5.1 Input/output modules EA12

Order No. 6DD1642-0BC0

Features
- 8 analog outputs
- 20-pin connector for the analog outputs
- 8 test socket pairs (2.3 mm) on the front panel to connect measuring equipment (for start-up)
- L bus connection

Load capability An analog output (signal at the connector and interface module and at the test socket) can be loaded **up to 10 mA** and is short-circuit proof for 2 min.

Adjustment, temperature The manufacturer adjusts the outputs as far as offset and gain are concerned for an ambient temperature of approximately 20° C:
This adjustment is made using 2 **potentiometers** for each output, which are not sealed so that they can be re-adjusted in operation (e. g. due to different ambient temperatures).
The temperature dependency is max. approx. +/-240 µV at a temperature change of +/-1° C.

Analog output	Offset	Gain
Output 1	-R49	-R46
Output 2	-R55	-R52
Output 3	-R61	-R58
Output 4	-R67	-R64
Output 5	-R73	-R70
Output 6	-R79	-R76
Output 7	-R85	-R82
Output 8	-R91	-R88

Table 5-1 Adjustment potentiometers for analog outputs

Adjustment The module should be operated for approx. 2 min before any adjustment is made so that it has time to reach its operating temperature.
The **offset adjustment** is first made. The value 0.0 (0%) should be output in the configured software at the connection of the associated function block, and the associated offset potentiometer should be adjusted until 0 V is measured.
The output voltage is increased by rotating the potentiometer clockwise.
The **gain is then adjusted**. The associated analog output should be driven with 2.0 (200%) (configured software) and the associated offset potentiometer should be adjusted until 10 V is measured.

Noise signals at the outputs The switch-mode power supply causes voltage spikes (these can be measured up to 100 mV) on the ground cable. They can be suppressed by:
- smoothing at the load input
- low-ohmic load

5.1.1 Supplementary components

Interface modules with terminals All of the cables for the output signals are not directly connected at the module, but via interface modules. The interface modules serve as mechanical connecting element (**screw/plug-in terminals**) and toelectrically adapt the system/plant signals (optional).

Interface module	Function
SU11	20 signals can be directly connected, no signal conversion

Table 5-2 Interface modules which can be connected at the module

Cables

- The module is connected to the interface modules using matching plug-in cables:
- **SC12** to connect an SU11

5.1.2 Connector assignment X5

SU11 terminal assignment

EA12 X5	Significance	Associated test socket	SU11	Connector designation when configuring
1	Analog output 1	X11 SIG	1	X5A
2	Ground	X11 COM	2	
3	Analog output 2	X12 SIG	3	X5B
4	Ground	X12 COM	4	
5	Analog output 3	X13 SIG	5	X5C
6	Ground	X13 COM	6	
7	Analog output 4	X14 SIG	7	X5D
8	Ground	X14 COM	8	
9	Analog output 5	X15 SIG	9	X5E
10	Ground	X15 COM	10	
11	Analog output 6	X16 SIG	11	X5F
12	Ground	X16 COM	12	
13	Analog output 7	X17 SIG	13	X5G
14	Ground	X17 COM	14	
15	Analog output 8	X18 SIG	15	X5H
16	Ground	X18 COM	16	
17	Electronics ground (connected with the electronics ground via 0 Ohm resistor)	---	17	
18	Electronics ground (connected with the electronics ground via 0 Ohm resistor)	---	18	
19	Ground	---	19	
20	Ground	---	20	

Table 5-3 EA12 connector- and SU11 terminal assignment

All of the **"ground" terminals** are connected together via 0 Ohm resistors and are connected to electronics ground via an associated inductance.

5.1.3 Application information and noise immunity

- operation **without fan** is possible
- noise-immune operation is only possible if the module is tightly screwed into the subrack

Screening

The input/output signals must be screened on the plant/system side. The screen must be connected through the largest possible surface area to the screen rail between the interface module and where the cable enters or exits the cabinet.

Ground connections

The front panel and if relevant, a connector housing, initially have no contact to the electronics ground of the module. The front panel is only connected to the electronics ground of the module via the backplane bus connector (L/C bus connection) and a cable connection, which can be released, between the backplane bus and the subrack housing.

Other information

Further information on EMC and ambient conditions, refer to Section "General technical data"

5.1.4 Technical data

General data

No. of slots occupied	1
Dimensions W x H x D [mm]	20.14 x 233.4 x 220
Weight	Approx. 0.5 kg

Power supply

Rated voltage	min.	max.	**Typ. current drain**
+5 V	+4.75 V	+5.25 V	600 mA
+15 V	+14.4 V	+15.6 V	200 mA
-15 V	-15.6 V	-14.4 V	200 mA

Analog outputs

No.		8
Output voltage, min.		- 10 V
Output voltage, max.		+ 10 V
Output current		+/- 10 mA max.
Output current (at +/- 10 V)		+/- 5 mA (recommended to suppress noise)
Resolution		13 bits + sign (corresponds to 1 mV)
Accuracy		14 bits (corresponds to 1 mV)
Short-circuit protection to ground		With 56 Ohm resistor
Short-circuit duration		120 s
Total load		All outputs simultaneously, each 10 mA
Temperature dependency		Max. 240 µV/degrees
Error		
	absolute linearity	+/-0.6 mV
	differential linearity	+/- 1 mV
	monotony	14 bits (corresponds to 1 mV)

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