MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with selected ABB IOB21 reference pages; not the complete installation manual

DCS800 / 3ADT220090R0014

SDCS-IOB-21

DIGITAL INPUT OUTPUT BOARD

OFFICIAL SOURCES

ABB3ADW000194R0701 RevG. Original publisher identification, safety and IOB21 technical pages retained unchanged.

DCS800 Drives
20 to 5200 A

Hardware Manual

Code: 3ADW000194R0701 Rev G

Effective: 03.07.2013
Supersedes: Rev F 09.2008

© 2013 ABB Automation Products GmbH. All rights reserved.

Safety instructions

What this chapter contains

This chapter contains the safety instructions which you must follow when installing, operating and servicing the drive. If ignored, physical injury or death may follow, or damage may occur to the drive, the motor or driven equipment. Read the safety instructions before you work on the unit.

To which products this chapter applies

The information is valid for the whole range of the product DCS800, the converter modules DCS800-S0x size D1 to D7, field exciter units DCF80x, etc. like the Rebuild Kit DCS800-R00-9xxx.

Use of warnings and notes

There are two types of safety instructions throughout this manual: warnings and notes. Warnings caution you about conditions which can result in serious injury or death and/or damage to the equipment. They also tell you how to avoid the danger. Notes draw attention to a particular condition or fact, or give information on a subject. The warning symbols are used as follows:



Dangerous voltage warning warns of high voltage which can cause physical injury and/or damage to the equipment.



General danger warning warns about conditions, other than those caused by electricity, which can result in physical injury or death and/or damage to the equipment.



Electrostatic sensitive discharge warning warns of electrostatic discharge which can damage the equipment.

Installation and maintenance work

These warnings are intended for all who work on the drive, motor cable or motor. Ignoring the instructions can cause physical injury or death and/or damage to the equipment..



WARNING!

- **Only qualified electricians are allowed to install and maintain the drive!**
- Never work on the drive, motor cable or motor when main power is applied. Always ensure by measuring with a multimeter (impedance at least 1 Mohm) that:
    1. Voltage between drive input phases U1, V1 and W1 and the frame is close to 0 V.
    2. Voltage between terminals C+ and D- and the frame is close to 0 V.
- Do not work on the control cables when power is applied to the drive or to the external control circuits. Externally supplied control circuits may cause dangerous voltages inside the drive even when the main power on the drive is switched off.
- Do not make any insulation resistance or voltage withstand tests on the drive or drive modules.
- Isolate the motor cables from the drive when testing the insulation resistance or voltage withstand of the cables or the motor.
- When reconnecting the motor cable, always check that the C+ and D- cables are connected with the proper terminal.

Note:

- The motor cable terminals on the drive are at a dangerously high voltage when the main power is on, regardless of whether the motor is running or not.
- Depending on the external wiring, dangerous voltages (115 V, 220 V or 230 V) may be present on the relay outputs of the drive system (e.g. SDCS-IOB-2 and RDIO).
- DCS800 with enclosure extension: Before working on the drive, isolate the whole drive from the supply.

Grounding



These instructions are intended for all who are responsible for the grounding of the drive. Incorrect grounding can cause physical injury, death and/or equipment malfunction and increase electromagnetic interference.



WARNING!

- Ground the drive, motor and adjoining equipment to ensure personnel safety in all circumstances, and to reduce electromagnetic emission and pick-up.
- Make sure that grounding conductors are adequately sized and marked as required by safety regulations.
- In a multiple-drive installation, connect each drive separately to protective earth (PE ⏚).
- Minimize EMC emission and make a 360° high frequency grounding (e.g. conductive sleeves) of screened cable entries at the cabinet lead-through plate.
- Do not install a drive equipped with an EMC filter to an ungrounded power system or a high resistance-grounded (over 30 ohms) power system.

Note:

- Power cable shields are suitable as equipment grounding conductors only when adequately sized to meet safety regulations.
- As the normal leakage current of the drive is higher than 3.5 mA AC or 10 mA DC (stated by EN 50178, 5.2.11.1), a fixed protective earth connection is required.

Printed circuit boards and fiber optic cables

These instructions are intended for all who handle the circuit boards and fiber optic cables. Ignoring the following instructions can cause damage to the equipment.

WARNING! The printed circuit boards contain components sensitive to electrostatic discharge. Wear a grounding wrist band when handling the boards. Do not touch the boards unnecessarily.

Use grounding strip:



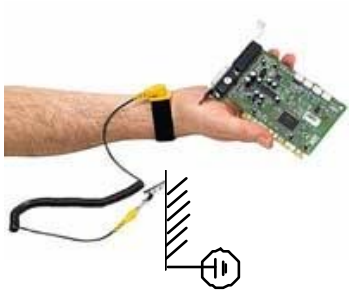


ABB order no.: 3ADV050035P0001

WARNING! Handle the fiber optic cables with care. When unplugging optic cables, always grab the connector, not the cable itself. Do not touch the ends of the fibers with bare hands as the fiber is extremely sensitive to dirt. The minimum allowed bend radius is 35 mm (1.4 in.).

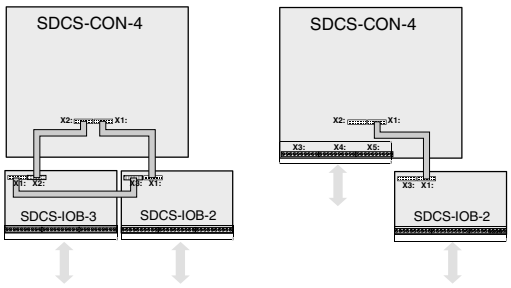
Digital I/O board SDCS-IOB-2

As described at the beginning of the chapter, there are various options for configuring the inputs and outputs. The SDCS-IOB-2x has 8 digital inputs and 8 digital outputs.
There are three different types existing, depending on the input voltage level:

SDCS-IOB-21 24 - 48 V_{DC}
SDCS-IOB-22 115 V_{AC}
SDCS-IOB-23 230 V_{AC}

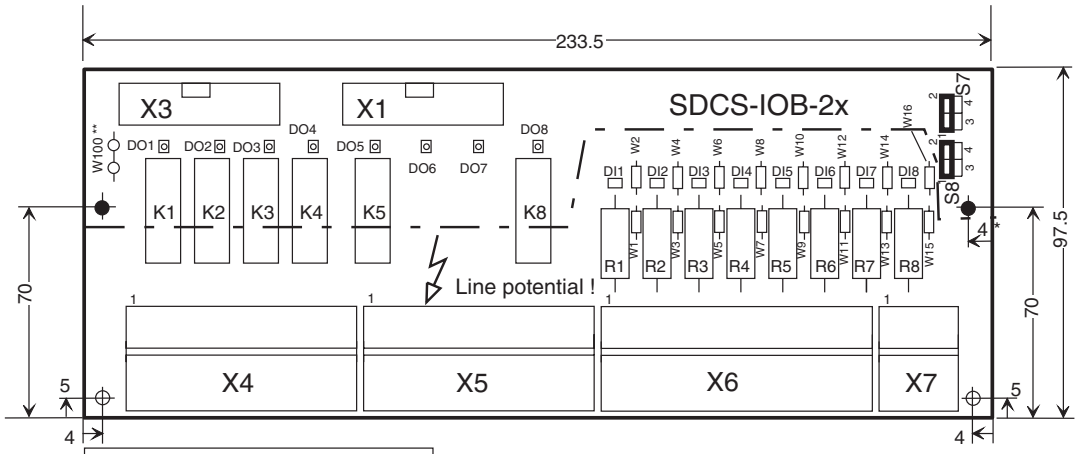
The inputs are filtered and galvanically isolated via optocouplers. Inputs can form two galvanically separated groups by using either X7:1 or X7:2.
If these boards are in use, they have to be mounted outside the converter. They must be mounted in a way, that the conductive supports have a good connection to ground of the installation.
The SDCS-IOB-2 is substituting the standard DI and DO of the SDCS-CON-4.
Also see *I/O Board Configuration.*

I/O via SDCS-IOB-2x / IOB-3 and SDCS-CON-4



The cable length between X1-X1 and X2-X2 is max. 1.7 m (D1 - D5 converters) or max. 4 m screened (required for D6 and D7 converters). Between X1-X3 it is max. 0.5 m because of EMC reasons. See chapter *Other cables*.

Layout and jumper settings of the SDCS-IOB-2x



Jumper coding

	Input	Time constant 2 ms	Time constant 10 ms
S7	DI7		*
S8	DI8		*

* Default value

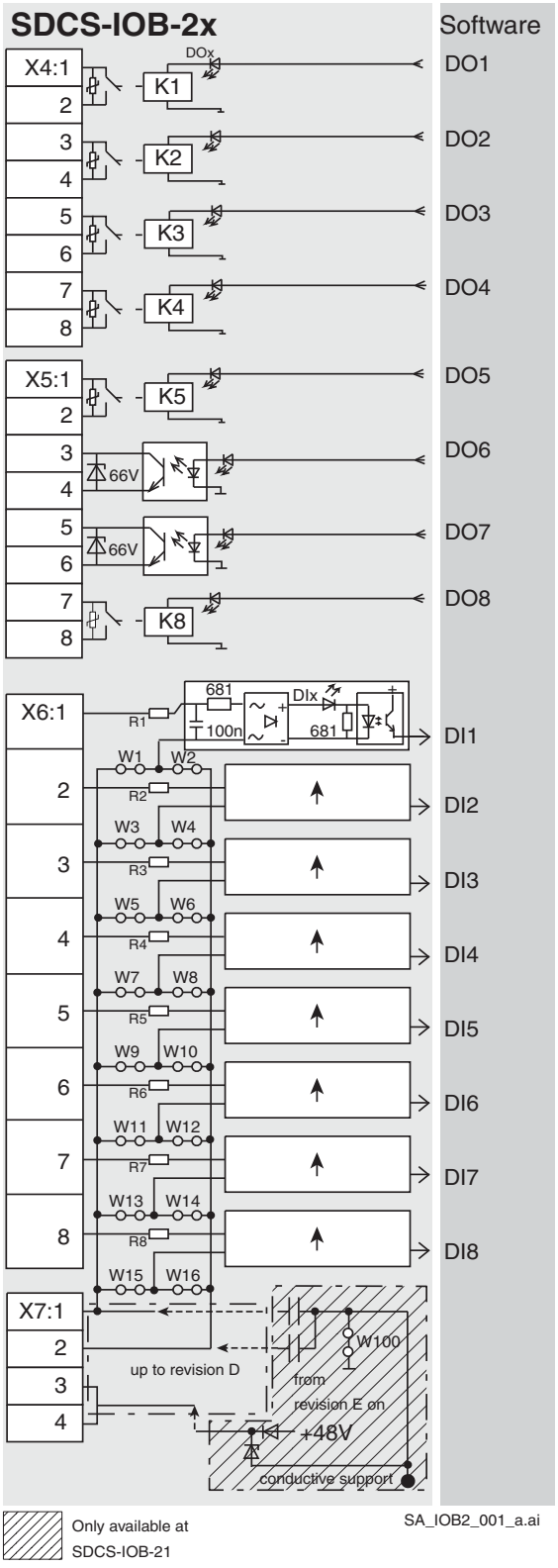
BL_Iob2_001_+Tab_a.ai

● Supports are conductive
Diameter of all supports: 4.3 mm

* This dimension may vary (4/5 mm) depending on the revision

** W100 as printed circuit

There is a card holder available as option for fastening the SDCS-IOB-2. For more information see chapter *Card holder for SDCS-IOB-2/3*.



Note:
When the SDCS-IOB-2 is connected to a SDCS-CON-4, DIs and DOs of the SDCS-CON-4 cannot be used (connectors X6 and X7).

Output value	Signal definition by	Remarks
K1 - K5, K8	Firmware	Isolated by relays (NO contacts) Contact ratings: **AC**: ≤ 250 V~/ ≤ 3 A~ **DC**: ≤ 24 V-/ ≤ 3 A- or ≤ 115/230 V-/ ≤ 0.3 A- MOV-protected (275 V)
K6, K7	Firmware	Potential-Isolated by optocouplers Switching capacity: ≤ 50 mA external voltage: ≤ 24 V-

X4, X5 are screw-clamp terminals for wires up to 4 mm² cross-sectional area.
Default values are shown within the software diagrams.
The ground potential of the digital outputs may vary within ±100 V against each other.

Input value	Signal definition by	Remarks
1 - 8	Firmware	Isolated by optocoupler
IOB-21		**(24 - 48 V-)** R1 - R8 = 4.7 kΩ
0 - 8 V		-> "0 signal"
18 - 60 V		-> "1 signal"
IOB-22	Firmware	**(115 V~)** R1 - R8 = 22 kΩ
0 - 20 V		-> "0 signal"
60 - 130 V		-> "1 signal"
IOB-23	Firmware	**(230 V~)** R1 - R8 = 47 kΩ
0 - 40 V		-> "0 signal"
90 - 250 V		-> "1 signal"
		Including tolerance; absolute max. values

X6, X7 are screw-clamp terminals for wires up to 4 mm² cross-sectional area
Input resistance: see diagram.
Input smoothing time constant: see diagram.
Filter time constant of DI7 and DI8 can be changed by jumper S7 or S8.

Power supply for digital inputs (X7:3,4):
• Only available at **SDCS-IOB-21**
• 48 V / ≤ 50 mA
• Not isolated from the DCS electronics!
If the inputs are supplied from the internal +48 V (X7:3 and/or X7:4) a connection must be routed from either X7:1 and/or X7:2 to ground of the DCS800 module. Usually the ground is identical to the converter's frame.

If the inputs are supplied by any external source (+48 V_{DC}, 115 V_{AC} or 230 V_{AC}) the neutral line / - line must be connected to either X7:1 or X7:2. If the inputs should be controlled with the same voltage level, but from two different voltage sources, having probably two different ground levels, the first neutral line should be connected to X7:1 and the second to X7:2. In this case the jumpers Wx connecting the inputs to X7:2, but controlled by the source, connected to X7:1, must be cut out.
The same method is needed for the other jumpers Wx.

High frequency grounding is done via 100 nF capacitors.