top hat style)
Power Input	
Voltage Input for Single or Redundant Feed	21.6 to 28.8 VDC
Current Consumption (nominal ratings)	
All inputs at +24 VDC	1.482 A maximum
All inputs at 0 VDC	1.002 A maximum
Power Dissipation (typical)	3 W
Terminal Block Wire Sizes	TB100 & TB101
Wire Size – US	24 – 14 gauge AWG
Wire Size – Metric	0,205 – 2,08 mm sq.
Power Supply Specifications	See Module Specs
Fuse Ratings	
Individual channel	0.05 A (Littelfuse P/N: 273.050) (Siemens Spare P/N: A5E01568887)
Module Power	1.0 A (Bussmann P/N: GMA-1.0A) (Siemens Spare P/N: A5E01568882)
Indicators	
Input Power	Green LED on when input power available
Module Power	Green LED on when Module power available
Channel Power	Green LED on when sensor power available

Field Terminal Block Wire Sizes TB1 – TB4	
Wire Size – US	24 – 14 gauge AWG
Wire Size – Metric	0,205 – 2,08 mm sq.
Environmental	
Ambient Temperature	-25C to +60C
Humidity	5% to 95% Non-condensing
Approvals	
MTA Agency Approvals	See Preface section, Approvals Table
Max achievable Safety Integrity Level in safety mode	
In Accordance with IEC 61508	SIL 3
Fail-safe performance characteristics (no dangerous undetected failures for DI MTA)	
Low demand mode (average probability of failure on demand) per channel	PFDavg = 0
High Demand / continuous mode (probability of dangerous failure per hour per channel)	PFH = 0
Proof-test time	20 years

13.9 Technical Specifications

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DIN Rail	35mm (deep top hat style)
Power Input	
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All inputs at +24 VDC	1.482 A maximum
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Power Dissipation (typical)	3 W
Terminal Block Wire Sizes	TB100 & TB101
Wire Size – US	24 – 14 gauge AWG
Wire Size – Metric	0,205 – 2,08 mm sq.
Power Supply Specifications	See Module Specs
Fuse Ratings	
Individual channel	0.05 A (Littelfuse P/N: 273.050) (Siemens Spare P/N: A5E01568887)
Module Power	2.0 A (Bussmann P/N: GMA-1.0A) (Siemens Spare P/N: A5E01568882)
Indicators	

Technical Specifications: 12/24-Channel, 24 VDC F Discrete Input MTA (6ES7650-1AK11-7XX0)		
Input Power	Green LED on when input power available	
Module Power	Green LED on when Module power available	
Channel Power	Green LED on when sensor power available	
Field Terminal Block Wire Sizes TB1 – TB4		
Wire Size – US	24 – 14 gauge AWG	
Wire Size – Metric	0,205 – 2,08 mm sq.	
Environmental		
Ambient Temperature	-25C to +70C (Horizontal mounting) -25C to +60C (Vertical mounting)	
Humidity	5% to 95% Non-condensing	
Approvals		
Maximum achievable safety class in safety mode (depends on the voting of the corresponding I/O module)	1oo1 voting	1oo2 voting
SIL according to IEC 61508, DIN EN 62061	SIL 2	SIL 3
Performance Level according to EN ISO 13849-1	PLd	PLe
Category according to EN ISO 13849-1	Cat. 3	Cat. 4
Low Demand (PFD) according to SIL 3 (per channel)	0 (no dangerous undetected failures for DI MTA)	
High Demand (PFH) according to SIL 3 (per channel)	0 1/h (no dangerous undetected failures for DI MTA)	
Proof-test time	20 years	

Note

Fuses are available as spare parts from Siemens.

Fuse information can be found at:

<http://www.littelfuse.com>

<http://www.bussmann.com>

13.10 Module Restrictions

Restrictions for 12/24-Channel, 24 VDC F Discrete Input MTA (6ES7650-1AK11-7XX0 or 6ES7650-1AK10-7XX0)	
I/O Module Restrictions	
MTA Design:	Connection of 2 redundant sensors to one channel is not possible
MTA Design: Module Vs not used	Short Circuit to L+ on the unswitched sensor line (contact open) - not detected

Restrictions for 12/24-Channel, 24 VDC F Discrete Input MTA (6ES7650-1AK11-7XX0 or 6ES7650-1AK10-7XX0)	
MTA Design: Module Vs not used	Cross circuit between channels of a channel group - not detected
MTA Design: Module Vs not used	Cross circuit between channels in different channel groups - not detected
MTA Design: Module Vs not used	There is no isolation between channels or between groups of channels.