

Installation guide

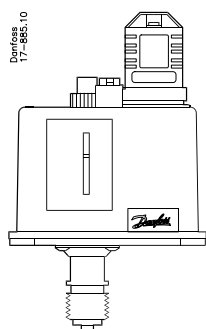
Pressure controller with fixed differential Type BCP



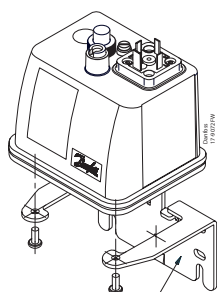
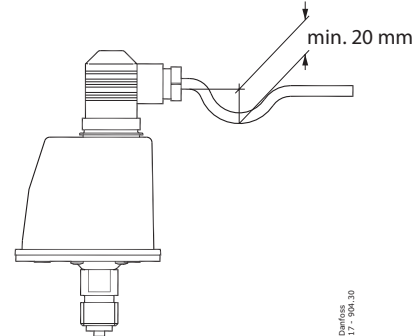
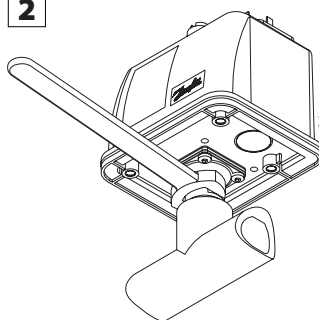
017R9329

017R9329

1

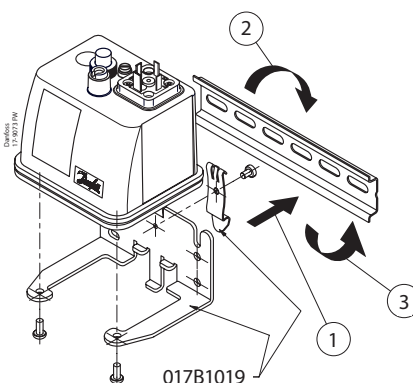


2



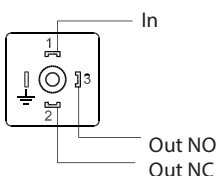
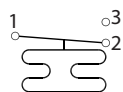
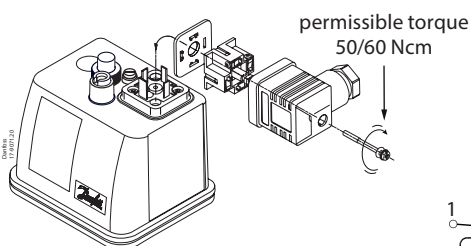
017B1018

Mounting accessories



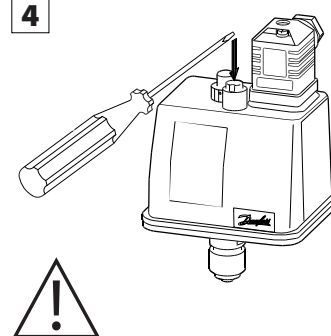
017B1019

3



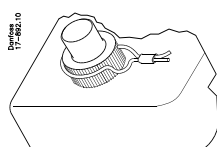
- 1. Input
- 2. Normally closed (NC)
- 3. Normally open (NO)
- ≡ Connected to chassis of pressure control

4

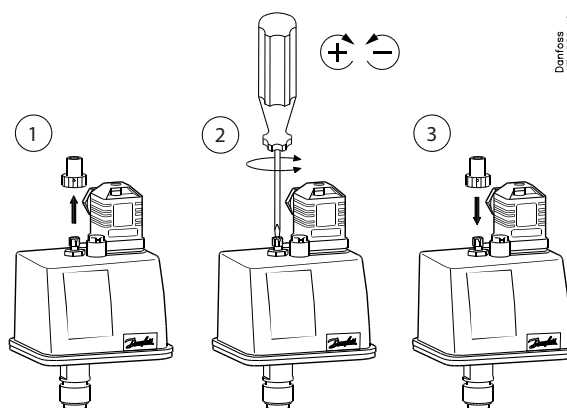


Danfoss 17-885.10

5



6



Danfoss 17-885.10

Імпортёр:ТОВ з іі "Данфосс ТОВ" 04080, Київ 80, п/с 168, Україна

Info for UK customers only: Danfoss Ltd., 22 Wycombe End, HP9 1NB, GB

ENGLISH

Technical data

BCP pressure controller with auto reset
(fig.1)

Type	Range	Max. working pressure* MWP
Controller	[bar]	[bar]
BCP1	0.1 – 1.1	6
BCP2	0 – 2.5	10
BCP3	0 – 6.0	16
BCP4	1 – 10	25
BCP5	2 – 16	32
BCP6**	5 – 25	40
BCP7**	10 – 40	63

Max. test pressure: 1.1 × MWP
 Min. test pressure: 1 bar
 Media: steam, water, air
 Max. allowable vacuum: 0.5 bar (BCP1 type only)
 Max. media temperature: max. 120 °C
 Ambient temperature: -20 – 70 °C
 Enclosure: IP65
 Pressure connection: G ½ A

Action type according to EN 60730:
 Type BCP 2B

***) If the system pressure exceeds MWP then accuracy of the control setting can be lost.**

****) Pressure controls with double bellows.**

Installation

In order to prevent malfunction of the pressure switch the installation must be carried out acc. to the below description.

The cover of BCP should never be dismounted. This is not necessary neither for installation nor for use of the switch.

The plug should be mounted after installation of the pressure switch. Mount the pressure switch directly on the pipe. Always use a wrench. (fig.2). Damp strong pressure pulsations. A damping loop will often be sufficient. Insert a water filled loop as a temperature barrier – for example a 10 mm copper tube – if there is a risk of the pressure connection to the switch becoming heated to more than 120 °C.

Steam boilers:

Connecting pipes for the controller should be connected to the steam space of the boiler and if necessary, the controller shall be protected against the steam temperature by a water seal. If isolating valve is fitted on the connection pipe, the valve must be fitted with a position locking device.

Fully flooded hot water generators:

The controller should be connected to the supply pipe before the first shut-off valve. The controller body should be installed vertically so that dirt does not enter the controller. If there is the possibility of sludge build-up in the connection pipe it should be possible to purge the pipe. Such purging must not remove the water seal or introduce dirt into the water seal.

In addition, the connection pipe and its boiler connection must be designed for cleaning and inspection and have a clear bore of at least:

1. Where pipe supplies only the controller:
 Ø8 mm – if pipe is less than 1 m long
 Ø15 mm – if pipe is more than 1 m long
2. Where pipe supplies the controller in addition to other controller:
 Ø20 mm – for all lengths of pipes.

Functional testing of the controller

Since the pressure controller has no internal possibility for functional testing, there has to be a provision made for functional testing of the device at the boiler site.

The result of the test must be clearly visible to the boiler operator. The test function should not decrease the boiler safety or lead the pressure controllers to become inoperable e.g. by possible permanent override.

Wiring

Electrical connection:
 Plug DIN 43650, Pg 11 (fig. 4)

Contact load

Type A contacts gold plated silver	
When used as gold contacts:	When used as silver contacts ¹⁾
Min. 1 mA, 5 V Max. 100 mA, 30 V	AC-1: 6 A, 250 V ²⁾ AC-15: 1 A, 250 V ³⁾ DC 13 10 W, 250 V ⁴⁾

¹⁾ If used with current higher than 100 mA and voltage higher than 30 V the gold layer will be burned away and the unit can not be used as gold again.

²⁾ AC-1 Ohmic load, cosφ 1.

³⁾ AC-15 inductive load like coil and contactors with cosφ 0.3.

⁴⁾ DC 13 Direct current load.

Short circuit protection

The BCP contact system and any cooperated external contactors or relays should, against the effects of short circuits, be overcurrent protected with 0.6 safety factor.

It means that the nominal current of the device, as stated by the manufacturer, is to be multiplied by a safety factor of 0.6.

Example:

Rated load for AC15 is 2 A.

Safety factor is 0.6 in consequence:

fuse = 2 A × 0.6 = 1.2 A or less.

Expected electrical life time:

Min. 250.000 cycles under full contact load

Adjustment

IMPORTANT:

- Do not adjust pointers beyond the highest or lowest indicator marks on the scale plate, as this may cause inaccurate switch operation.
- Do not apply torque greater than 50 Ncm as it can damage the pointers
- The scale plate is only for reference and for more precise setting a pressure gauge should be used.
- Low Switching Point must be above absolute vacuum!

If the differential is set too high on the controller then it will not switch.

Pressure Controller

Scale plate directly indicates High Switching Point (HSP):

1. Set High Switching Point (HSP) by adjusting range screw (fig. 6)
2. Low Switching Point (LSP) is equal to High Switching Point (HSP) less Differential:

$$\text{LOW} = \text{HIGH} - \text{DIFFERENTIAL}$$

Protection for settings

The protective cap on adjustment screws may be used to lock and seal the settings (fig. 5)

BCP pressure controller with auto reset as a limiting device

Since the pressure controller BCP has no lockout with manual resetting, this function must be realized externally as a part of a safety logic e.g. by external contactors and/or relays which then are to be used according to the requirements of prEN50156-1 standard for safety relevant hardware.

External closure must not be interlocked, while loss of auxiliary energy must lead to a closure.

Resetting must not be automated; it has to be performed manually.

Resetting on fault must lead to a repeated closure. When BCP limits, for rising or falling application, the external safety logic must change to the fail safe position.

Endurance of any external contactors and relays must be according to

EN12952-11, which means 250000 switching cycles under conditions similar to operating conditions and be capable of a mechanical life time of 2 000 000 switching cycles. Conditions similar to operating conditions include chemical and climatic influences as well as electrical and mechanical stresses. In addition, contactors must fulfil EN60947 and relays must fulfil EN60255.

BCP with double bellows

BCP6 and BCP7 have a double bellows; an outer bellows and a regulating (inner) bellows.

When system pressure exceeds the set value, the BCP will automatically stop the plant. The double bellows system prevents loss of media in the event of bellows rupture. A rupture in the inner bellows will cause the switch cut-out pressure to fall about 3 times less the set value, thus the system will stop. A rupture in the outer bellows will cause the switch cut-out pressure to fall to about 3 bar under the set value, thus providing a fail-safe function.



Safety requirements

Installation

- Internal rules and legislation current in the country concerned with respect to health and safety at work must be observed,
- For safety reasons, the installation of pressure switches must be carried out only by qualified staff, trained in all technical aspects of their operation,
- Before installation the pipes must be depressurised and purged (empty of its fluid) in order to avoid any danger to the operator,
- It is essential to isolate the power supply before wiring connections are made to avoid possible electrical shock or damage to equipment. Never touch live parts with your fingers or with any tool,
- DIN plug supplied by Danfoss and cable approved for the application must be used. The cable must be connected with adequate stress relief in order to prevent that pulling forces can be carried through the cable to the plug.

Commissioning

Before putting pressure switch into operation, check that:

- The working conditions are compatible with the details given in the product label and this instruction notice,
- All electrical connections have been properly made,
- Installation is tight after assembly.

Operation

- This notice must be available on site where pressure switches are installed,
- Internal rules and legislation current in the country concerned with respect to health and safety at work must be observed,
- Personnel carrying out any intervention on the pressure switch must be qualified for the task,
- The pressure switch should be checked regularly to see if it operates properly,
- The BCP cover must not be removed under any circumstances,
- Any overload of the pressure switch must be prevented. Overloaded or damaged switch must be exchanged,
- It is essential to disconnect the plug before dismantling the switch from the system,
- All operations must be performed using suitable tools,
- It is the responsibility of the user to check that there is no leakage after a faulty operation or on a periodic basis under normal conditions,
- Only pressure switches designed, constructed and released by Danfoss must be used for the applicaiton concerned. Danfoss can accept no responsibility in case of alterations made on the pressure switches or the use of them against the instructions of Danfoss,
- Danfoss is not responsible for any damage which may be caused by the use of parts, accessories or switches which are not original Danfoss parts.