

Approvals

Marshallled Termination Assembly	Part Numbers	Agency Approvals
Analog Input 8-Channel 16 bit	6ES7650-1AA50-2XX0	CE EMC in accordance with EN61000-6-2 EN61000-6-4 ATEX in accordance with EN600079-0 EN600079-15
	6ES7650-1AA51-2XX0	
	6ES7650-1AA52-2XX0	
Analog Output 8-Channel 12 bit	6ES7650-1AB50-2XX0	Safety: ⁸⁾ EN 61131-2:2007
	6ES7650-1AB51-2XX0	
RTD Input 8-Channel	6ES7650-1AG50-2XX0	FM Approved: FM3600, FM3611, FM3810
	6ES7650-1AG51-2XX0	
TC Input 8-Channel	6ES7650-1AF50-2XX0	Class I, Division 2, Groups A,B,C,D; Temperature code T4A at Ta = 60°C
	6ES7650-1AF51-2XX0	
Discrete Input 16-Channel 24 VDC	6ES7650-1AC10-3XX0	Class I, Zone 2, Group IIC; Temperature code T4 at Ta = 60°C
	6ES7650-1AC11-3XX0	
F Relay Output ²⁾ 10-Channel 24-150 VDC 120-230 VAC	6ES7650-1AM30-6XX0 ^{6) 7) 10)}	cULus - UL508, CSA C22.2 No.142 cULus haz.loc. - UL1604, CSA C22.2 No.213 ¹¹⁾ ISA 12.12.01, CSA C22.2 No.213
	6ES7650-1AM31-6XX0 ^{6) 7) 10)}	
Relay Output 16-Channel 24-150 VDC 120-230 VAC	6ES7650-1AM30-3XX0 ^{6) 7) 10)}	KEMA ATEX in accordance with EN 60079-15: 2005 and EN 60079-0 : 2006 II 3 G Ex nA II T4 T/C & RTD MTA II 3 G Ex nC IIC T4 All others C-Tick
	6ES7650-1AH50-5XX0	
F Analog Input ²⁾ 6-Channel Failsafe	6ES7650-1AH51-5XX0	
	6ES7650-1AH61-5XX0	
F Analog Input HART ²⁾ 6-Channel Failsafe	6ES7650-1AH62-5XX0 ¹¹⁾	
	6ES7650-1AK10-7XX0	
F Discrete Input ²⁾ 12/24-Channel Failsafe 24 VDC	6ES7650-1AK11-7XX0	Temperature Range -25 to 60°C ²⁾ TÜV (Functional Safety) IEC61508 (SIL3, Relay MTA's SIL 2) ³⁾ Accessory TÜV when used with any Failsafe MTA
	6ES7650-1AL10-6XX0	
F Discrete Output ²⁾ 10-Channel Failsafe 24 VDC	6ES7650-1AL11-6XX0	
	6ES7650-1BA02-0XX0 ⁷⁾	⁴⁾ Accessory - used with F Analog Input ⁵⁾ Accessory - used with F Analog Input MTA
Power Monitor Board ³⁾	6ES7650-1BB50-0XX0 ⁹⁾	
	6ES7650-1BB51-0XX0 ⁹⁾	⁶⁾ UL60079-15 instead of UL1604 ⁷⁾ Class I, Division 2, Groups A,B,C,D; Temperature code T4
6.2V Diode Board ⁵⁾	6ES7650-1BC50-0XX0	
	6ES7650-1BC51-0XX0	⁹⁾ Not for use on MTAs with covers ¹⁰⁾ See manual for special temperature restrictions
FET Switch Adapter ^{4) 5)}	6ES7650-1BD50-0XX0	
	6ES7650-1BD51-0XX0	
Discrete Output 16-Channel 24 VDC	6ES7650-1AD10-2XX0	¹¹⁾
	6ES7650-1AD11-2XX0 ¹¹⁾	
HART Analog Input 8-Channel	6ES7650-1AA61-2XX0 ⁷⁾	
HART Analog Output 8-Channel	6ES7650-1AB61-2XX0 ⁷⁾	

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 6ES7650-1AA51-2XX0	Analog Input 8-Channel 16 bit	6ES7331-7NF00-0AB0, E_Stand 5 or higher	Yes
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 6ES7650-1AB51-2XX0	Analog Output 8-Channel 12 bit	6ES7332-5HF00-0AB0, E_Stand 3 or higher	Yes
6ES7650-1AG50-2XX0 6ES7650-1AG51-2XX0	RTD Input 8-Channel	6ES7331-7PF00-0AB0, E_Stand 8 or higher & 6ES7331-7PF01-0AB0	No
6ES7650-1AF50-2XX0 6ES7650-1AF51-2XX0	TC Input 8-Channel	6ES7331-7PF10-0AB0, E_Stand 4 or higher & 6ES7331-7PF11-0AB0	No
6ES7650-1AH50-5XX0 6ES7650-1AH51-5XX0	F Analog Input 6-Channel Failsafe	6ES7336-1HE00-0AB, E_Stand 4 or higher	Yes
6ES7650-1AH61-5XX0 6ES7650-1AH62-5XX0	F Analog Input HART 6-Channel Failsafe HART	6ES7336-4GE00-0AB0	Yes
6ES7650-1AM30-6XX0 6ES7650-1AM31-6XX0	F Relay Output 10-Channel Failsafe 24 VDC	6ES7326-2BF01-0AB0, E_Stand 2 or higher	Yes
6ES7650-1AK10-7XX0 6ES7651-1AK11-7XX0	F Discrete Input 12/24-Channel Failsafe 24 VDC	6ES7326-1BK00-0AB0, & 6ES7326-1BK01-0AB0, E_Stand 1 or higher	Yes
6ES7650-1AC10-3XX0 6ES7650-1AC11-3XX0	Discrete Input 16-Channel 24 VDC	6ES7321-7BH01-0AB0, E_Stand 2 or higher	Yes
6ES7650-1AL10-6XX0 6ES7650-1AL11-6XX0	F Discrete Output 10-Channel Failsafe 24 VDC	6ES7326-2BF01-0AB0, E_Stand 2 or higher	Yes
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

6 8-Channel Analog Output MTA

Part No. 6ES7650-1AB51-2XX0 or 6ES7650-1AB50-2XX0

6.1 Description

This section contains information and requirements to facilitate installation of Siemens Marshalled Termination Assembly (MTA) (6ES7650-1AB51-2XX0 or 6ES7650-1AB50-2XX0), designed to interface with the Siemens ET 200M 8-Channel Analog Output Module (6ES7 332-5HF00-0AB0, 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.

Note

Drive capability for the analog output module is limited to less than 600 Ω .

6.2 Features

The following features have been incorporated into this MTA:

- Redundant power connections
- LED indication for each power supply
- Power monitor plug-in available (optional)
- Dual connectors for redundant I/O Module operation
- Per module power fusing
- Shield connections available for channel cabling
- Ground stud for connecting shield to earth ground
- Power input and field terminations are pluggable for easy maintenance
- Connectivity for HART Handheld Terminal (HHT) per channel

6.3 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 circuitry to detect the presence of voltage over 15 VDC and turn on the LED indicator. 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. 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**. The channels do not require power from the I/O power supply and therefore no channel power circuitry is required.

Field Terminals, Channel + (**CHx+**), Channel – (**CHx-**), and Shield (**SHx**), connect to the field devices. **CHx+** is the current output source and **CHx-** is the current output sink. The I/O module outputs from **J1** and **J2** are diode OR'd, via CR1-CR16, before connecting to **CHx+** of the Field terminals. 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**.

The field termination connector is removable for ease of wiring maintenance and is retained by friction.

6.4 Installation Requirements

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

A common interconnecting cable (6ES7922-3BD00-0AS0 or 6ES7922-3BJ00-0AS0), supporting eight analog output channels, interconnects the analog output termination assembly to the 8-channel analog output module (6ES7 332-5HF00-0AB0, E-Stand 3 or higher). See Figure 2-11.

It may be necessary to modify the printed circuit board as follows:

To separate channel input low from power supply common, cut and remove the jumper **W200**.

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.

6.5 Maintenance

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

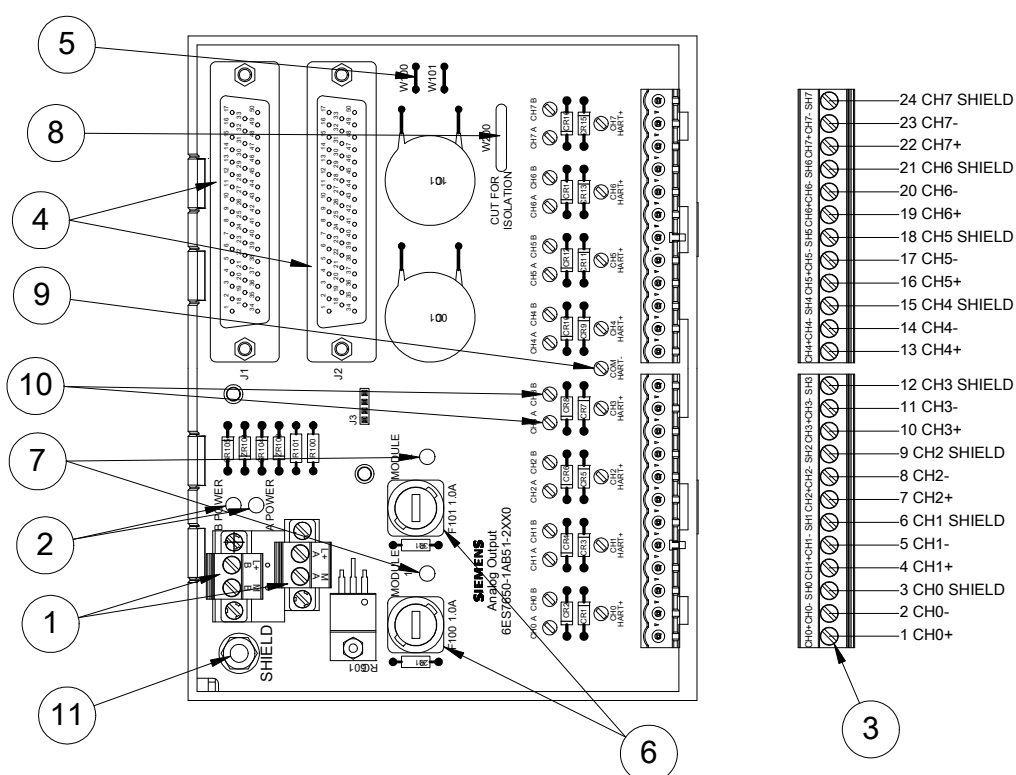
Under normal operation, the **A/B Power LED** and **Module 1/2 Fuse LED** are on. If both are off, check the power supply to MTA. If the **A/B Power LED** is off, check the power supply to the MTA. If **Module 1/2 Fuse LED** is off, check the module fuse and replace if necessary.

6.6 8-Channel Analog Output Marshallled Termination Assembly

Figure 6–1 below shows the basic parts of the 8-Channel Analog Output MTA.

Figure 6–1 8-Channel Analog Output Marshallled Termination Assembly

(6ES7650-1AB51-2XX0 or 6ES7650-1AB50-2XX0)



Key to numbered items in Figure 6–1:

Item	Description
1	Input power connections
2	Input power indicators
3	Field wiring connections
4	I/O module connections (J1 & J2)
5	Shield disconnect jumper (W100 & W101)
6	Module power fuses
7	Module power indicators
8	Output isolation jumper (W200)
9	Hart connectivity (1 of 8)
10	I/O Module Output Test Points (2 of 16)
11	Shield Ground Stud for connecting to earth ground

6.7 Technical Specifications

Technical Specifications for 8-Channel Analog Output MTA (6ES7650-1AB51-2XX0 or 6ES7650-1AB50-2XX0)	
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)	0.870 A Maximum
Power Dissipation (typical)	1 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	NA
Module Power	1.0A (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	NA
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 +60C
Humidity	5% to 95% Non-condensing
Approvals	
MTA Agency Approvals	See Preface section, Approvals Table

Note

Fuses are available as spare parts from Siemens.

Fuse information can be found at:

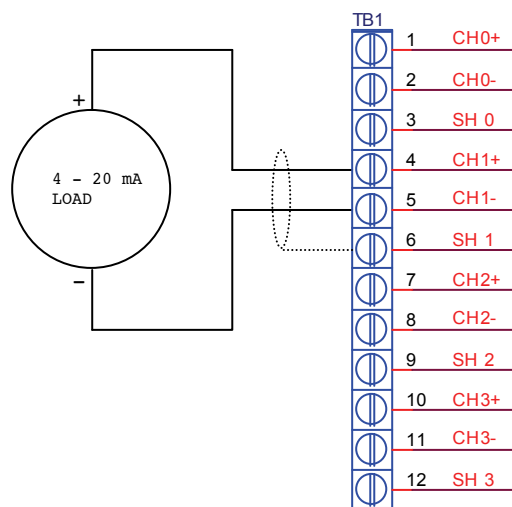
<http://www.bussmann.com>

6.8 Module Restrictions

Restrictions for 8-Channel Analog Output MTA (6ES7650-1AB51-2XX0 or 6ES7650-1AB50-2XX0)	
I/O Module Restrictions	
MTA Design	There is no Channel to Channel Isolation
MTA Design	Series diodes lower the output compliance load to less than 600 Ω
MTA Design	Short Circuit to M not detected
MTA Design	SAO must be configured for Current Mode
MTA Design	Output Range: only 4-20mA & 0-20mA ¹
Module Accuracy	
Current Output	See Module Specs

6.9 Typical Load Connection to Field Terminals

Figure 6–2 Connecting an Analog Output to Field Terminals



¹ Minimum 0, 22 mA cutoff current