

4.8 Digital Input/Output Module 07 DC 92

32 configurable digital inputs/outputs, 24 V DC, electrically isolated in groups, outputs can be loaded with 500 mA, CS31 system bus

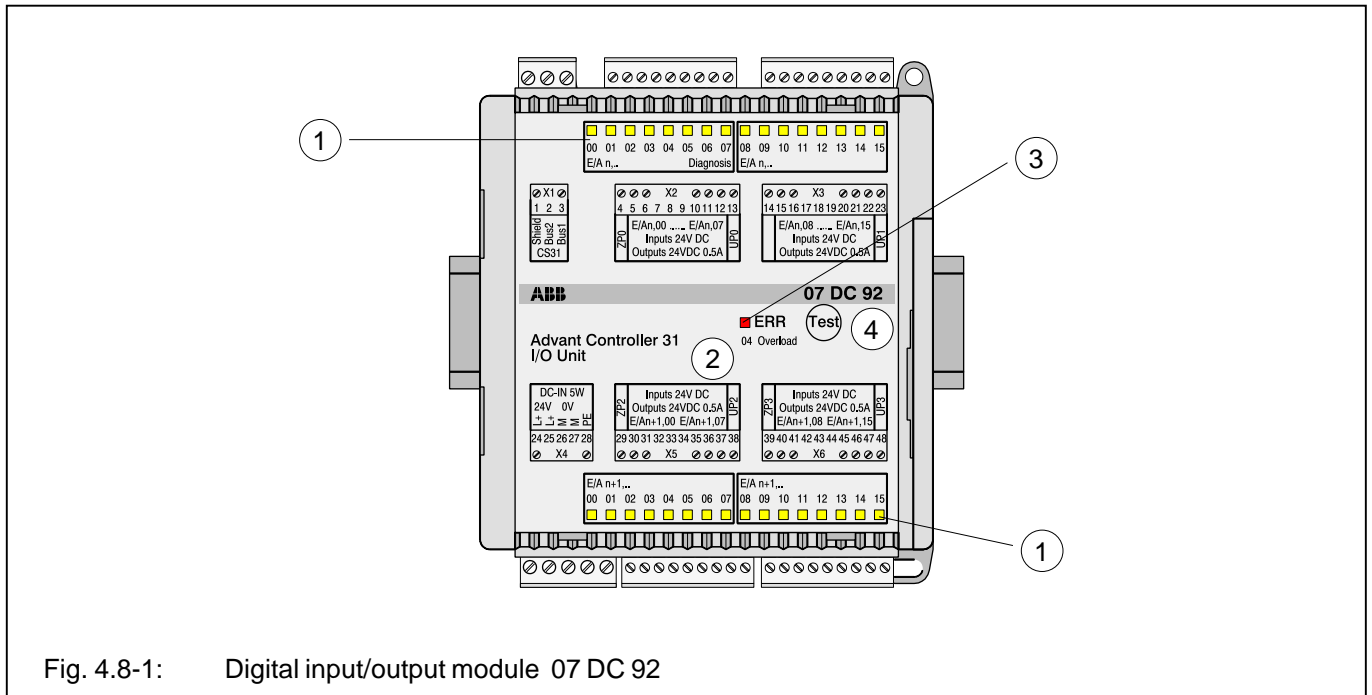


Fig. 4.8-1: Digital input/output module 07 DC 92

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Intended purpose

The digital input/output module 07 DC 92 is used as a remote module on the CS31 system bus. It contains 32 inputs/outputs, 24 V DC, in 4 groups with the following features:

- The inputs/outputs can be accessed individually
 - as input,
 - as output or
 - as re-readable output (combined input/output)
- The outputs
 - work with transistors,
 - have a nominal load rating of 0.5 A and
 - are protected against overload and short circuit.

- The 4 groups of inputs/outputs are electrically isolated from each other and from the rest of the unit.
- The module occupies two digital addresses for inputs and outputs on the CS31 system bus. It is possible to configure the unit solely as an output module. In this case, the addresses for the inputs are not needed.

The unit works with a supply voltage of 24 V DC.

The system bus connection is electrically isolated from the rest of the unit.

The module offers a number of diagnosis functions (see chapter "Diagnosis and displays").

Displays and operating elements on the front panel

- ① 32 yellow LEDs to indicate the signal status of the configurable inputs and outputs
- ② List of diagnosis information concerning the LEDs when they are used for diagnosis display
- ③ Red LED for error message
- ④ Test button

Electrical connection

The module can be mounted on a DIN rail (height 15 mm) or with 4 screws. The following figure shows the electrical connection of the input/output module.

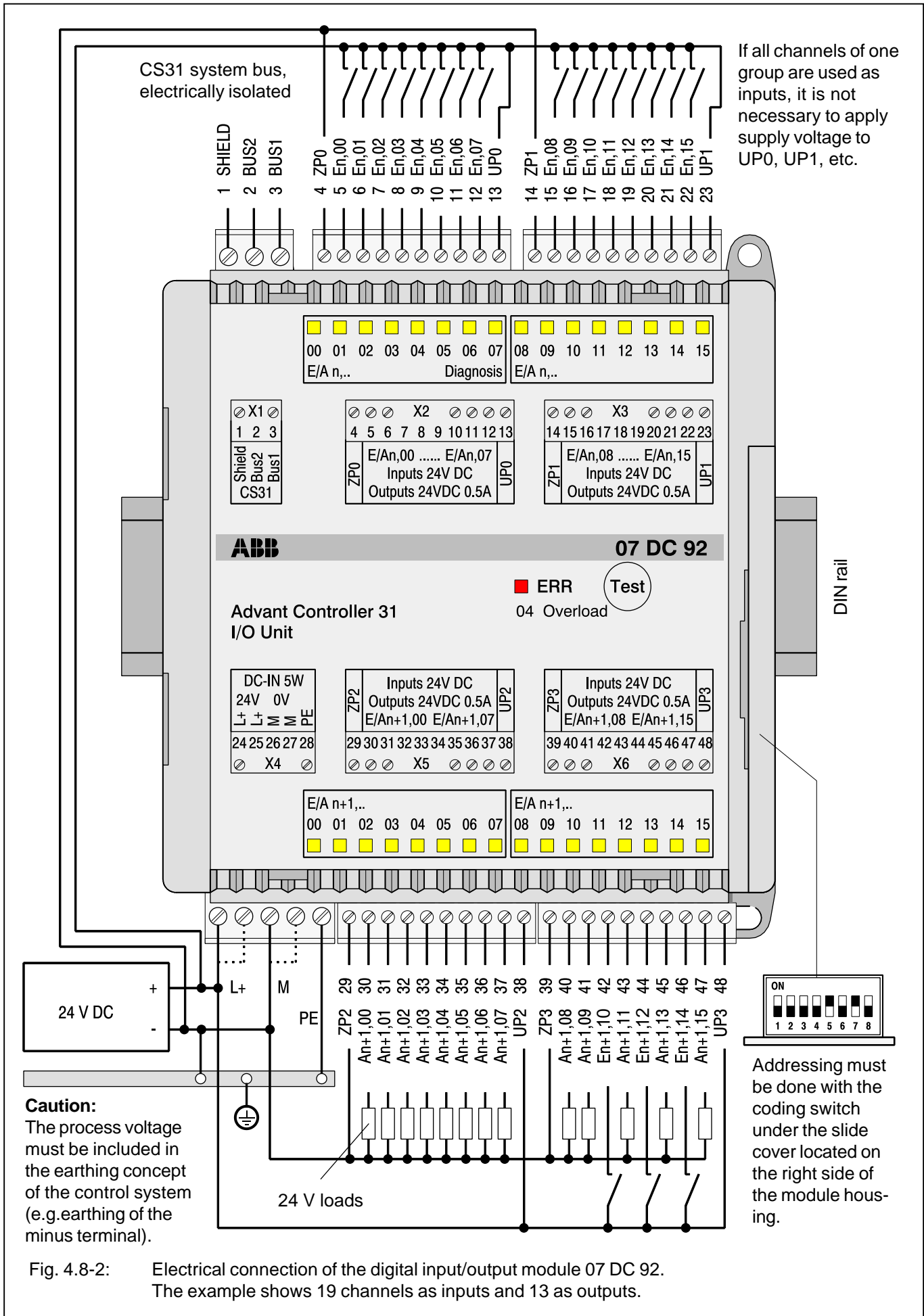


Fig. 4.8-2: Electrical connection of the digital input/output module 07 DC 92. The example shows 19 channels as inputs and 13 as outputs.

Addressing

An address must be set for each module to enable the central unit to correctly access the inputs and outputs.

A detailed description about "Addressing" can be found in the chapter "Addressing" for the central processing unit and coupler.

The address setting is accomplished with the DIL switch located under the slide cover on the right side of the module housing.

When using central units 07 KR 91 or 07 KT 9x as bus master, the following **possibilities** (address assignments) are offered, depending on the setting of the address DIL switch No. 1:

Central units 07 KR 91 / 07 KT 9x		
If the address DIL switch No. 1 is set to OFF , all 32 channels can be used individually as inputs or outputs. DIL switch 8 is not used.		
Terminal	Input	Output
5	E n,00	A n,00
6	E n,01	A n,01
7	E n,02	A n,02
8	E n,03	A n,03
9	E n,04	A n,04
10	E n,05	A n,05
11	E n,06	A n,06
12	E n,07	A n,07
15	E n,08	A n,08
16	E n,09	A n,09
17	E n,10	A n,10
18	E n,11	A n,11
19	E n,12	A n,12
20	E n,13	A n,13
21	E n,14	A n,14
22	E n,15	A n,15
30	E n+ 1,00	A n+1,00
31	E n+ 1,01	A n+1,01
32	E n+ 1,02	A n+1,02
33	E n+ 1,03	A n+1,03
34	E n+ 1,04	A n+1,04
35	E n+ 1,05	A n+1,05
36	E n+ 1,06	A n+1,06
37	E n+ 1,07	A n+1,07
40	E n+ 1,08	A n+1,08
41	E n+ 1,09	A n+1,09
42	E n+ 1,10	A n+1,10
43	E n+ 1,11	A n+1,11
44	E n+ 1,12	A n+1,12
45	E n+ 1,13	A n+1,13
46	E n+ 1,14	A n+1,14
47	E n+ 1,15	A n+1,15

Fig. 4.8-3: Addresses of channels (channel numbers) when the DIL switch No. 1 is switched to OFF

Item **n** in the table designates the module address that can be set with the address DIL switch with switches 2...7.

When using 07 KR 91 / 07 KT 9x as bus master, we recommend to use even-numbered module addresses (08, 10, 12.....60).

In this setting, (**DIL switch 1 in OFF position** = factory setting) the module occupies **two** addresses for inputs and outputs.

If the **DIL switch 1 is set to ON**, the unit is configured solely as an output module. In this case, the addresses for inputs are not needed.

Note:

Module 07 DC 92 reads the setting of the address switch **only** during initialization, after switching on the power supply, meaning that changes of the setting during operation remain ineffective until the next initialization process.

Acknowledging outputs after a short-circuit

When an overload or short-circuit occurs, the output limits the current and thermally switches it off. The LED of the overloaded output is flashing.

After the overload or short-circuit is corrected, the outputs are switched on again automatically. A manual acknowledgement or one initiated by the user program is not necessary. The error message has to be acknowledged.

I/O configuration

Module 07 DC 92 does not store configuration data. The 32 configurable channels are defined by the user program as inputs or outputs, which means that through reading and writing data in the user program, each configurable input/output channel can be used as input, output, or re-readable output.

Normal operation

- The module automatically initializes after the power has been switched on. During that time, all LEDs are switched on.
- When the CS31 system bus does not run, LED ③ flashes.
- LED ③ goes out again when the bus operation runs correctly and the module does not recognize an error.
- The 32 yellow LEDs ① show the signal status of the 32 channels.

Diagnosis and displays

Diagnosis functions:

- Short-circuit/overload of outputs ($I > 0.7 \text{ A}$)
- Reporting of a short-circuit or overload condition to the central unit and flashing of the corresponding LED
- Storing and making this information available for recall (kind of error and location of error)
- Error inside of module
- Error on CS31 system bus

If one of these errors occur, the red LED ③ will light up.

The error message will be reported to the central unit or to the coupler. For additional information refer to chapter "Diagnosis" for these devices.

A direct diagnosis inquiry can be made with the test button ④ and the upper LED displays ①.

By pressing the test button once, the channel E/A n, **00** is selected: the status LED of the selected input flashes while all other status indicators are switched off during the test. After releasing the test button, the diagnosis information for this channel is displayed for about 3 seconds by the upper yellow LEDs 00 to 07.

Explanation of the lit LEDs:

00 not used
01 not used
02 not used
03 not used
04 Overload or short-circuit, only for outputs
05 not used
06 not used
07 not used

The explanation of the LEDs ② is also printed on the front panel.

The procedure is repeated for the other input and output channels with each successive pressing and releasing of the test button.

After accessing the last channel, another pressing of the test button initiates an LED test. All LEDs must light up. Following that, the position of the address switch is displayed by LEDs 00 to 07 for about 3 seconds which was set by module 07 DC 92 during the initialization. In this case LED 00 shows the setting of switch 1 (LEDs 0...7 are assigned to switches 1...8).

The error messages at the I/O module and at the central control unit go out as soon as the errors have been corrected, no new errors exist **and** the error correction has been acknowledged.

Acknowledging an error after error correction:

- by pressing the test button for about 5 seconds or
- by the PLC program, or
- by the PC.

Notes:

The short-circuit and overload display can indicate in which group of 8 channels the error has occurred.

The error message to the PLC is as follows:

Overload in group 00...07	Channel 00 is reported
Overload in group 08...15	Channel 08 is reported
Overload in group 16...23	Channel 15 is reported
Overload in group 24...31	Channel 15 is reported

After the diagnosis interrogation has finished, the 32 yellow LEDs again show the signal status of the channels.

Technical Data for 07 DC 92

In general, the technical system data listed under "System data and system configuration" in chapter 1 of volume 2 of the "Advant Controller 31" system description are valid. Additional data or data which are different from the system data are listed as follows.

Technical data of the complete unit

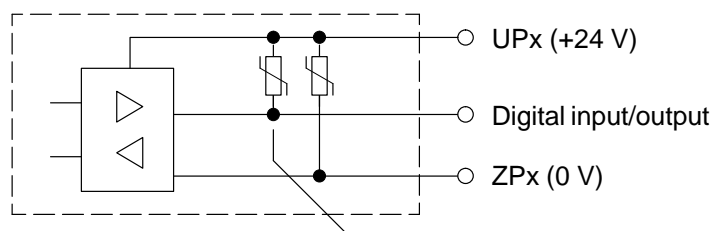
Permissible temperature range during operation	0...55 °C
Rated supply voltage	24 V DC
Rated signal voltage for inputs and outputs	24 V DC
Max. current consumption without load	0.15 A
Max. rated load for supply terminals	4.0 A
Max. power dissipation in module (outputs without load)	5 W
Max. power dissipation in module (outputs under load)	10 W
Protection against reversed polarity of power connection	yes
Conductor cross section for the removable connectors	
power supply	max. 2.5 mm ²
CS31 system bus	max. 2.5 mm ²
signal terminals	max. 1.5 mm ²
supply for I/O groups	max. 1.5 mm ²
Number of configurable inputs/outputs	32 (the configurable channels are defined individually by the user program to be either inputs or outputs. This is accomplished by interrogating or assigning the appropriate channel).
Electrical isolation CS31 system bus inputs/outputs	from the rest of the unit group from group, all groups from the rest of the unit
Supply of the I/O groups	each group is supplied individually, see Fig. 4.8-2
Number of interfaces	1 CS31 system bus interface
Address setting	Coding switch located under the slide cover at the right side of the housing
Diagnosis	see chapter "Diagnosis and display"
Operation and error displays	a total of 33 LEDs

Technical data of the I/O channels as binary inputs

Number of channels per unit	32
Division of channels into groups	4 groups with 8 channels each, channels En,00...En,07 and En,08...En,15 channels En+1,00...En+1,07 and En+1,08...En+1,15
Reference potential for inputs	ZP0, ZP1, ZP2 and ZP3
Electrical isolation	group from group, all groups from the rest of the unit
Input delay	typ. 7 ms
Signalization of the input signals	one yellow LED per channel, LED activated according to the input signal

Input signal voltage	24 V DC	
0 signal (when UPx connected)	- 6 V...+ 5 V	*
0 signal (when UPx not connected)	- 30 V...+ 5 V	
1 signal	+ 13 V...+ 30 V	
residual ripple at 0 signal (UPx connected)	within - 6 V...+ 5 V	*
at 0 signal (UPx not connected)	within - 30 V...+ 5 V	
at 1 signal	within + 13 V...+ 30 V	

* Due to the direct connection to the output, the demagnetizing varistor is also effective at the input when disconnecting inductive loads (see figure). This is why the difference between UPx and the input signal may not exceed the clamp voltage of the varistor. The varistor limits the voltage to approx. 36 V. Following this, the input voltage must range from - 12 V to + 30 V when UPx = 24 V and from - 6 V to + 30 V when UPx = 30 V. When all 8 channels of the group are used as inputs and terminal UPx is not wired-up, there are no restrictions to the input signals. In this case, the input voltage can range from - 30 V to + 30 V. The following figure shows the circuit arrangement of a digital input/output.



For demagnetization when switching off inductive loads

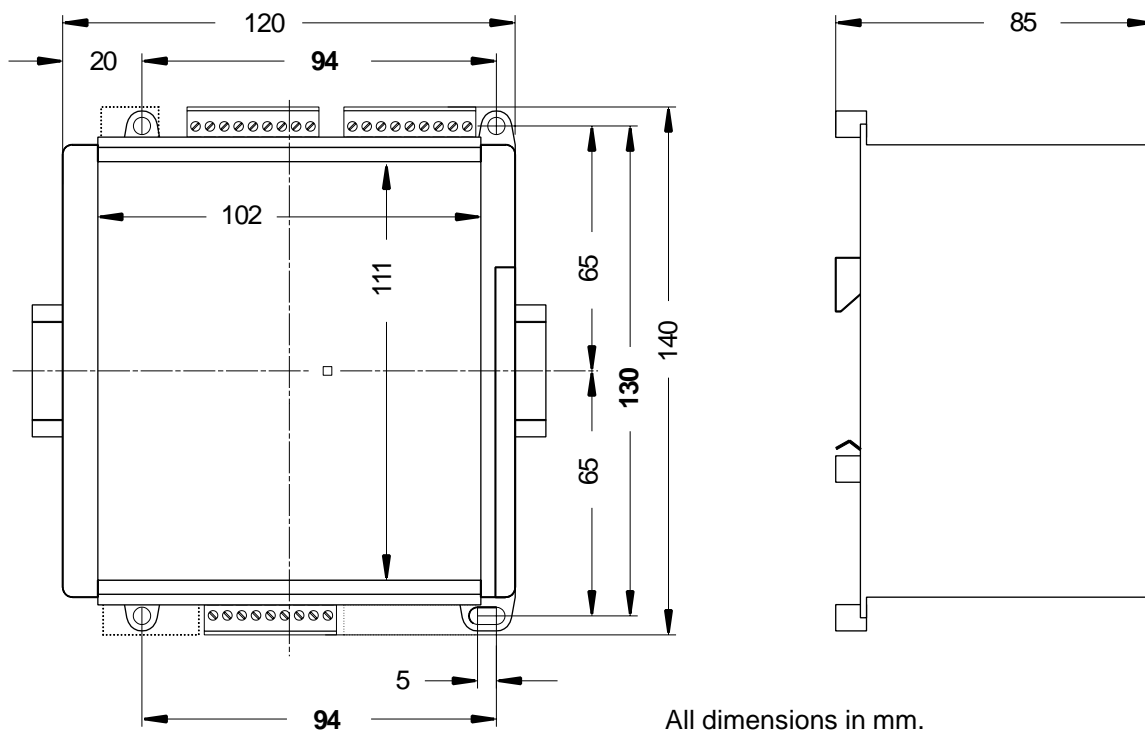
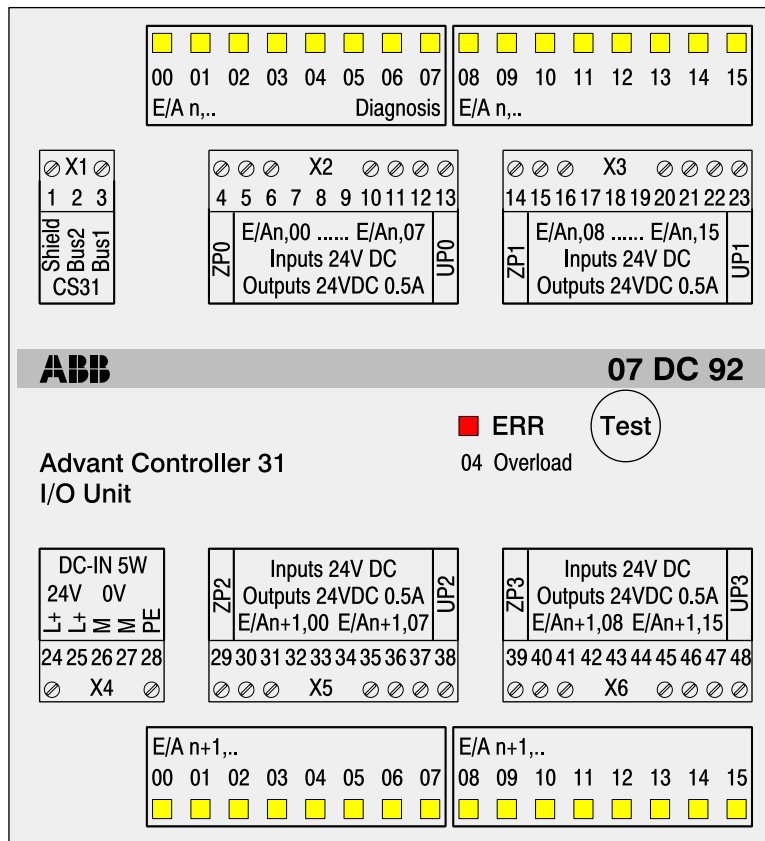
Input current per channel	
input voltage = + 24 V	typ. 7.0 mA
input voltage = + 5 V	≥ 0.2 mA
input voltage = + 13 V	≥ 2.0 mA
input voltage = + 30 V	≤ 9.0 mA

Conductor cross section for the removable connectors	max. 1.5 mm ² (grid space 3.81 mm)
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Technical data of I/O channels as digital outputs

Number of channels per unit	32 transistor-outputs
Division of channels in groups	4 groups with 8 channels each, channels An,00...An,07 and An,08...An,15 channels An+1,00...An+1,07 and An+1,08...An+1,15
Reference potentials for outputs	ZP0, ZP1, ZP2 and ZP3
Voltage supply for outputs	UP0, UP1, UP2 and UP3
Electrical isolation	group from group, all groups from the rest of the unit
Signalization of output signals	one yellow LED per channel, LED activated according to the input signal
Output current	
nominal value	500 mA at L+ = 24 V
max. value	4 A total current for each group
leakage current at 0 signal	< 0.5 mA
Demagnetization at inductive load	via internal varistor
Switching frequency for inductive load	max. 0.5 Hz
Switching frequency for lamp load	max. 11 Hz at max. 5 W

Protection against short-circuit/overload overload message ($I \geq 0,7 \text{ A}$) limitation of output current reactivation after short-circuit/overload	yes yes, after approx. 100 ms yes automatically
Resistance to feedback against 24V signals	yes
Load current (total)	max. 4 A for each group
Conductor cross section for the removable connectors	max. 1.5 mm ² (grid space 3.81 mm)
Connection to the CS31 system bus	
Interface standard	EIA RS-485
Galvanic separation	from supply voltage, inputs and outputs
Conductor cross section for the removable 3-pole connector	max. 2.5 mm ²
Mechanical data	
Mounting to DIN rail	according to DIN EN 50022-35, 15 mm deep. The DIN rail is centrally positioned between upper and lower edges of the module.
Mounting with screws	by 4 screws M4
Width x height x depth	120 x 140 x 85 mm
Connector conductor cross section	removable connectors with screw-type terminals max. 2.5 mm ² (grid space 5.08 mm) max. 1.5 mm ² (grid space 3.81 mm)
Weight	450 g
Dimensions for installation	see figure on next page
Installation instructions	
Installation position	vertical with connectors pointing up and down
Cooling	The natural convection cooling must not be hindered by cable ducts or other additional components installed in the cabinet.
Ordering data	
Module 07 DC 92	Order No. GJR5 2522 00 R0101
Scope of delivery	Digital Input and output module 07 DC 92 1 5-pin connector (grid space 5.08 mm) 1 3-pin connector (grid space 5.08 mm) 4 10-pin connectors (grid space 3.81 mm)



The depth of the module is 85 mm. If a DIN rail is used, the installation depth must be increased by the dimension of the rail.

Fig. 4.8-5: 07 DC 92, Front panel foil and outside dimensions.
Dimensions for installation holes are shown in bold print