DOL 100 I/O Box

Technical User Guide

SKOV

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Product and Documentation Changes

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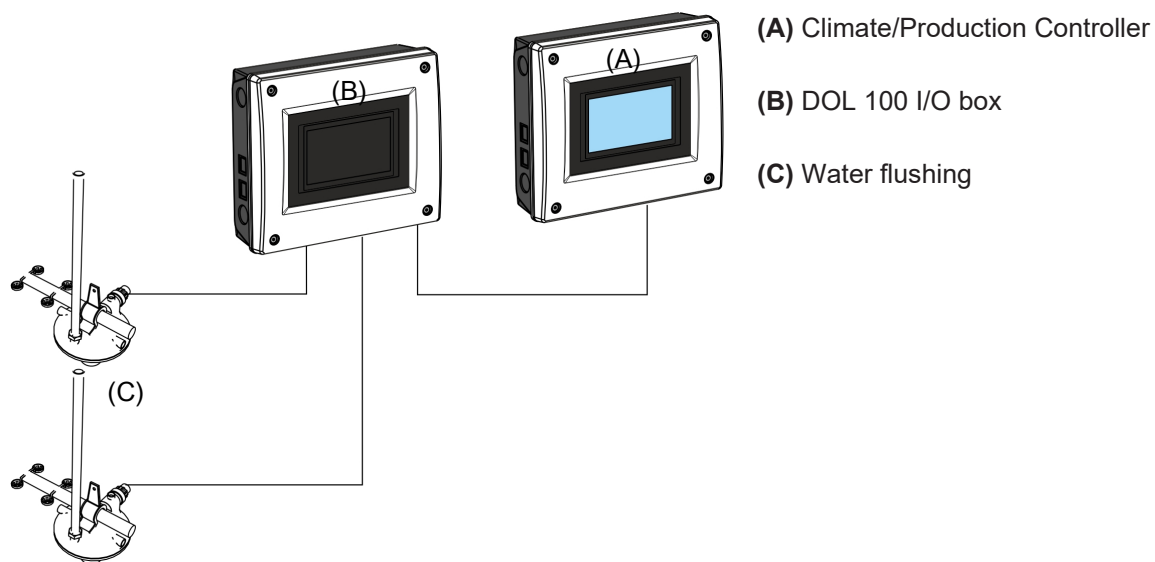
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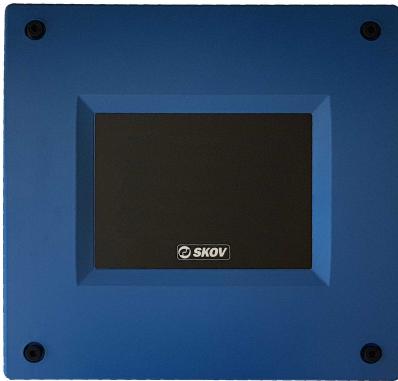
1 Product description

DOL 100 I/O box 10RL/20RL is used to control valves used for water flushing.

The DOL 100 converts the signal into digital signals and transmits them to the controller using CAN bus communication.

- The DOL 100 I/O box is available in two variants:
- DOL 100 I/O box 10RL
- DOL 100 I/O box 20RL

(A) Climate/Production Controller

(B) DOL 100 I/O box

(C) Water flushing

2 Product survey

130195 DOL 100 I/O box 10 RL

130196 DOL 100 I/O box 20 RL

External I/O box is used to control valves used for water flushing.

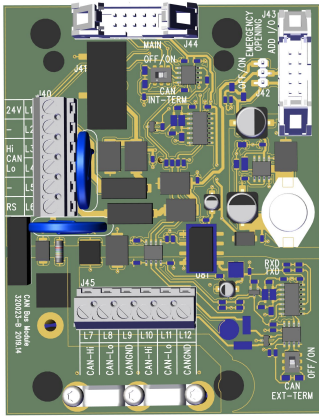DOL 100 I/O box contains one or two I/O modules type 15.

Relays: 10/20 x NO/NC potential free max.

The DOL 100 converts signals into digital signals and transmits them to the controller using CAN bus communication.

Standard software / hardware of the DOL 530/630 series supports 13 I/O modules in total. DOL 100 I/O box 10 RL counts as one module. DOL 100 I/O box 20 RL counts as two modules.

Is used with the CAN bus module (132245) and a CAN bus cable (130121-130128).

2.1 Accessories

132245 CAN bus module

Always use the CAN bus module when using external CAN bus communication.

One for each controller.

130121 CAN bus cable 50 m
130125 CAN bus cable 100 m
130126 CAN bus cable 250 m
130122 CAN bus cable 500 m

For indoor use.

Use these cables in connection with external units using the CAN bus communication.

130123 CAN bus cable UV 50 m
130127 CAN bus cable UV 100 m
130128 CAN bus cable UV 250 m
130124 CAN bus cable UV 500 m

For outdoor use.

Use these cables for external units that apply CAN bus communication and for extending silo load cell cables.

3 Mounting guide

3.1 Recommended tools

Below follows a list of tools recommended for installation of the DOL 100.

Item	Description
	Cordless drill
	Screwdriver bits
	Utility knife
	Multimeter
	Tape measure
	Side cutter
	Needle-nose pliers
	Ladder
	Screwdriver
	Spirit level

3.2 Mounting on wall

Mount the DOL 100 digital box on the wall using four screws.

4 Installation guide

4.1 Electrical connection

Installation, servicing and troubleshooting of all electrical equipment must be carried out by qualified personnel in compliance with the applicable national and international standard EN 60204-1 and any other EU standards that are applicable in Europe.

The installation of a power supply isolator is required for each motor and power supply to facilitate voltage-free work on the electrical equipment. The power supply isolator is not included.

4.2 Cable routing

To prevent water from running into the DOL 100 via cables and screwed connections, run the cables so that water does not gather around the cable in the gasket of the screwed connection.

4.3 CAN bus module

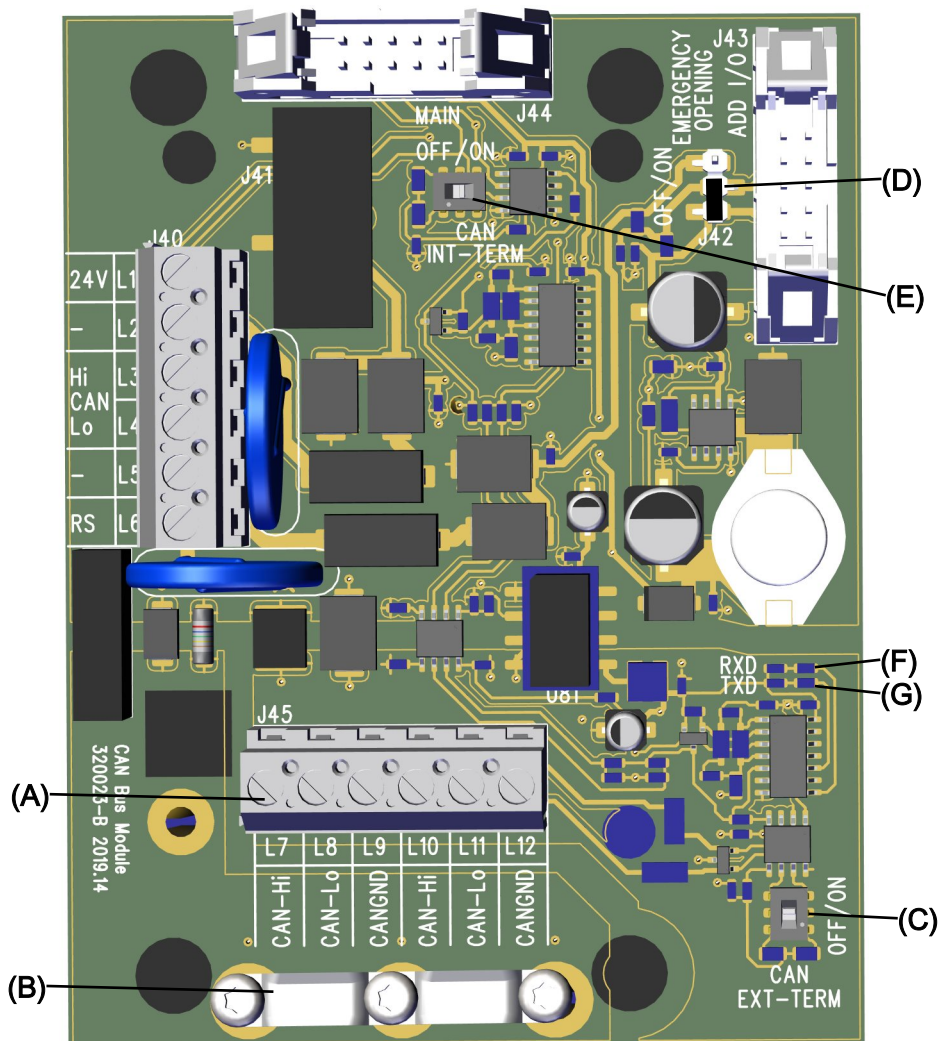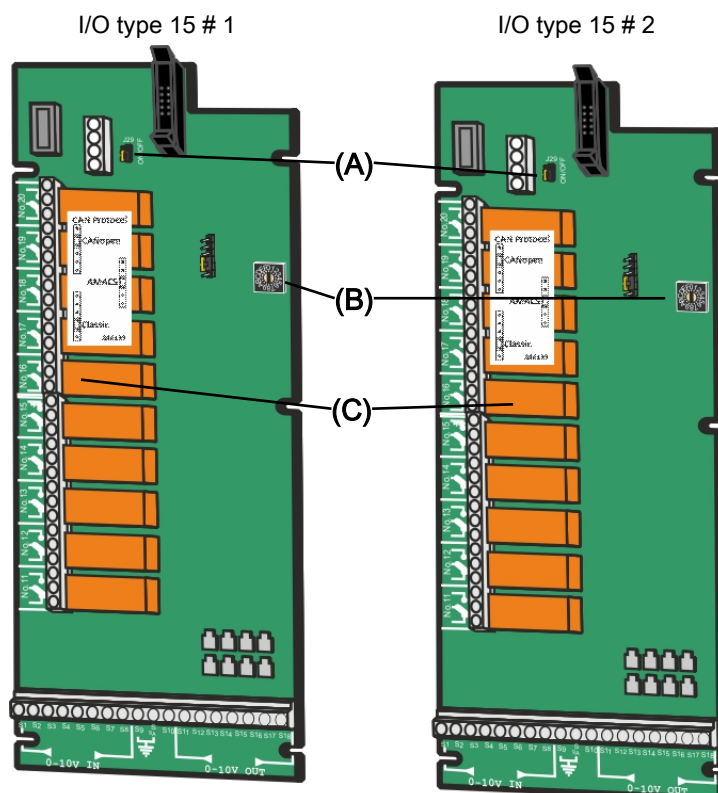| Item	Function	Description
(A)	L7 CAN-Hi L8 CAN-Lo L9 CANGND	CAN high (brown CAN bus) CAN low (white CAN bus) GND (green CAN bus) The terminals below can also be used as a looped terminal strip to the next box. CAN high (brown CAN bus) CAN low (white CAN bus) GND (green CAN bus)
	L10 CAN-Hi L11 CAN-Lo L12 CANGND	
(B)	Shield termination	Used for termination of the shield (braided shield in CAN bus cable)
(C)	CAN EXT-TERM OFF/ON	CAN bus termination. If DOL 100 is the last node on the CAN bus, the jumper must be set to (ON) .
(D)	OFF/ON EMERGENCY OPENING	Jumper is set to (OFF)
(E)	CAN INT-TERM OFF/ON	Internal CAN bus termination must always be set to (ON)
(F)	RXD	LED shines (green) when data is received on connection terminals L7 to L12.
(G)	TXD	LED shines (red) when data is sent from connection terminals L7 to L12.

4.4 I/O type 15

I/O type 15 # 1   I/O type 15 # 2

(A)

(B)

(C)

Item	Function	Description		
(A)	CAN TERM	The modules are controlled via CAN bus communication. It is important that the CAN termination jumpers are set correctly in order to achieve secure communication between the modules. The jumper must be ON on the module where communication ends.		
			Type 15 # 1	Type 15 # 2
		DOL 100 I/O 10RL	Jumper setting ON Address 7.	-
		DOL 100 I/O 20RL	Jumper setting OFF Address 7	Jumper setting ON Address 8.
(B)	CAN-ad-dress	Each I/O module must have a specific CAN address for the controller to communicate with it. The address of the individual module corresponds to the address in the controller's **Technical | Setup | Installation | I/O Modules | Additional I/O Modules** menu.		
(C)	Relays	10 relays for controlling flushing valves		

4.5 Connection of CAN bus cable in DOL 100

24 V DC power supply

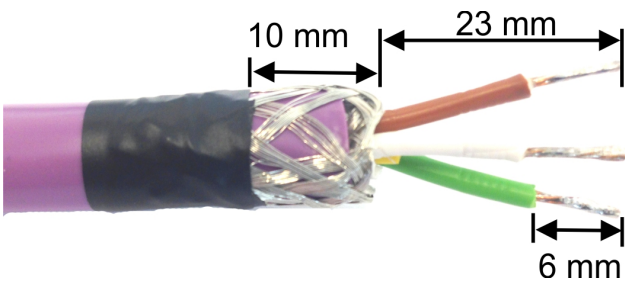CAN bus connection, see dimensions below.
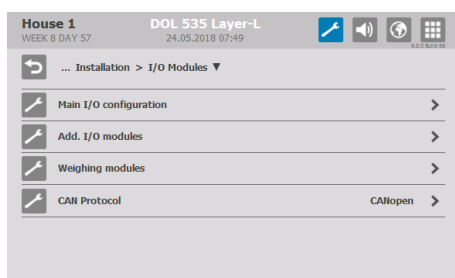CAN_Hi = brown
CAN_Lo = white
CAN GND = green.

Strip the cable so the shield can be connected to the DOL 100 when mounting in the connection terminal.

As illustrated by the picture, the connection terminal can also be used as a looped terminal strip to the next box.
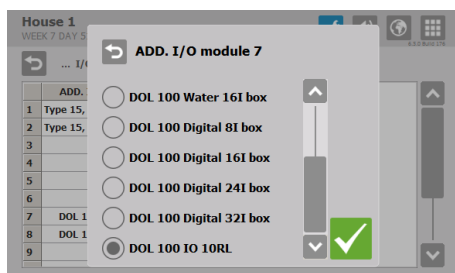
4.6 Setting up the DOL 100 in the controller

Make sure the CAN protocol is set to CANopen.

Technical | Setup | Installation | I/O Modules | CAN protocol

Technical | Setup | Installation | I/O Modules | Extra I/O modules

Select the number of DOL 100 IO 10RL.

Using the DOL 100 I/O box 10RL, select one DOL 100 IO 10RL
Using the DOL 100 I/O box 20RL, select two DOL 100 IO 10RL.

DOL 100 IO 10RL supports up to 10 valves for water flushing.

The DOL 100 I/O box 10RL counts as one module
The DOL 100 I/O box 20RL counts as two modules

The software supports up to 13 I/O modules.

Here you see the CAN bus address (CAN ID) and if it is connected.

Select the number of water lines for flushing
Technical | Setup | Installation | Production | Water | Water flushing

The DOL 539/535 installation menu specifies which termnial numbers and in which DOL 100 box the water line for flushing must be connected.
For correct connection of the water line for flushing see the menu
Technical | Setup | Show connections

I/O#7 S21+S22 = DOL 100 box I/O module with address 7, terminal S21 and S22

4.7 Cable plan

(A) Power supply to the controller two-wire cable including earthing contact.

(B) Max. 400 m CAN bus communication cable between the DOL 100 I/O box and the controller. The CAN bus cable connecting all units of the system may not exceed 400 m.

(C) Power supply to the DOL 100 I/O box, two-wire + earthing contact.

(D) Two-wire signal cable to water flushing.

4.8 Circuit diagram

4.8.1 DOL 100 I/O and water flushing

5 Cleaning

The DOL 100 box is maintenance-free but should be kept free of litter and dirt.

Clean the product with a cloth that has been wrung out almost dry in water and avoid using:

- high-pressure cleaner
- solvents
- corrosive/caustic agents

6 Troubleshooting guide

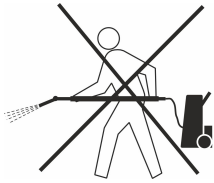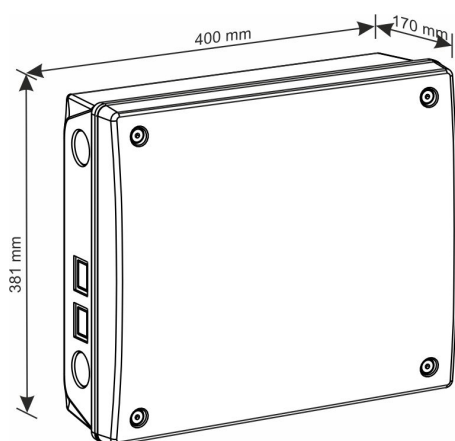| Defects	
No light in RXD (green) and TXD (red) LED on the CAN bus module and DOL 100 does not appear as connected in the production controller.	Check the supply to the power supply and check for 24 V DC on the socket J41 on DOL 100.
TXD (red) LED shines. No light in RXD (green) and on CAN bus module.	No data is received from the CAN bus.
	Check that the CAN bus cable is connected correctly and that power is being supplied to the production controller.
DOL 100 does not appear as connected in the production controller.	Check that the correct addresses are selected on the I/O modules.
	See section Setting up the DOL 100 in the controller [▷ 13].
	Check resistance between CAN-Hi and CAN-Lo, the resistance must be approximately 60 ohms.
	If the resistance is > 100 ohms, a termination is missing.
	If the resistance is < 45 ohms, there are too many terminations.
	❗ ● All units connected to the CAN bus must be measured without power supply.

7 Technical data

		DOL 100 I/O box
Electrical		
Rated voltage	V AC	115, 200 and 230/240
Operating voltage	V AC	103.5-264
Frequency	Hz	50/60
Effect	W	75
Max. power consumption	A	0.7
IO type 15, 10RL 8AI 8AO		No jumpers. Requires external resistors for use with e.g., water meters. Comes with resistors.
Inputs		8 x 0-10 V DC Input impedance 2.1 mOhm
Outputs		8 x 0-10 V DC Output impedance 10 Ohm
Relays		10 x NO/NC potential free max. Max. voltage/current at resistive load 250Vac/5Aac Max. voltage/current at inductive load 250Vac/2Aac
CAN bus		
Protocol		CANopen in accordance with CiA301 and CiA401
Baud rate (non-adjustable)	Kbd	125
Max. cable length	m	400
Mechanical		
Material		ABS
Cable knock-out holes		20 x M25 For metrical cable glands
Environment		
Operating temperature	°C (°F)	-10 to +45 (+14 to 113)
Storage temperature	°C (°F)	-25 to +60 (-13 to +140)
Relative humidity, operation	% RH	0-80
Protection class	IP	54 (splash-proof) It is assumed that the base surface is flat, i.e. ≤ there is a 1.5 mm difference in height, and the front panel screw is tightened to a minimum of 1.5 Nm.
Shipment		
Dimensions H x W x D	mm	381 x 400 x 170
Packing dimensions H x W x D	mm	425 x 555 x 195
Weight	g	5800
Shipping weight	g	6900

7.1 Dimensioned sketch