

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS SIMATIC S7

6ES7650-1AL11-6XX0

FAILSAFE DISCRETE OUTPUT MTA

Used with the applicable SIMATIC PCS 7 ET 200M MTA configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens Marshalled Termination Assemblies for ET200M Remote I/O Modules, A5E00482820-12

1.2 Marshalled Termination Assemblies (MTAs)

The following table identifies the Siemens Marshalled Termination Assemblies (MTAs) discussed in this manual, including associated SIMATIC PCS 7 ET 200M I/O modules and interconnecting cables.

Table 1–1 Marshalled Termination Assembly and Module Cross-Reference

Marshalled Termination Assembly Part Numbers	PCS 7 ET 200M Module		Redundant
	Description	Part Number	
6ES7650-1AA50-2XX0	Analog Input 8-Channel 16 bit	6ES7331-7NF00-0AB0, E_Stand 5 or higher	Yes
6ES7650-1AA51-2XX0			
6ES7650-1AA52-2XX0	Analog Input 8-Channel 16 bit	6ES7331-7NF00-0AB0, E_Stand 5 or higher 6ES7331-7NF10-0AB0, E_Stand 8 or higher	Yes
6ES7650-1AB50-2XX0	Analog Output 8-Channel 12 bit	6ES7332-5HF00-0AB0, E_Stand 3 or higher	Yes
6ES7650-1AB51-2XX0			
6ES7650-1AG50-2XX0	RTD Input 8-Channel	6ES7331-7PF00-0AB0, E_Stand 8 or higher & 6ES7331-7PF01-0AB0	No
6ES7650-1AG51-2XX0			
6ES7650-1AF50-2XX0	TC Input 8-Channel	6ES7331-7PF10-0AB0, E_Stand 4 or higher & 6ES7331-7PF11-0AB0	No
6ES7650-1AF51-2XX0			
6ES7650-1AH50-5XX0	F Analog Input 6-Channel Failsafe	6ES7336-1HE00-0AB, E_Stand 4 or higher	Yes
6ES7650-1AH51-5XX0			
6ES7650-1AH61-5XX0	F Analog Input HART 6-Channel Failsafe HART	6ES7336-4GE00-0AB0	Yes
6ES7650-1AH62-5XX0			
6ES7650-1AM30-6XX0	F Relay Output 10-Channel Failsafe 24 VDC	6ES7326-2BF10-0AB0, E_Stand 3 or higher	Yes
6ES7650-1AM31-6XX0			
6ES7650-1AK10-7XX0	F Discrete Input 12/24-Channel Failsafe 24 VDC	6ES7326-1BK00-0AB0, & 6ES7326-1BK01-0AB0, E_Stand 1 or higher	Yes
6ES7651-1AK11-7XX0			
6ES7650-1AC10-3XX0	Discrete Input 16-Channel 24 VDC	6ES7321-7BH01-0AB0, E_Stand 2 or higher	Yes
6ES7650-1AC11-3XX0			
6ES7650-1AL10-6XX0	F Discrete Output 10-Channel Failsafe 24 VDC	6ES7326-2BF10-0AB0, E_Stand 3 or higher	Yes
6ES7650-1AL11-6XX0			
6ES7650-1AD10-2XX0	Discrete Output 16-Channel 24 VDC	6ES7322-8BH01-0AB0 E_Stand 1 or higher	Yes
6ES7650-1AD11-2XX0	Discrete Output 16-Channel 24 VDC	6ES7322-8BH10-0AB0	Yes
6ES7650-1AM30-3XX0	Relay Output 16-Channel 24 – 150 VDC 120 – 230 VAC	6ES7322-8BH01-0AB0 E_Stand 1 or higher	Yes

14 10-Channel, 24 VDC F Discrete Output MTA

Part No. 6ES7650-1AL11-6XX0 or 6ES7650-1AL10-6XX0

14.1 Description

This section contains information and requirements to facilitate installation of Siemens Marshalled Termination Assembly (MTA) (6ES7650-1AL11-6XX0 or 6ES7650-1AL10-6XX0), designed to interface with the Siemens ET 200M 10-Channel, 24 VDC F Discrete Output module (6ES7 326-2BF10-0AB0, E-Stand 3 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.

14.2 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
- Per channel fusing of field power
- Shield connections available for channel cabling
- Ground stud for connecting shield to earth ground
- Power input and field terminations are pluggable for easy maintenance

14.3 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**.

Field Terminals, Channel + (**CHx+**), Channel – (**CHx-**), and Shield (**SHx**), connect to the field devices. **CHx+** is the Channel Output power source and is fused (1.0A) on a channel-by-channel basis. **CHx-** is the output device return. 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**. Redundant operation is achieved by connecting the diode output from each channel on different modules together. Non-redundant systems have one module connected to either **J1** or **J2**.

Connection from the MTA to the I/O Module is accomplished with a 40 pin Siemens connector wired to a D25 female connector. This cable has larger wires than the other cables because of the higher current capabilities of the module.

14.4 Installation Requirements

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

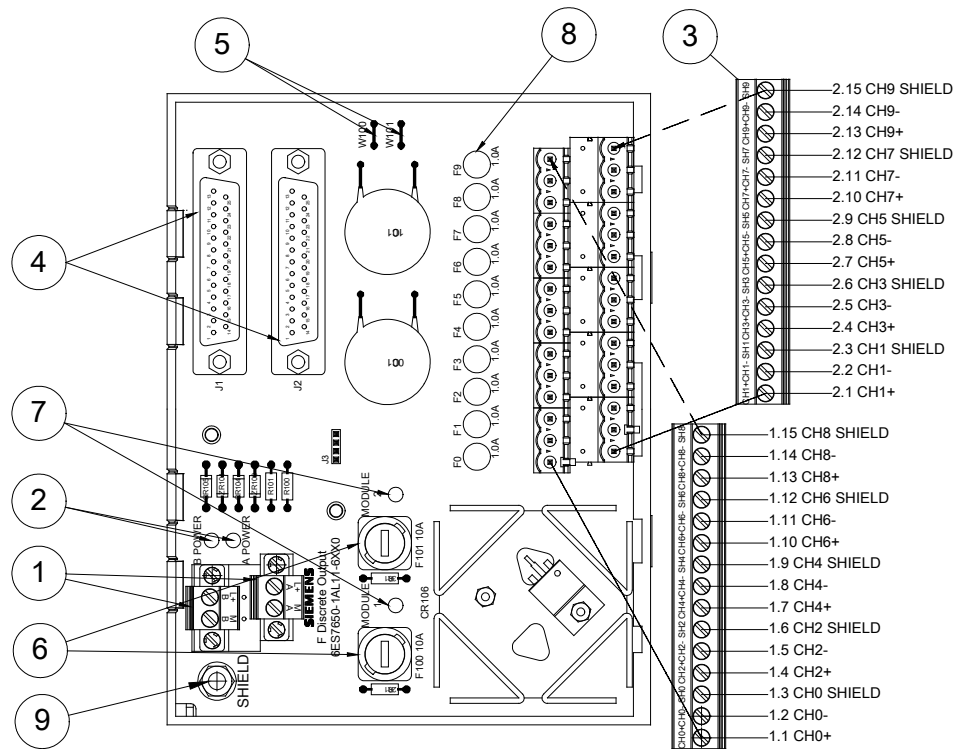
A common interconnecting cable (6ES7922-3BD00-0AN0 or 6ES7922-3BJ00-0AN0), supporting Failsafe 10-channel Discrete outputs, interconnects the discrete output termination assembly to the 10-channel, 24 VDC discrete output module (6ES7 326-2BF10-0AB0, E-Stand 3 or higher).

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.

14.7 10-Channel, 24 VDC F Discrete Output Marshallled Termination Assembly

Figure 14–2 10-Channel, 24 VDC F Discrete Output Marshallled Termination Assembly (6ES7650-1AL11-6XX0 or 6ES7650-1AL10-6XX0)



Key to numbered items in Figure 14–2:	
Item	Description
1	Input power connections
2	Input power indicators
3	Field wiring connections
4	I/O module connectors
5	Shield disconnect jumpers (W100 & W101)
6	Module power fuses
7	Module power indicators
8	Channel power fuse (1 of 10)
9	Shield Ground Stud for connecting to earth ground

Technical Specifications: 10-Channel, 24 VDC F Discrete Output MTA (6ES7650-1AL10-6XX0)	
Fail-safe performance characteristics	(no dangerous undetected failures for DO 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

14.9 Technical Specifications

Technical Specifications: 10-Channel, 24 VDC F Discrete Output MTA (6ES7650-1AL11-6XX0)	
Dimensions - See Section 1, Figure 1.3, Short 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 channels connected)	
All outputs ON	10.570 A maximum
All outputs OFF	0.575 A normal
Power Dissipation (typical)	7 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 – Normal	1.0 A (Littelfuse P/N: 273 001) (Siemens Spare P/N: A5E01568884)
Individual channel – Optional	3.0 A (Littelfuse P/N: 273 003) ⁹
Module Power	10 A (Schurter P/N: 0034.1526) (Siemens Spare P/N: A5E01574409)
Indicators	
Input Power	Green LED on when input power available
Module Power	Green LED on when sensor power available
Channel Power	NA

⁹ A 3.0 A fuse can be used but Group current and total channel current are limited. See module specifications under *Total current of the outputs with series diode* for more information

* Note derating table below

Technical Specifications: 10-Channel, 24 VDC F Discrete Output MTA (6ES7650-1AL11-6XX0)	
Field Terminal Block Wire Sizes TB1 – TB2	
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)	
SIL according to IEC 61508, DIN EN 62061	SIL 3
Performance Level according to EN ISO 13849-1	PLe
Category according to EN ISO 13849-1	Cat. 4
Low Demand (PFD) according to SIL 3 (per channel)	0 (no dangerous undetected failures for DO MTA)
High Demand (PFH) according to SIL 3 (per channel)	0 1/h (no dangerous undetected failures for DO MTA)
Proof-test time	20 years

* Derating table

Mounting position	Maximum temperature	Total current across all channels
Horizontal	40 °C	10 A
	50 °C	7 A
	60 °C	6 A
	70 °C	4 A
Vertical	60 °C	6 A

Note

Fuses are available as spare parts from Siemens.

Fuse information can be found at:

<http://www.littelfuse.com><http://www.schurter.com>**14.10 Module Restrictions**

Restrictions for 10-Channel, 24 VDC F Discrete Output MTA (6ES7650-1AL11-6XX0 or 6ES7650-1AL10-6XX0)	
I/O Module Restrictions	
Module Design - Diode Outputs used	See module specifications for limitations
MTA Design - Isolation	There is no isolation between channels or between groups of channels