

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

S7-300

6ES5460-4UA13

ANALOG INPUT MODULE

Used with the applicable S7-300 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens official manufacturer documentation

9.1 Technical Description

The description below applies to the following modules:

Analog Input Modules and Cards				
Order No. of the Module	No. of Inputs	Isolation/Groups	Range Card (4 Channels)	Order No. of the Range Card
6ES5 460-4UA13	8	Yes/8 inputs isolated from M, M _{ext} and L+/L-	$\pm 12.5/50/500$ mV/Pt 100	6ES5 498-1AA11
6ES5 465-4UA12 6ES5 465-4UA13	16/8	No/none	$\pm 50/500$ mV/Pt 100 ± 1 V ± 10 V ± 20 mA 4 to 20 mA/4-wire trans. ± 5 V 4 to 20 mA/4-wire trans.	6ES5 498-1AA11 6ES5 498-1AA21 6ES5 498-1AA31 6ES5 498-1AA41 6ES5 498-1AA51 6ES5 498-1AA61 6ES5 498-1AA71
Analog Input Modules				
Order No. of the Module	No. of Inputs	Isolation/Groups	Measuring Range	
6ES5 463-4UA12 6ES5 463-4UB12,	4	Yes/4 inputs isolated from M, M _{ext} and L+/L-	1 V, 10 V, 20 mA, 4 to 20 mA	
6ES5 466-3LA11 6ES5 466-4UA11	16/8	Yes	1.25 V, 2.5 V, 5 V, 10 V 20 mA, 4 to 20 mA	
Analog Output Modules				
Order No. of the Module	No. of Inputs	Isolation/Groups	Output Range	
6ES5 470-4UA12 6ES5 470-4UA13	8	Yes/8 outputs isolated from M, M _{ext} and L+/L-	± 10 V/0 to 20 mA	
6ES5 470-4UB12 6ES5 470-4UB13	8	Yes/8 outputs isolated from M, M _{ext} and L+/L-	± 10 V	
6ES5 470-4UC12 6ES5 470-4UC13	8	Yes/8 outputs isolated from M, M _{ext} and L+/L-	± 1 to 5 V/4 to 20 mA	

I/O Modules

Analog input and analog output modules are I/O modules for the input/output of widely differing, analog process signals for the S5-135U/155U programmable (logic) controller.

These I/O modules allow the creation of control systems which require the processing of analog measured variables or continuous input to actuators.

9.2 Common Technical Specifications

Important for the USA and Canada

The following approvals have been issued:

- **UL Listing Mark**
Underwriters Laboratories (UL) to Standard UL 508, Report E85972 and E116536 for the 466-3LA11/466-4UA11 analog input module
- **CSA Certification Mark**
Mark Canadian Standard Association (CSA) to Standard C 22.2 No. 142, Report LR 63533C and LR 48323 for the 466-3LA11/466-4UA11 analog input module

Address range	128 to 255 (0 to 255)
Supply voltage L+ rated value ripple V_{pp} permissible range (including ripple) reference potential	24 V 3.6 V 20 to 30 V $L = M_{ext} = 0$ V
Voltage for the isolated enable inputs (only required when enable jumper is inserted)	F+ = + 24 V F- = 0 V
Line lengths for Analog input modules with rated input range of ± 12.5 m, ± 50 mV and Pt 100 Analog input modules with rated input range of ± 500 mV / ± 1 / ± 5 / ± 10 V / ± 20 mA, 4 to 20 mA and Pt 100 Analog output modules	50 m max. for shielded cables laid separately from power system cables (see Chapter 3) 200 m max., shielded 200 m max., shielded
Temperature range in operation for storage and transportation	0 to 55 °C - 40 to 70 °C
Relative humidity	95 % max. at 25 °C, no condensation
Site altitude	3500 m max. above sea level
Dimensions (W x H x D)	20 x 255 x 195 mm
Weight	Approx. 0.4 kg

9.3 The 460 Analog Input Module

9.3.1 Design

The modules are designed as plug-in PCBs for central controllers and expansion units with a backplane connector and with a blade connector to accept a plug-in front connector. You can directly connect the process signal lines to the front connector, which is available separately, with screw or crimp terminals.

Addressing Switch, Mode Switches

Situated on each module is an addressing switch with six rockers to set the module address. Analog input modules also have two switches on the side with eight rockers for setting the mode, and receptacles for range cards.

The modules are protected by covers on both sides.

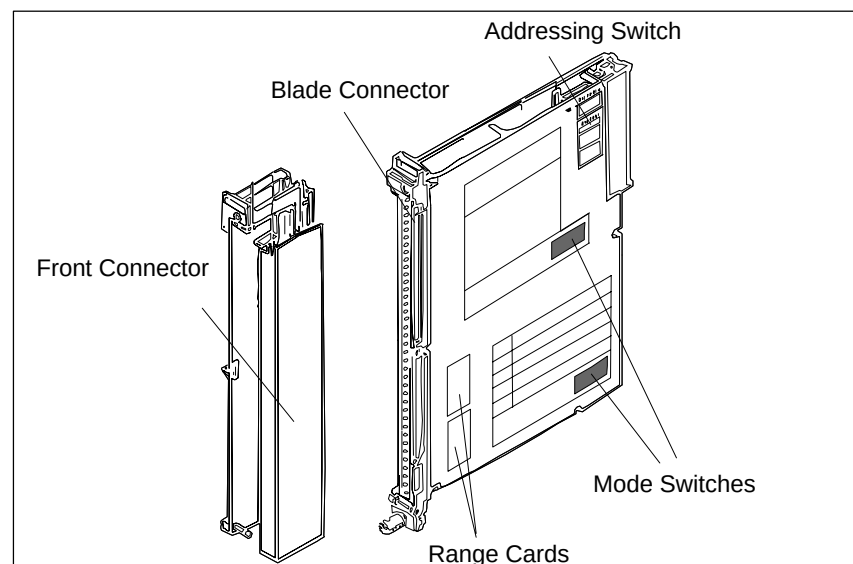


Figure 9-1 Analog Input Module

9.3.2 Function of the Enable Input

The 460 module has an enable circuit. You can use the enable inputs to switch off individual modules whilst the PLC is in operation. This means that:

- The module can no longer be addressed by the user program.

Modules which are switched off can be removed or inserted during operation. If this is not necessary, operate the module with the enable input switched off.

Enable Input

The enable circuit requires an external 24 V voltage at enable inputs F+/F- in the front connector. If there is no voltage at F+/F-, the modules will not acknowledge.

When the front connector is swivelled away from the front strip of the module, the supply of power to the enable input is interrupted, i.e. the module is switched off and can no longer be addressed by the user program: a timeout (QVZ) occurs in the CC.

Switching Off the Enable Input

The 460 module additionally offers the facility for changing the enable mode. The module has a jumper accessible from above in the vicinity of the addressing switch.

When the enable jumper is inserted, you can define the behaviour of the 460 analog input module as follows:

- When the enable voltage and load voltage are obtained from the same load supply, a shutdown of the 24 V load voltage will result in a timeout.
- When the enable voltage and load voltage are obtained from different load supplies, a shutdown of the 24 V load voltage will not result in a timeout. (With the 460-4UA11/12 modules, a shutdown of the load voltage will result in a timeout.)

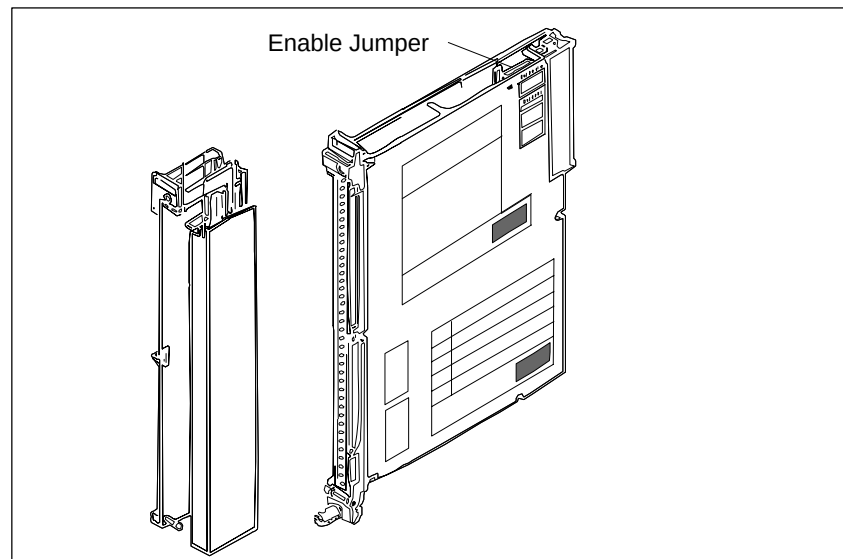


Figure 9-2 Enable Input and Enable Jumper

Jumper inserted: Enable input (F+/F-) active (factory setting)

Jumper open: Enable input (F+/F-) switched off

Examples of functioning of the enable inputs:

- To switch off individual subprocesses, i.e. outputs of various modules can be operated from a common load supply and yet activated separately.
- The load voltage of individual modules can be monitored without additional circuitry. Any reactions to failure of the load voltage can be programmed in the QVZ (timeout) organization block.

Configuring

You must observe the following when configuring systems:

Switching on	At the latest 100 ms after power-up of the PLC, the voltage must be present at the enable inputs of the I/O modules.
Switching off	When the PLC has been switched off, the voltage at the enable inputs of the I/O modules must still be present as long as the internal 5 V voltage is present.

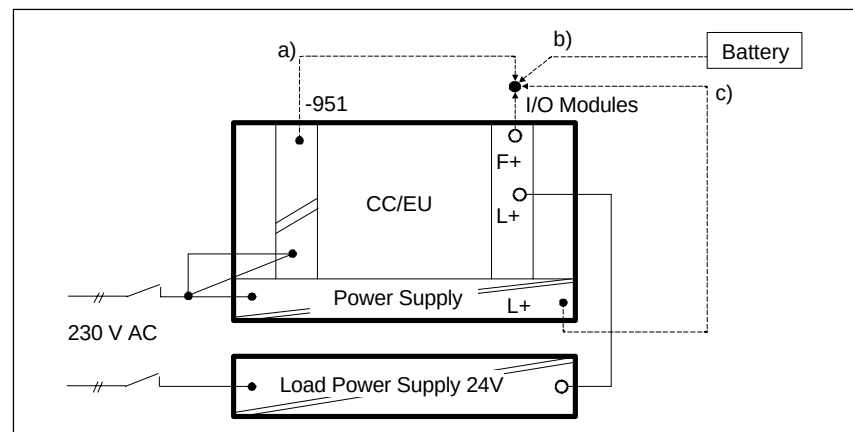
Switching off the CC

You should observe the following instructions for switching off CCs and equipment for supplying power to the enable inputs.

Separate or Common Shutdown of the CC/EU and Load Power Supply

When there is a need to switch off the load power supply separately without affecting the enabling of modules, there are the following possibilities for producing the enable voltage. These exist even when the load power supply is used without an additional capacitor and common shutdown.

- **230 V AC supply for CC/EU and load power supply**



Supply for the enable inputs from:

- 6ES5 951-4LB11 load power supply
- Battery
- Terminals for 24 V on the front plate of the power supply

9.3.15 Technical Specifications

6ES5 460-4UA13 Analog Input Module

Rated input ranges with cards for every 4 channels - 6ES5 498-1AA11 - 6ES5 498-1AA21 - 6ES5 498-1AA31 - 6ES5 498-1AA41 - 6ES5 498-1AA51 - 6ES5 498-1AA61 - 6ES5 498-1AA71	$\pm 12.5 \text{ mV} / \pm 50 \text{ mV} / \pm 500 \text{ mV/Pt 100}$ $\pm 1 \text{ V}$ $\pm 10 \text{ V}$ $\pm 5 \text{ mA} / \pm 20 \text{ mA}$ 4 to 20 mA for two-wire transducer $\pm 5 \text{ V}$ 4 to 20 mA for four-wire transducer
Number of inputs	8 voltage/current inputs or 8 resistance inputs (Pt 100)
Measured-value representation	13 bits (two's complement) or 12 bits + sign; ± 2048 units in rated range; 512 to 2560 units for 4 to 20 mA
Measuring principle	Integrating
Isolation	Yes 8 inputs tested with respect to 0 V at 500 V AC
Permissible potential difference between reference potentials of sensors and the module (U_{CM}) and between sensors (channels)	25 V AC/60 V DC max.
Power Supply - digital section from system bus - analog section from load voltage - enabling for module F+/F- - tripping current L+	5 V $\pm 5 \%$; 130 mA typical 24 V; approx. 50 mA ¹⁾ 24 V; approx. 5 mA 24 V; approx. 5 mA
Constant current source for Pt 100 connection I_{C+}/I_{C-}	2.5 mA; TC = $\pm 5 \times 10^{-5}/K$
Integration time	20 ms at 50 Hz; $16 \frac{2}{3}$ ms at 60 Hz
Encoding time per measured value	60 ms at 50 Hz; 50 ms at 60 Hz

¹⁾ Plus 20 mA max. per connected two-wire transducer.

Fuse for 6ES5 455-4UA12 and 6ES5 455-4UA12 6.3 A, fast/250 V	W79054-L1011-F630
Fuse for 6ES5 482-4UA11 6.3 A/125 V	W79054-M1041-T630
Light guide K for front connector with crimp terminal	6ES5 497-4UL11
Light guide S for front connector with screw terminal	6ES5 497-4UL21

For Chapter 9

Analog Input/Output Modules	
Modules	Adhesive Labels
6ES5 460-4UA13	C79451-A3079-C723
6ES5 463-4UA12	C79451-A3079-C746
6ES5 465-4UA12	C79451-A3079-C748
6ES5 470-4UA12	C79451-A3079-C724
6ES5 470-4UB12	C79451-A3079-C725
6ES5 470-4UC12	C79451-A3079-C726
Front Connectors	
Crimp terminals, single-width, 42-way	6ES5 497-4UA12
Crimp terminals, double-width, 42-way	6ES5 497-4UA22
Crimp terminals, double-width, 20-way	6ES5 497-4UA42
Screw terminals, single-width, 42-way	6ES5 497-4UB31
Screw terminals, double-width, 42-way	6ES5 497-4UB12
Screw terminals, double-width, 25-way	6ES5 497-4UB22
Screw terminals, double-width, 20-way	6ES5 497-4UB42

Mini spring contacts (250 single contacts)	6XX3070
Crimping tool	6XX3071
Ferrules to DIN 46228	
Extraction (releasing) tool	6ES5 497-4UC11
Set of labels for addresses	6ES5 497-4UD11

Range Cards		
Modules	Features	Range Card
6ES5 460-4UA13 6ES5 465-4UA12	$\pm 12.5/50/500\text{mV/Pt } 100$ $\pm 50/500\text{mV/Pt } 100$ $\pm 1\text{V}$ $\pm 5\text{V}$ $\pm 10\text{V}$ $\pm 20\text{mA}$ 4 to 20mA/2-wire transducer 4 to 20mA/4-wire transducer	6ES5 498-1AA11 6ES5 498-1AA11 6ES5 498-1AA21 6ES5 498-1AA61 6ES5 498-1AA31 6ES5 498-1AA41 6ES5 498-1AA51 6ES5 498-1AA71