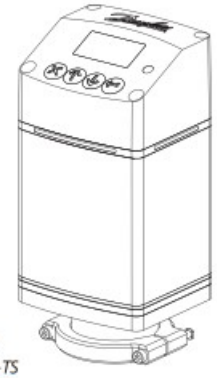
Danfoss ICAD 600B Motor Actuator Installation Guide

UK CA

ENGINEERING TOORROW
Installation guide
Actuator
Type ICAD 600B / 600B-TS / 1200B
027R9001

Contents

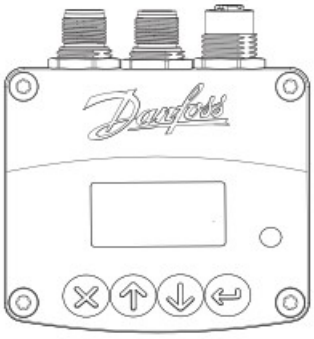
ICAD 600B Motor Actuator



ICAD 600B
ICAD 600B-TS
ICAD 1200B

1

ICAD 600B
ICAD 600B-TS
ICAD 1200B



Buttons and display description in page 4

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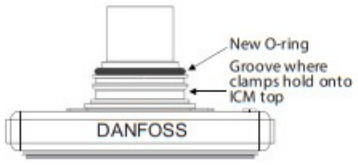
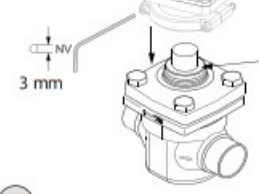
Before installing ICAD on ICM please read the separate guides "Mechanical installation of ICAD on ICM", and "Quick start guide"

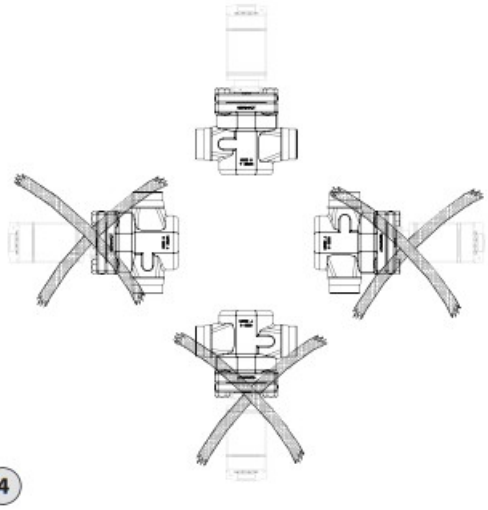




Remove PTFE ring (if fitted)
Replace O-ring

Nm	LB-feet
Max. 3	Max. 2.2

3



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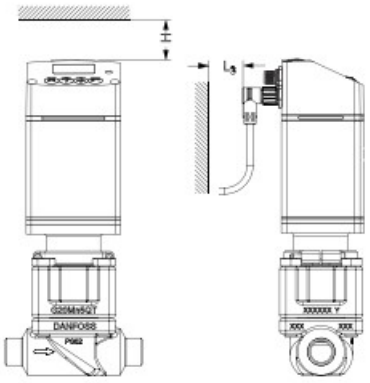
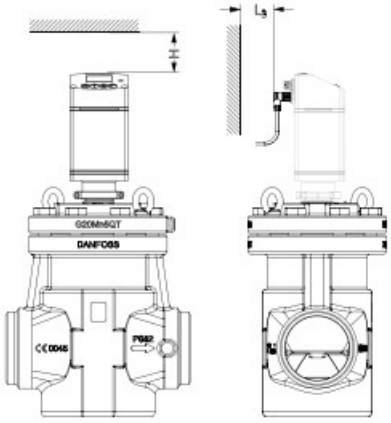
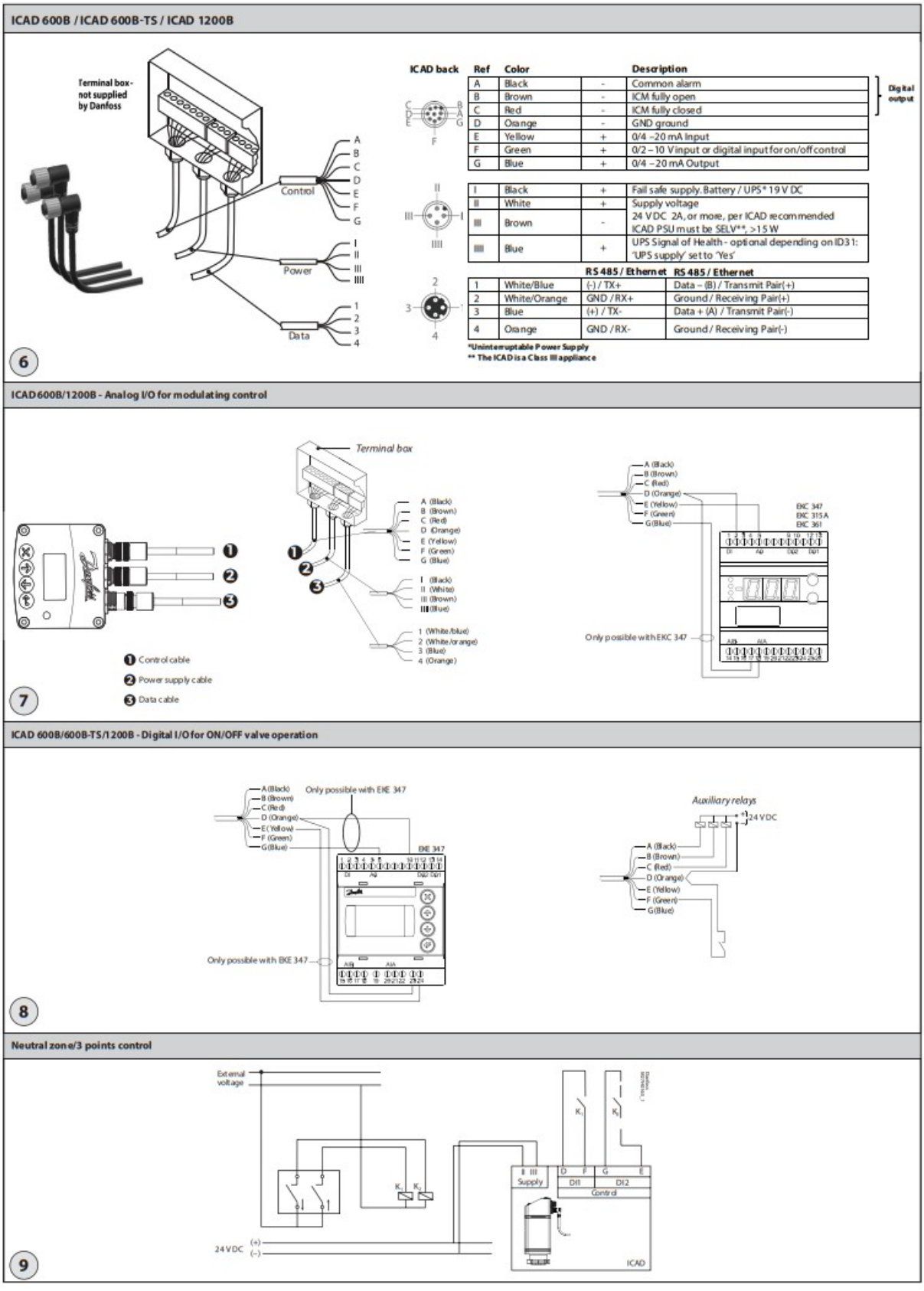


	mm	in.
H	45	1.77
L_3	25	1

5a *ICM + ICAD 600B/ICAD 600B-TS*



5b *ICM + ICAD 1200B*



Installation

Do not install ICAD before welding. This apply for electrical as well as for mechanical installation. Please observe that ICAD when connected to 24 V DC, will send out acoustic noise at stand still. This has no influence on the function/ operation of the ICAD.

Use

ICAD 600B, ICAD 600B-TS and ICAD 1200B can be used together with the following Danfoss valves (fig. 1, 5a and 5b).

ICAD 600B	ICAD 600B-TS	ICAD 1200B
ICM 20	ICMTS 20	ICM 40
ICM 25	ICMTS 50	ICM 50
ICM 32	ICMTS 80	ICM 65
		ICM 100
		ICM 125
		ICM 150
		CVE pilot valve

Electrical data
Supply voltage is galvanically isolated from in-/output.
ICAD is a Class III product.
PSUs connected to ICAD must be SELV<100 VA For UL compliance: PSU must be Class 2 NEC
Supply voltage
24 V DC (Tolerances; see below table)
Load ICAD 600B, ICAD 600B-TS: 1.2 A ICAD 1200B: 2.0 A

24 Volt DC ONLY

 Please observe cable voltage drop.
Distance between the applied DC transformer and the ICAD terminal box may cause a voltage drop. Cross section of cables and size of DC transformer must be calculated so that the voltage at all time at the ICAD terminal box*, both during standstill and during operation of ICAD, is within this range:

Prefabricated ICAD cable length Code number		1.5 m 027H0426	3 m 027H0438	10 m 027H0427	15 m 027H0435
Voltage ICAD terminal (600B/12006) [V DC]	Min.	21	22	23	24
	Max.	26.4			

* Do not measure inside the ICAD itself (value can be checked in ICAD B menu).
Fail safe supply
24 V DC (Tolerances; see table above)
Load ICAD 600B, ICAD 600B-TS: 1.2 A ICAD 1200B: 2.0 A
Data communication
RS 485: It is important that the installation of the data communication cable is done correctly. For further guidance, see literature No. RC8AC902.
Remember termination at the bus termination.
Max lenght of cable: 1200 m with specific cable and limited data rate. Follow RS485 standard.
Insulation from power supply input, metallic part and interface output : 500 V DC: *For input/output connections
Anolog Input – Current or Voltage Current
Input range: 0/4 – 20 mA
Max input range: 0 – 24 mA
Input resistance: 120 W + diode voltage 0.7 V DC
Measurement error: <±1.5% of the full scale
Reverse polarity protection: yes
Overcurrent protection: yes

Voltage
Input range: 0/2 – 10 V DC
Max input range: 0 – 12 V DC
Measurement error: <±1.5% of the full scale
Reverse polarity protection: yes
Analog Output
Output range: 0/4 – 20mA
Load: <800 W
Output error: <±1.5% of the full scale
Recommended external resistor for Hot application:
Rext=800 W-load 1W power rate
Digital Input – Digital ON/OFF input by means of voltfree contact (Signal/Telecom relays with gold-plated contacts recommended) – Voltage input used
Rth rise(OFF): >10 kW
Rth fall(ON): < 45 W
Digital Output – 3 pcs. NPN transistor output
External supply: 7 – 24 V DC (same supply as for ICAD can be used, but please note that the galvanically isolated system will then be spoiled).
On resistance: 55 W + diode voltage 0.7 V DC
Max 70 W at 50 mA
Max Output current: 50 mA
Reverse polarity protection: Yes
Overcurrent protection: No
Temperature range (ambient)
-30 °C/+50 °C (-22 °F/122 °F)
Enclosure
IP67 (~NEMA 6)
Electrical connection
Connection to ICAD is done via M12 connectors. ICAD has two M12 male and one M12 female connectors build-in:
Power supply: 4 poled M12 male connector
Control signals: 8 poled M12 male connector
Data communication: 4 poled M12 female connector
Power Supply cable with 4 poled M12 female connector
4 x 0.34 mm2 (4 x ~22 AWG) (fig. 6)
I: Black (+) 19 – 24 V DC fail safe supply (optional)
II: White (+) 24 V DC
III: Brown (–) 24 V DC
IIII: Blue (+) UPS signal of health
Control cable with 8 poled M12 female connector
7 x 0.25 mm2 (7 x ~24 AWG) (fig. 7)
A: Black (–) Digital output Common Alarm
B: Brown (–) Digital output ICM fully open
C: Red (–) Digital output ICM fully closed
D: Orange (–) GND – Ground
E: Yellow (+) Analog input 0/4 – 20 mA)
F: Green (+) Analog input 0/2 – 10 V / DI1 – Digital ON/OFF input.
G: Blue (+) Analog output 0/4 – 20 mA)
Data communication cable with 4 poled M12 male connector:

	RS 485 / Ethernet	RS 485 / Ethernet
1: White/Blue	(-) / TX+	Data – (B) / Transmit Pair(+)
2: White/Orange	GND / RX+	Ground / Receiving Pair(+)
3: Blue	(+) / TX-	Data + (A) / Transmit Pair(-)
4: Orange	GND / RX-	Ground / Receiving Pair(-)

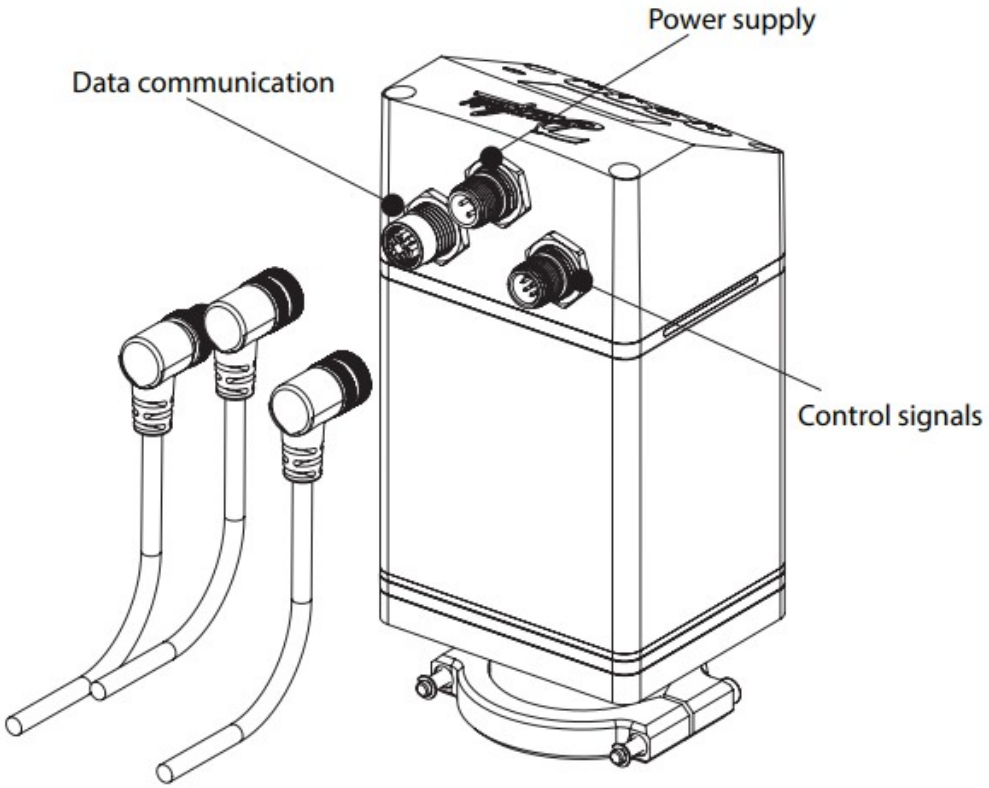
Electrical installation
General procedure for ICAD 600B/ICAD 600B-TS/1200B installed on all ICM, ICMTS & CVE valves.
All necessary electrical connections to be made.
Fig. 6
• Analog operation – 7 wired cable (A-G)
Modulation control. Valve to be controlled from Danfoss electronics, type EKC/EKE (fig. 7), or third party electronics (like e.g. PLC).
Connect analog input signals. Currrent (mA) or Voltage (V). See Parameter list for configuration of analog input signals
Yellow (+) and Orange (GND) are used for current (mA) input
or
Green (+) and Orange (GND) are used for Voltage (V) input
Blue (+) and Orange (GND) are used for current (mA) output (optional, not mandatory)
Fig. 6
• Digital operation – 7 wired cable (A-G)
ON/OFF ICM solenoid valve operation. ICM valve to be controlled by means of a digital voltfree contact.
– Connect digital input signals (fig. 8). See Parameter list for configuration of digital input signals
– Green (+) and Orange (GND) are connected to a voltfree contact
Digital output signals are optional, not mandatory.
– Black (–) and Orange (GND) are connected to auxiliary relay for Common Alarm
– Brown (–) and Orange (GND) are connected to an auxiliary relay indicating ICM fully open
– Red (–) and Orange (GND) are connected to an auxiliary relay indicating ICM fully closed
• **Supply voltage – 4 wired cable(I, II, III, IIII)**
ICAD must be connected to a normal 24 V DC supply. As an option, a fail safe supply is possible by means of a battery or UPS (Uninterruptible Power Supply). When voltage is applied as described below, ICAD is ready to be configurated.
See Parameter list.
ICAD configuration can be done independently whether the ICAD is installed on the valve or not.
See Mechanical installation.
Connect the White (+) and Brown (–) to 24 V DC supply voltage (fig. 6)
Fail safe supply as an option (not mandatory).
Connect the Black (+) and Brown (–) to a fail safe supply.
Mechanical installation
General procedure for ICAD 600B/ICAD 600B-TS/1200B installed on all valves (fig. 3).

- Check that the two socket screws are fully unscrewed counter clockwise with a 3 mm Hexagon key
- If valve is fitted with PTFE ring and O-ring, remove both and replace it with O-ring included in ICAD (as instructed in fig. 3)
- Mount ICAD by slowly lowering it on top of the valve.
- The magnet coupling will drag the valve and ICAD together and in position
- Push ICAD in place
- Fasten valve and ICAD with the two socket set screws using a 3 mm Hexagon key

 Special moisture seal is damaged if screws are removed (fig. 3).

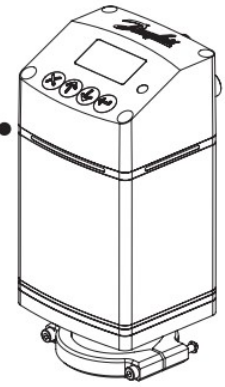
Power on & start operation

ICAD has a light guide viewable from three sides, which indicates the status. Immediately after power on the light guide and display lights up.



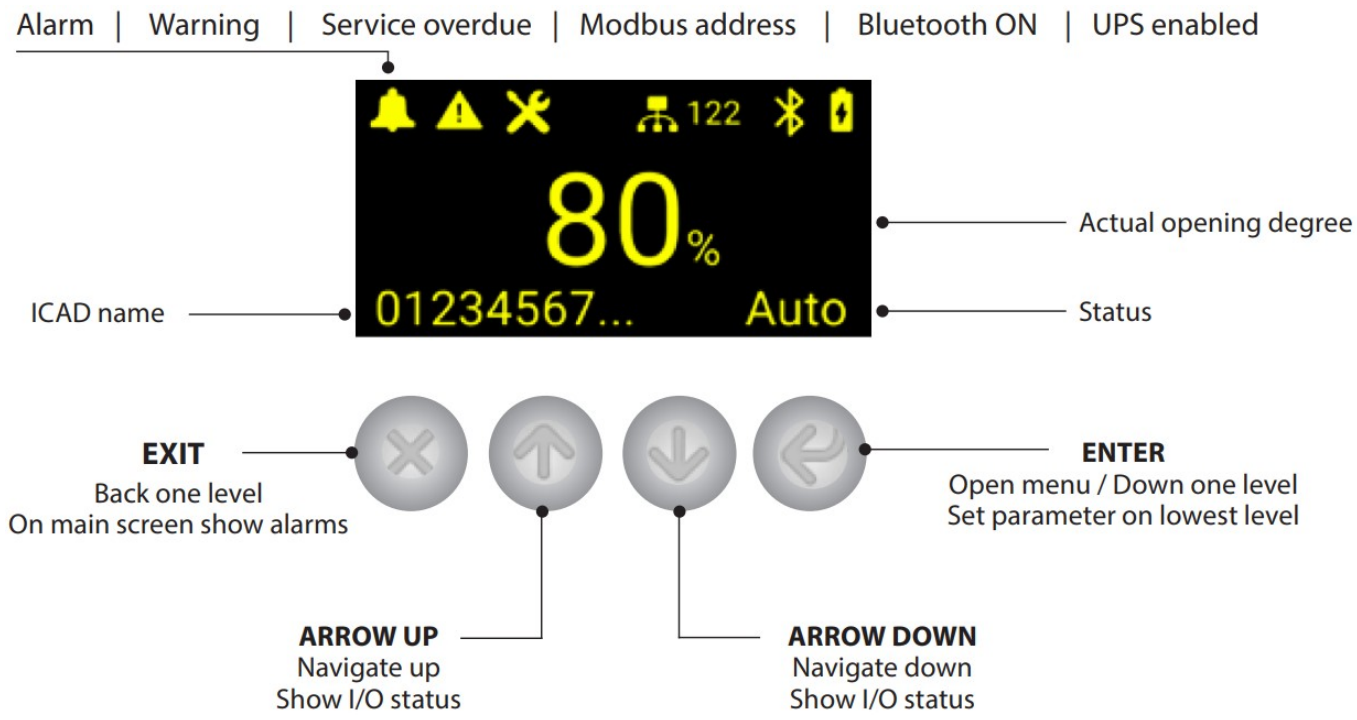
Light guide

Steady red	Critical alarm - stopped operating
Flashing red	Severe alarm - danger of stopping operating
Flashing blue	ICAD is connected via Bluetooth
Flashing yellow	Warning
Flashing green	OK



The main screen layout and navigation is as described below. ICAD will start up in alarm mode as the ICM configuration needs to be defined to start operation. Follow the steps on next page to set this up correctly.

STATUS BAR

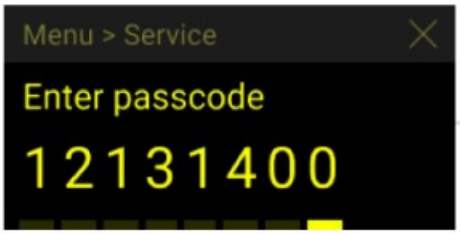


Set valve (A1 alarm)

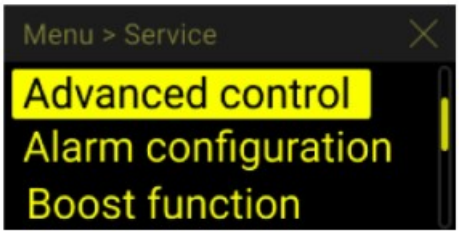
Press enter ↵

*Pressing and holding ↵ will go directly to the passcode screen

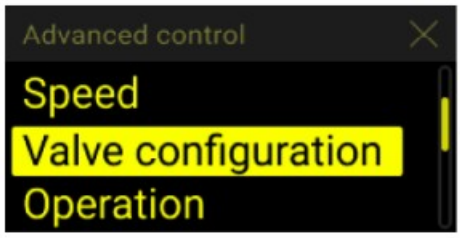
Press down ↓ until Service is selected, then press enter



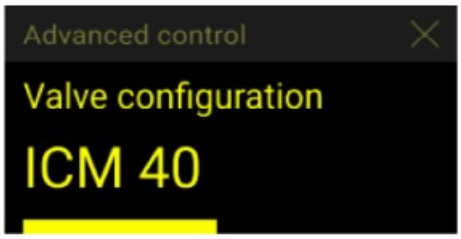
Enter the 8 digit service passcode* using ↑ ↓ press enter ↵ to enter next number
*factory is 12131400



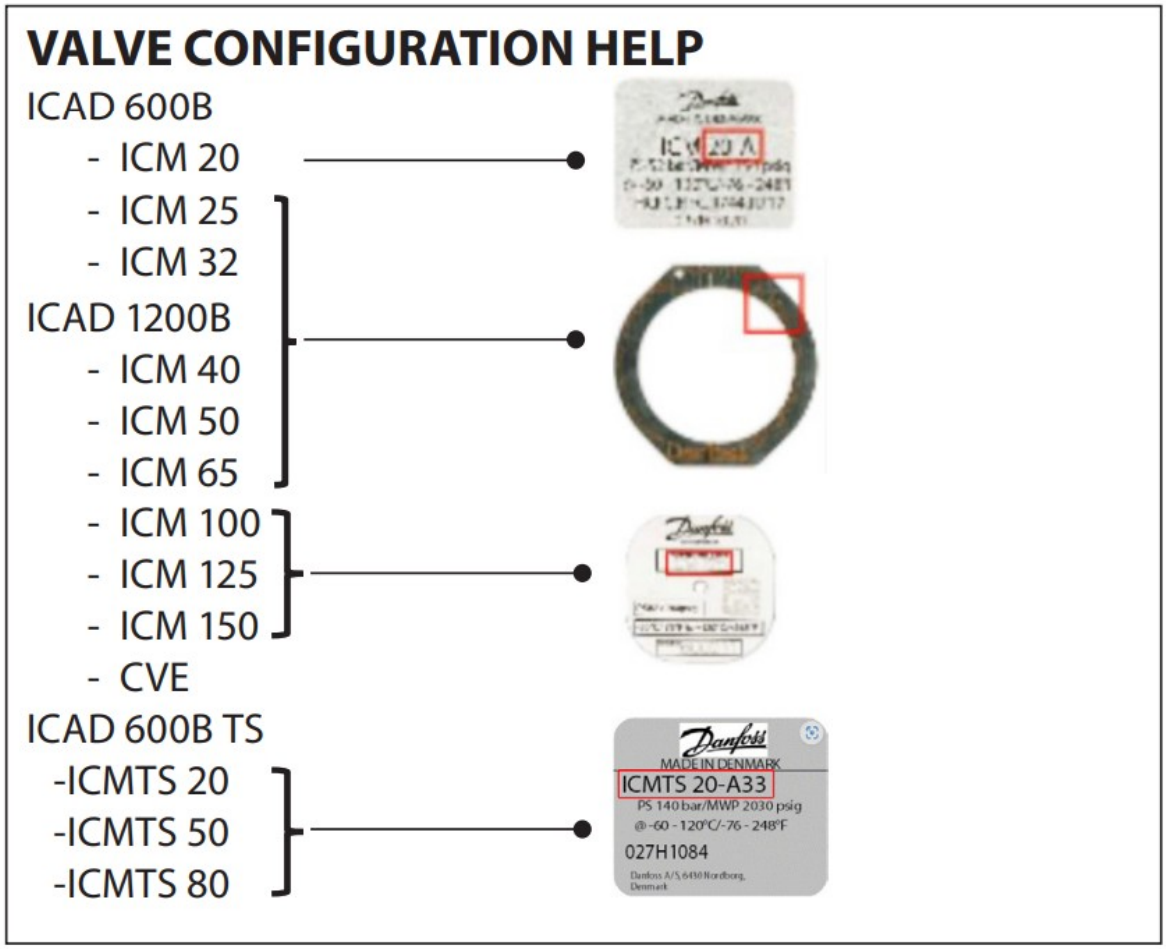
Navigate to Advanced control in the service menu using ↓, then press enter ↵



Navigate to Valve configuration using ↓, then press enter ↵

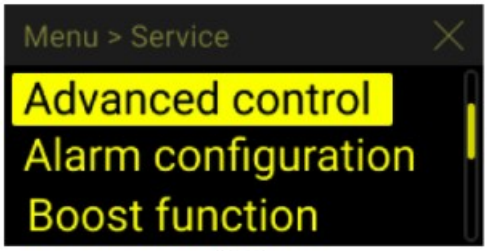


Select the ICM size or CVE. Press enter ↵ to set, and you will be navigated back to the previous screen. Continue to next step or press ✕ to get back to main screen



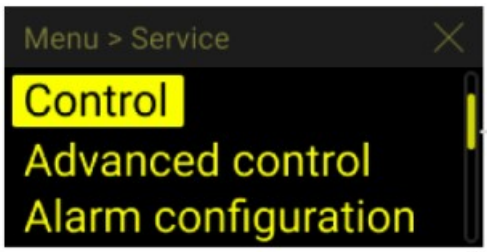
Change analog input signal (optional)

ICAD will function based on factory settings as soon as the valve configuration has been set. The default settings are Modulation using an analog input of 4–20 mA.

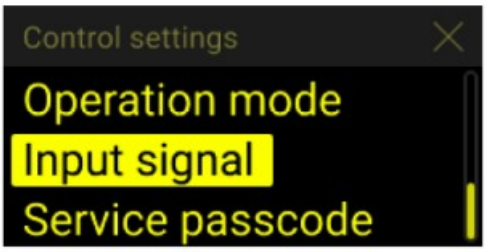


Navigate back from the advanced control menu using ✕

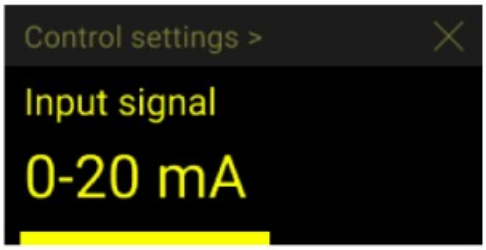
If starting from main screen press enter ↵ and navigate to the service menu like in previous step.



Now navigate to Control in the service menu using ↑, then press enter ↵



Next navigate to Input signal in the service menu using ↓, then press enter ↵



Select the desired input signal. Press enter ↵ to set, and you will be navigated back to the previous screen.

Press ✕ to get back to main screen

Further languages and documentation

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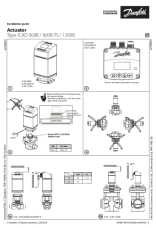
Documents / Resources

	Danfoss ICAD 600B Motor Actuator [pdf] Installation Guide ICAD 600B, ICAD 600B-TS, ICAD 1200B, ICAD 600B Motor Actuator, Motor Actuator, Actuator