



Collection of Instructions

Instructions for Danfoss

Refrigeration & Air conditioning Controls



Contents

Liquid level controls

38E	354
AKS 38	355
PMFH damping cylinder.....	360
EKA 38E Converter	361
HFI 040-070	363
TEVA	365
LLG	366
MLI 20-40	369
PMFH	370
PMFH 80-500	374
PMFH special springs	377
PMFL	378
PMFL special springs	384
RT 280A, RT 281A	385
SV 1-3	387
SV 4, 5, 6	392
SV 4, 5, 6 Orifice	394
SV complete float insert	395
SMV/SMVE	396
MEV.....	402



38E

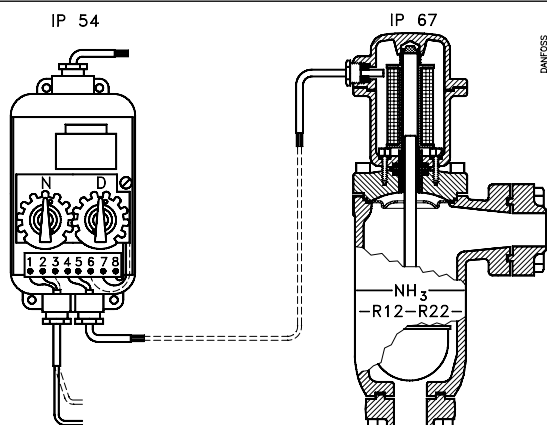


Fig. 1

R12, R22, R502, R717 (NH₃)

PB / MWP = 28 bar (400 psig)

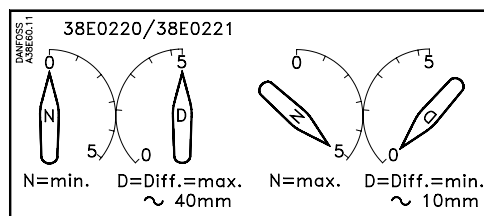
P_{test} max = 42 bar 600 psig

Fig. 6

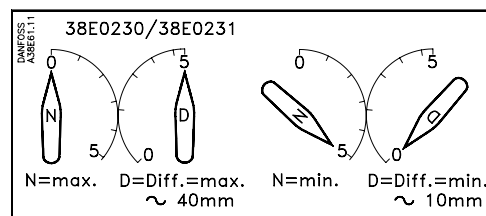


Fig. 7

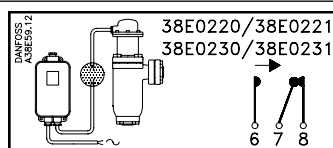


Fig. 2

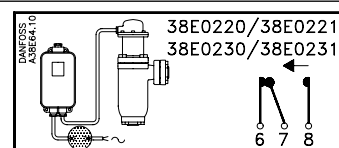


Fig. 3

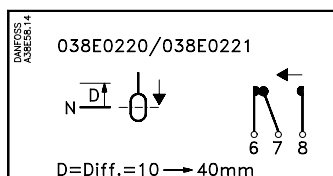


Fig. 4

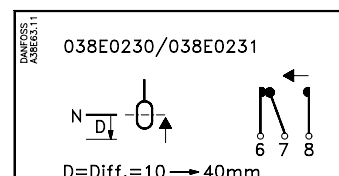


Fig. 5

DANSK

Montering

- Niveaumærkerne 1 på svømmerhuset (fig. 1) viser middelniveauet for det anvendte kølemiddel.
- Det nederste tilslutningsrør skal have fald mod væskeseparatoren for at undgå, at der dannes en olielås, der ville hæmme svømmerens bevægelse.
- Afspærringsventil/magnetventil skal monteres så tæt ved svømmerhuset som muligt
 - for at minimere indespærret væskevolumen
 - for at undgå risiko for væskeslag
- Forstærkeren kan monteres i vilkårlig afstand fra svømmerhuset
- Forstærkerhuset skal monteres lodret.

El-tilslutning, fig. 1

Hvis styrespolen kortsluttes eller afbrydes, fås kontaktstilling 7-8 (fig. 2).

Hvis netspændingen afbrydes, fås kontaktstilling 7-6 (fig. 3)

Indstilling

Indstil niveau N og differens D (fig. 1, 6 og 7). Summen af skalaværdierne for niveau og differens kan højst være 5 (N + D = max. 5).

38E0220/38E0221

Kontakterne 6-7 (fig. 4) slutter, når niveauet er faldet til den indstillede værdi N - og bryder igen, når niveauet er steget med differensværdien D. Drejes knappen N (fig. 6) højre om, hæves væskeneiveauet.

38E0230/38E0231

Kontakterne 6-7 (fig. 5) slutter, når niveauet er steget til den indstillede værdi N - og bryder igen, når niveauet er faldet med differensværdien D. Drejes knappen N (fig. 7) højre om, sænkes væskeneiveauet.

ENGLISH

Fitting

- The level marks 1 on the ball float (fig. 1) show the mean level for the refrigerant used.
- The lowest connecting pipe must have an inclination towards the liquid separator to avoid an oil seal forming which would hamper the ball float's movement.
- The shut-off valve/solenoid valve must be mounted as close as possible to the ball float
 - to minimize trapped liquid volume
 - to avoid risk of water hammering
- The amplifier can be fitted at any distance from the ball float housing
- The amplifier housing must be fitted vertically.

Electrical connection, fig. 1

If the pilot coil short circuits or switches off, contacts 7-8 will occur (fig. 2).

If the main voltage is disconnected, contacts 7-6 will occur (fig. 3).

Setting

Set level N and differential D (figs. 1, 6 and 7). The sum of the scale values for level and differential may be max. 5 (N + D = max. 5).

38E0220/38E0221

The contacts 6-7 (fig. 4) make the circuit when the level has fallen to the setting N and break it again when the level has risen by the value of the differential D. Turning the knob N (fig. 6) clockwise raises the liquid level.

38E0230/38E0231

The contacts 6-7 (fig. 5) make the circuit when the level has risen to the setting N and break it again when the level has fallen by the value of the differential D. Turning the knob N (fig. 7) clockwise lowers the liquid level.

DEUTSCH

Installation

- Niveaumarkierung 1 im Schwimmergehäuse (Abb. 1) gibt die mittlere Einfüllmenge des Kältemittels an.
- Das untere Verbindungsrohr muß zum Flüssigkeitsabscheider hin geneigt sein, um so Ölsammlungen zu verhindern, die die Beweglichkeit des Schwimmers einschränken.
- Das Absperrventil bzw. das Magnetventil so dicht wie möglich am Schwimmergehäuse installieren, um
 - Flüssigkeitseinschlüsse zu reduzieren.
 - Flüssigkeitsschläge zu vermeiden.
- Der Verstärker kann in beliebiger Entfernung zum Schwimmergehäuse angebracht werden.
- Das Verstärkergehäuse immer senkrecht montieren.

Elektrische Anschlüsse, Abb. 1

Kurzschluß bzw. Unterbrechung der Steuerspulen verursacht Kontaktstellung 7-8 (Abb. 2).

Eine Unterbrechung der Netzspannung verursacht Kontaktstellung 7-6 (Abb. 3).

Einstellung

Niveau N und Differenz D (Abb. 1, 6 und 7) einstellen. Die Summe der Skalenwerte für Niveau und Differenz darf 5 nicht überschreiten (N + D = max. 5).

38E0220/38E0221

Die Kontakte 6 und 7 (Abb. 4) schließen den Stromkreis, sobald der Flüssigkeitsstand auf den eingestellten Wert N gefallen ist, und öffnen ihn wieder, sobald ein Anstieg um den Differenzwert D verzeichnet wird. Durch Drehen des Schalters N (Abb. 6) nach rechts wird der N-Wert erhöht.

38E0230/38E0231

Die Kontakte 6 und 7 (Abb. 5) schließen den Stromkreis, sobald der Flüssigkeitsstand auf den eingestellten Wert N gestiegen ist, und öffnen ihn wieder, sobald ein Abfall um den Differenzwert D verzeichnet wird. Durch Drehen des Schalters N (Abb. 7) nach rechts wird der N-Wert gesenkt.

148R9524

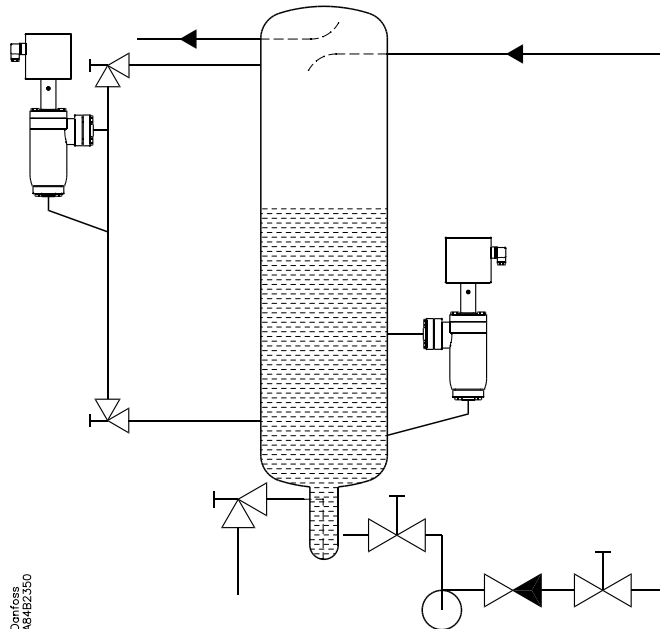


Fig./Abb. 1

CE

148R9524

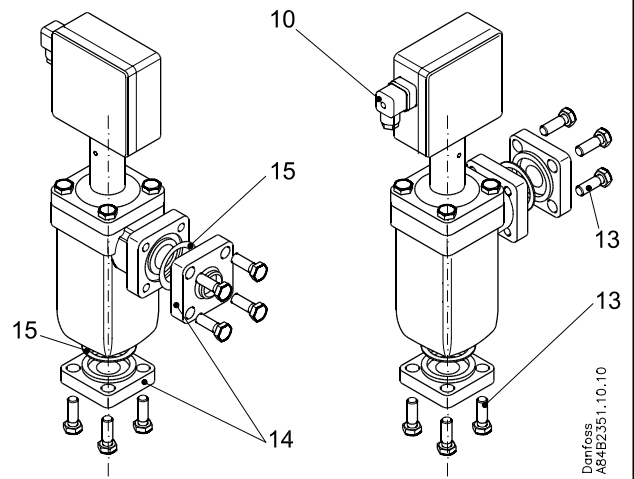


Fig./Abb. 2

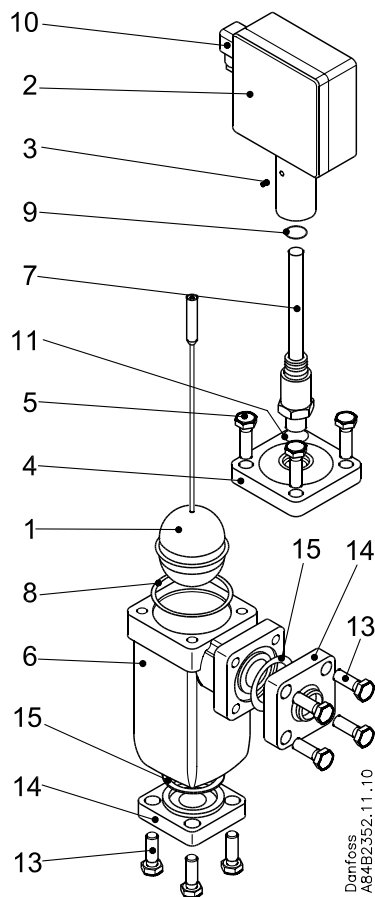


Fig./Abb. 3

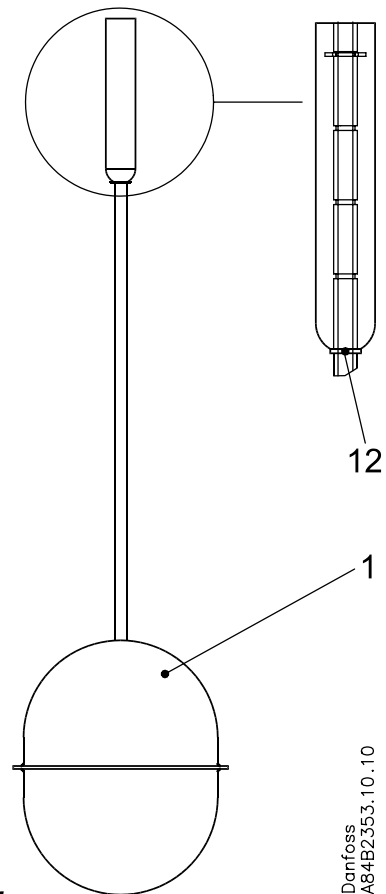


Fig./Abb. 4

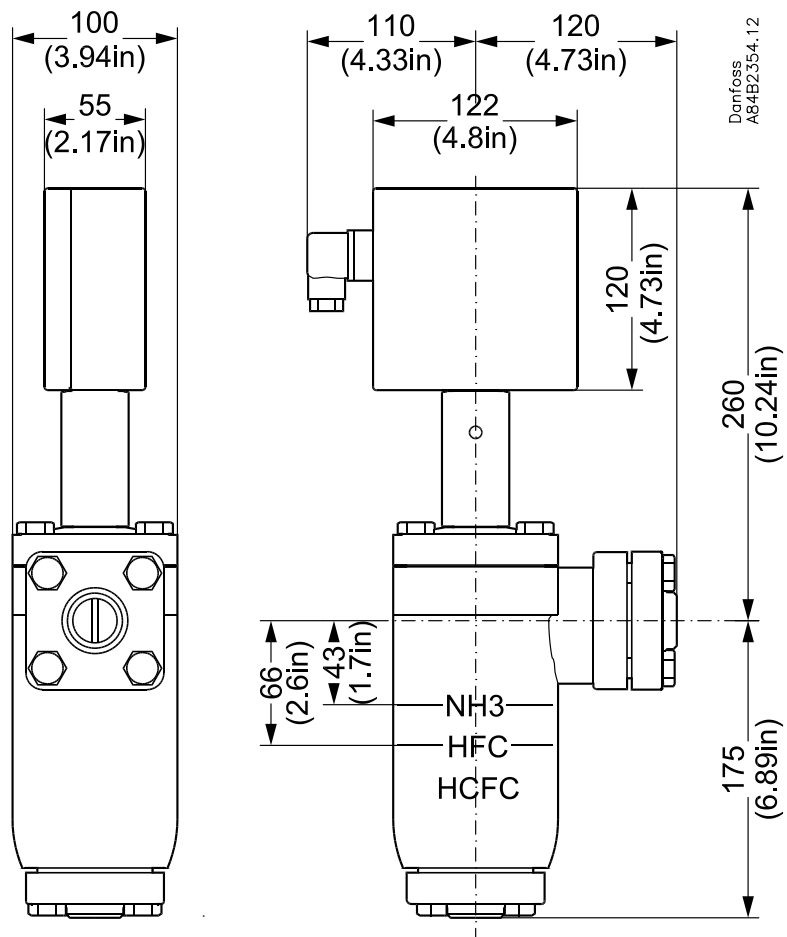


Fig./Abb. 5

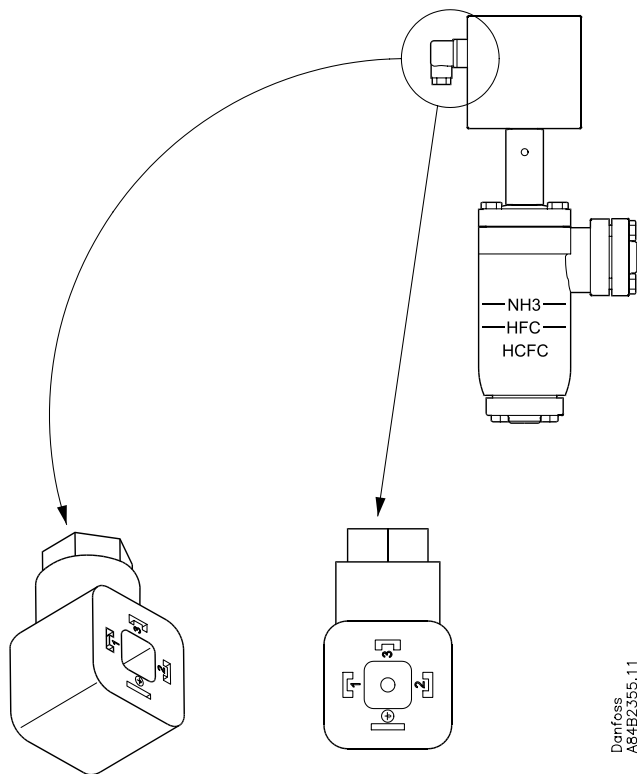


Fig./Abb. 6

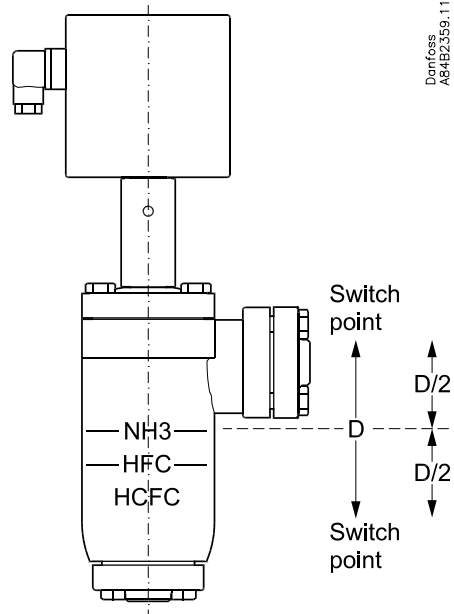
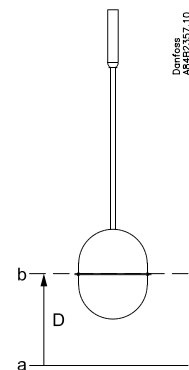
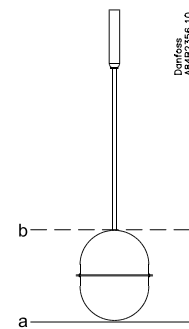
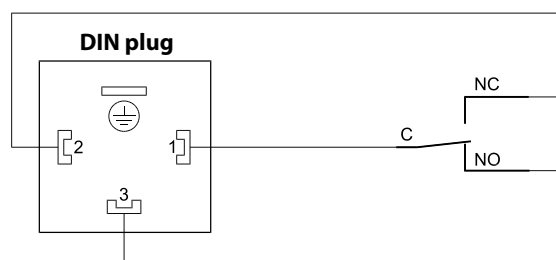
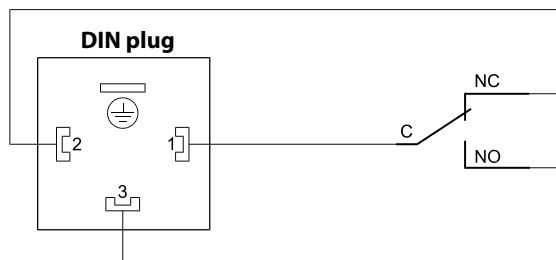


Fig./Abb. 7



- DK** Differens (D) = Variabel mellem 12,5 mm (1/2") og 50 mm (2") i trin à 12,5 mm (1/2").
- GB** Differential (D) = Variable between 12.5 mm (1/2") to 50 mm (2") in 12.5 mm (1/2") increments.
- D** Differenzial (D) = variabel zwischen 12,5 mm (1/2") und 50 mm (2") in Stufen von 12,5 mm (1/2").
- F** Différentiel (D) = Variable de 12,5 mm (1/2") à 50 mm (2") par pas de 12,5 mm (1/2").
- E** Diferencial (D) = Variable entre 12mm y 50 mm (1/2" a 2") con incrementos de 12 mm (1/2").
- I** Differenziale (D) = variabile tra 12.5 mm e 50 mm (da 1/2" a 2") con incrementi di 12 mm (1/2").

Fig./Abb. 8

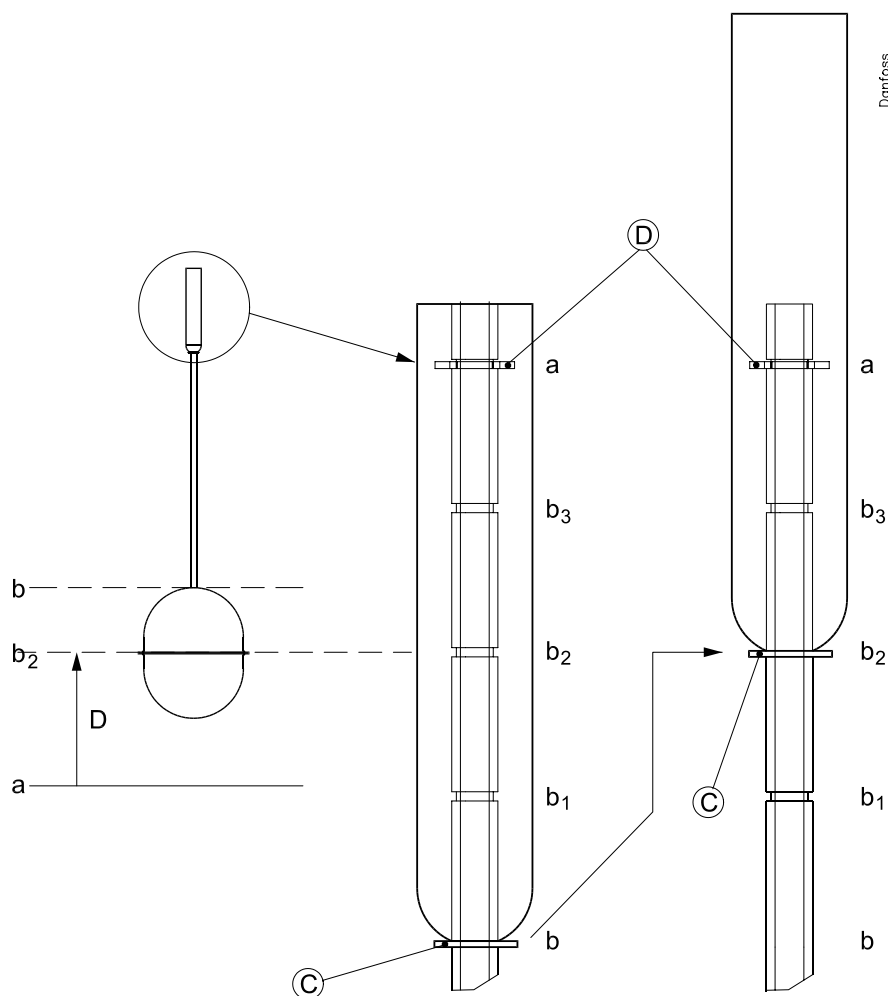


Fig./Abb. 9

Refrigerants

The AKS 38 can be used for all common non-flammable refrigerants, including R717 and non-corrosive gases/liquids dependent on sealing material compatibility.

Flammable hydrocarbons are not recommended.

Temperature range

-50°C/+65°C (-58°F/149°F)

Pressure range

AKS 38 is designed for a max. working pressure of 28 bar g (406 psi g)



IMPORTANT

Should pressure testing in excess of 28 bar g (406 psi g) be necessary then the internal float assembly must be removed, thus allowing a maximum test pressure of 42 bar g (609 psi g)

Electrical data

- Change-over Micro (SPDT) switch
- 250 V a.c / 10 A
- 30 V d.c / 5 A
- DIN Plug
- DIN 43650 connection
- PG 11, 8-10 mm (0.31" - 0.39")
- Screw terminal 1.5 mm² (16 AWG)
- 3+PE

Liquid level differential

Variable between 12.5 mm to 50 mm (½" to 2") in 12.5 mm (½") increments. Required differential setting should be made prior to installation.

Factory set at 50 mm (2").

Enclosure

IP 65

Installation



IMPORTANT

AKS 38 must always be installed in a vertical position (fig. 1 and 2).

AKS 38 is supplied complete with flanges (fig 2, pos. 14). The external surfaces of the flanges must be prevented against corrosion with a suitable protective coat after installation.

To avoid an oil seal forming which would affect the movement of the internal float the bottom connecting pipe must have an incline towards the liquid separator.

Shut-off valves should be mounted as close as possible to the float for service (fig. 1).

Switch point

The switch point is relative to the actual liquid level marking on the AKS 38 housing. See fig 7.

The upper switch point is actually (D : 2) higher than the actual liquid level marking.

The lower switch point is actually (D : 2) lower than the actual liquid level marking.

Where D = differential.

Adjusting the liquid level differential switch point (see fig. 9)

The float comes factory set with a differential setting of 50 mm (2") with the lower locking ring (C) in position b. To achieve smaller differential settings reposition the lower locking ring (C) at b₁ = 37.5 mm (1½"); (b₂ = 25 mm (1"); b₃ = 12.5 mm (½").

The upper locking ring (D) in position a should not be adjusted or repositioned.



IMPORTANT

The adjustment must be made before AKS 38 is installed in the refrigeration system. Use two thumbs for repositioning the locking rings. Do not use any tools.

Remove the AKS 38 switch box (fig. 3, pos. 2).

- Unfasten the M4 × 8 (fig. 3, pos. 3) pinol tailstock screw with a Allen key.
- Remove the switch box by slowly easing upwards.

Remove the AKS 38 housing top cover (fig. 3, pos. 4).

- Unfasten the 4 × M12 × 35 stainless steel bolts (fig. 3, pos. 5).
- Remove the complete top cover including installed pressure tube (fig. 3, pos. 7).

Remove the complete float assembly (fig. 3, pos. 1 and fig. 4, pos. 1) from the AKS 38 housing (fig. 3, pos. 6).

- Reposition the lower locking ring at the required differential setting.
- See fig. 8 and fig. 9.

Reassembly

- Refit the float assembly back into the AKS 38 housing (fig. 3, pos. 6).
 - Reinstall the complete top cover (fig. 3, pos. 4) and fasten the 4 × M12 × 35 bolts (fig. 3, pos. 5).
- Max. tightening torque: 74 Nm (100 ft-lb).

- Reinstall the switch box (fig. 3, pos. 2) by slowly forcing it down over the pressure tube (fig. 3, pos. 7).
- Position the switch box (fig. 3, pos. 2) as required and fasten the M4 × 8 pinol tailstock screw (fig. 3, pos. 3) with a Allen key.

Electrical installation

Make electrical connection to DIN plug using cable with maximum 4 cores and wire in accordance with wiring diagram (fig. 8).

1. Common
 2. Normally Closed
 3. Normally Open
- Earth terminal



IMPORTANT

The AKS 38 must be evacuated before opening to air.

Replacing the internal float assembly (fig. 3, pos. 1)

- Unscrew the stainless steel bolts 4 × M12×35 (fig. 3, pos. 5).
- Remove the top cover (fig. 3, pos. 4) including installed pressure tube (fig. 3, pos. 7) and switch box (fig. 3, pos. 2).
- Remove the internal float assembly (fig 3, pos. 1).
- Install the new float assembly.

Replacing the flange gaskets (fig. 2, pos. 15)

- Unscrew the 4 × M12×35 stainless steel bolts on the side flange (fig. 2, pos. 13).
- Unscrew the 4 × M12×35 stainless steel bolts on the bottom flange (fig. 2, pos. 13).
- Remove both gaskets (fig. 2, pos. 14).
- Install the new gaskets.
- Fasten 4 × M12×35 stainless steel bolts in each flange. Max. tightening torque: 74 Nm (100 ft-lb).

Replacing the top cover gasket (fig. 3, pos. 8)

- Unscrew the 4 × M12×35 stainless steel bolts (fig. 3, pos. 5).
 - Remove the top cover (fig. 3, pos. 4) including installed pressure tube (fig. 3, pos. 7) and switch box (fig. 3, pos. 2).
 - Remove the gasket (fig. 3, pos. 8).
 - Install the new gasket.
 - Fasten 4 × M12×35 stainless steel bolts (fig. 3, pos. 5).
- Max. tightening torque: 74 Nm (100 ft-lb).

Replacing the aluminium gasket (fig. 3, pos. 11)

- Unscrew the M4 × 8 pinol tailstock screw (fig. 3, pos. 3) with a Allen key.
- Remove the switch box (fig. 3, pos. 2) by slowly easing upwards.
- Unscrew the pressure tube (fig. 3, pos. 7) with a 32 mm wrench.
- Remove the aluminium gasket (fig. 3, pos. 11).
- Install the new gasket.
- Reinstall the pressure tube.
- Reinstall the switch box.

Replacing the switchbox (fig. 3, pos 2)

- Remove the DIN-plug (fig. 6).
- Unscrew the M4 × 8 pinol tailstock screw (fig. 3, pos. 3) with a Allen key.
- Remove the switch box (fig. 3, pos. 2) by slowly easing upwards.
- Install the new switch box.

Replacing the O-ring at the pressure tube (fig. 3, pos. 9)

- Unscrew the M4 × 8 pinol tailstock screw (fig. 3, pos. 3) with a Allen key.
- Remove the switch box (fig. 3, pos. 2) by slowly easing upwards.
- Remove the O-ring.
- Install the new O-ring.
- Reinstall the switch box.

DECLARATION OF CONFORMITY
The Pressure Equipment Directive 97/23/EC



Name and Address of Manufacturer within the European Community

Danfoss Industrial Refrigeration A/S
Stormosevej 10
PO Box 60
DK-8361 Hasselager
Denmark

Description of Pressure Equipment

Refrigerant Float Switch
Type AKS 38

Nominal bore	DN32 (1 1/4 in.)	
Classified for	Fluid Group I (all refrigerants (toxic, non-toxic, flammable and non-flammable)) For further details / restrictions - see Installation Instruction	
Temperature range	AKS 38	-50°C/+65°C (-58°F/+149°F)
Maximum allowable working pressure	AKS 38	28 bar (406 psi) -50°C/+65°C (-58°F/+149°F)

Conformity and Assessment Procedure Followed

Category		I
Module		A
Nominal bore	Standard applications	DN32 mm. (1 1/4 in.)

Name and Address of the Notified Body which carried out the Inspection

TÜV-Nord e.V.
Grosse Bahnstrasse 31
22525 Hamburg, Germany



Name and Address of the Notified Body monitoring the Manufacturer's Quality Assurance System

TÜV-Nord e.V.
Grosse Bahnstrasse 31
22525 Hamburg, Germany

References of Harmonised Standards used

EN 10028-3 EN 10213-3 EN 10222-4

LVD 73/23/EEC

References of other Technical Standards and Specifications used

DIN 3840 EN/IEC 60730-2-16

AD-Merkblätter

Authorised Person for the Manufacturer within the European Community

Name: Morten Steen Hansen Title: Production Manager

Signature:

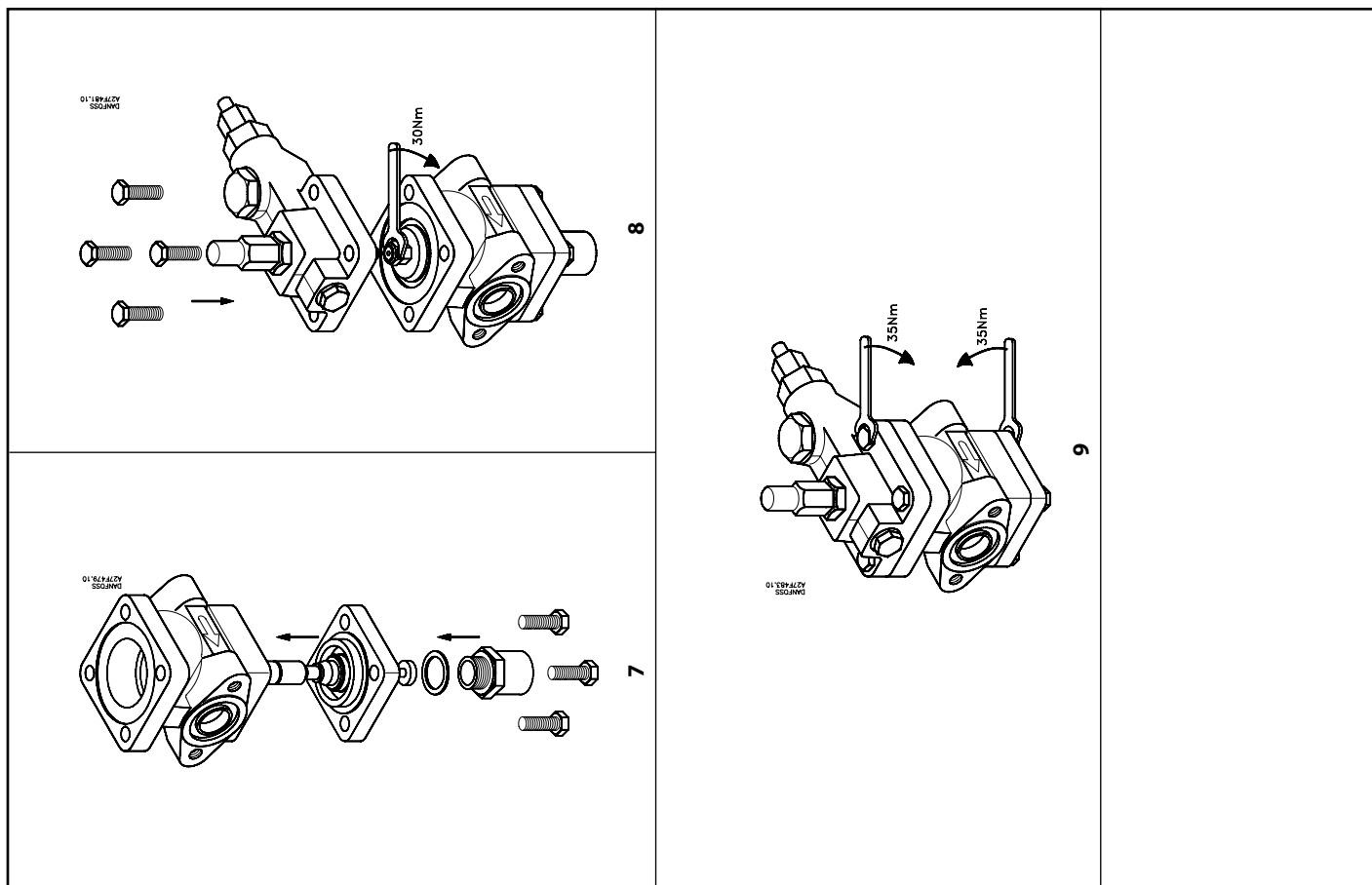
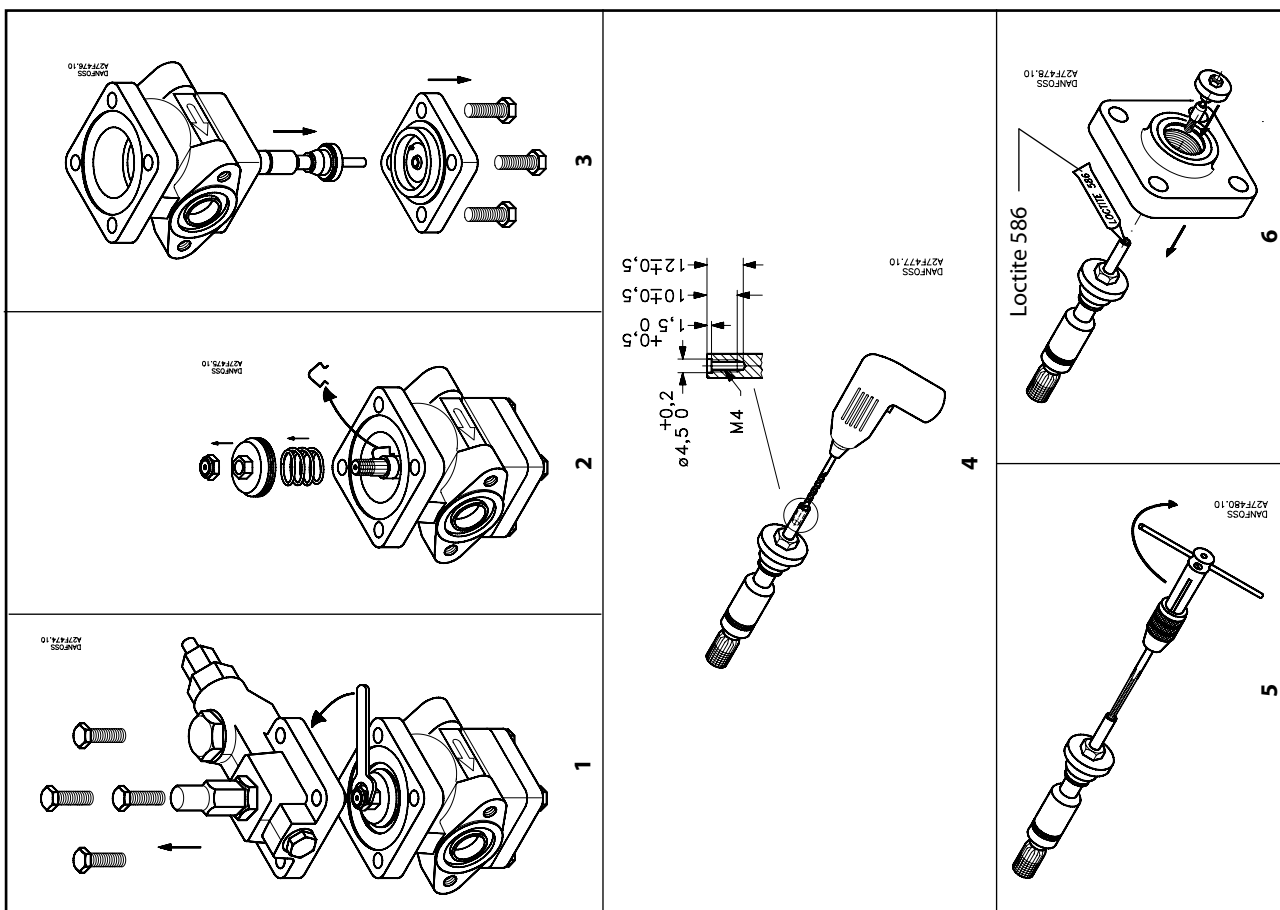
Date: 10/01/2003

148B9738 - rev. 0

Instructions Damping cylinder for PMFH

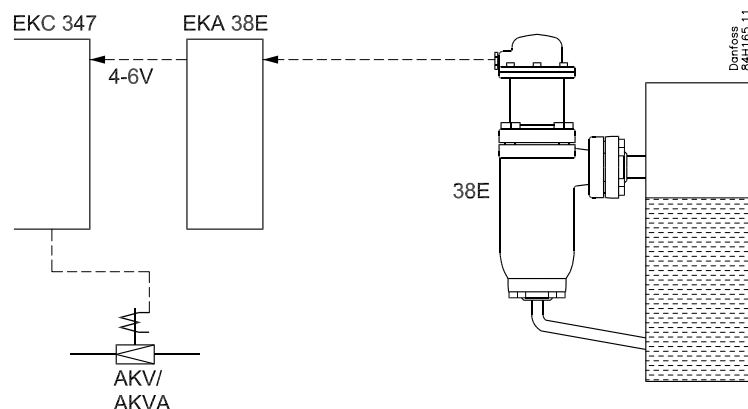
027R9507

027R9507



INSTRUCTIONS

EKA 38E Converter



Anvendelse

EKA 38E er en konverter, der kan modtage signal fra en svømmer type 38E, og derefter videregive signalet til niveauregulatoren type EKC 347.

Application

EKA 38E is a converter that can receive a signal from a float, type 38E, and subsequently retransmit the signal to liquid level controller, type EKC 347.

Anwendung

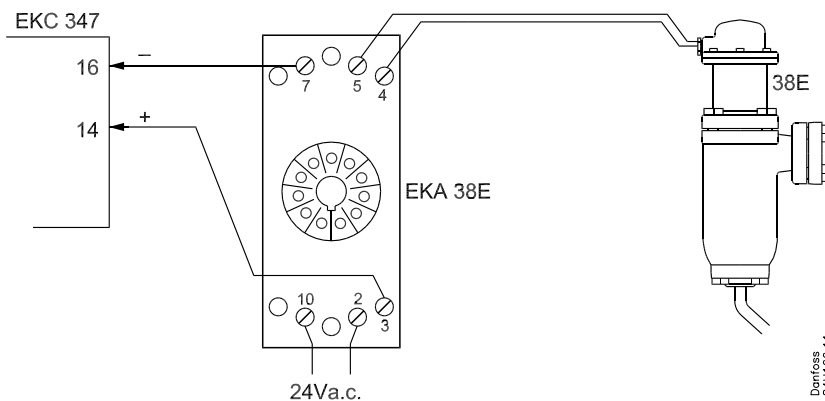
EKA 38E ist ein Umformer, der Signale von einem Schwimmer Typ 38E empfangen und diese danach an den Niveauregler Typ EKC 347 weiterleiten kann.

Application

Le convertisseur EKA 38E reçoit le signal d'un flotteur 38E et le transmet au régulateur de niveau EKC 347.

Aplicación

El EKA 38E es un convertidor que puede recibir una señal desde un flotador, tipo 38E, y retransmitir la señal a un controlador de nivel de líquido, tipo EKC 347.



Tilslutning

- Tilslut en forsyningsspænding på 24 V a.c. (modulet og den tilsluttede 38E, vil tilsammen bruge 1 VA).
- Tilslut 38E svømmeren.
- Tilslut udgangssignalet til EKC 347.

Connection

- Connect a supply voltage of 24 V a.c. (the module and the connected 38E will together use 1 VA).
- Connect the 38E float
- Connect output signal to EKC 347

Anschluß

- Eine Versorgungsspannung von 24 V a.c. anschließen. (Das Modul und das angeschlossene 38E brauchen zusammen 1 VA.)
- Den Schwimmer 38E anschließen.
- Das Ausgangssignal an EKC 347 anschließen.

Raccordement

- Raccorder la tension d'alimentation 24 V c.a. (le module et le 38E absorbent ensemble 1 VA).
- Raccorder le flotteur 38E
- Raccorder le signal de sortie à l'EKC 347.

Conexión

- Alimentación de 24 V a.c. (el módulo y el 38E conectado consumen 1 VA).
- Conectar el flotador 38E
- Conectar la señal de salida al EKC 347

Justering Se EKC 347 instruktionen.	Adjustment Read EKC 347 instructions.	Einstellung Siehe Instruktion für EKC 347.	Réglage Voir l'instruction EKC 347.
Ajustes Ver le instrucciones EKC 347.			
Måleværdier til en eventuel funktionskontrol 38E-spole 420 ohm EKA 38E indgang 5-13 V a.c. EKA 38E udgang 4-6 V d.c. (svømmer i top ca. 6 V d.c.) (svømmer i bund ca. 4 V d.c.)	Measuring values for function control, if required 38E coil 420 ohm EKA 38E input 5-13 V a.c. EKA 38E output 4-6 V d.c. (float in top position approx. 6 V d.c.) (float in bottom position approx. 4 V d.c.)	Meßwerte für eine eventuelle Funktionskontrolle 38E-Spule 420 ohm Eingang EKA 38E 5-13 V a.c. Ausgang EKA 38E 4-6 V d.c. (Schwimmer im Höchstpunkt ca. 6 V d.c.) (Schwimmer in Tiefstpunkt ca. 4 V d.c.)	Valeurs de mesure pour un contrôle de fonctionnement éventuel Bobine 38E 420 ohm Entrée EKA 38E 5-13 V a.c. Sortie EKA 38E 4-6 V d.c. (Flotteur en haut 6 V d.c. environ) (Flotteur en bas 4 V d.c. environ)
Valores de medida para una funcion de control eventual Bobina 38E 420 ohm entrada EKA 38E 5-13 V a.c. salida EKA 38E 4-6 V d.c. (floatador en el tope superior aprox. 6 V d.c.) (floatador en el tope inferior aprox. 4 V d.c.)			

Installation

027R9528

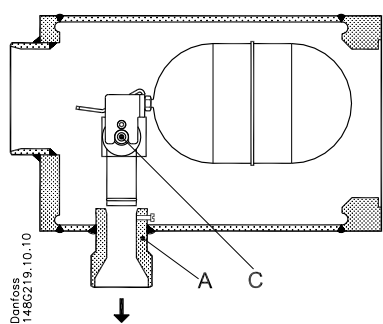


Fig. 1

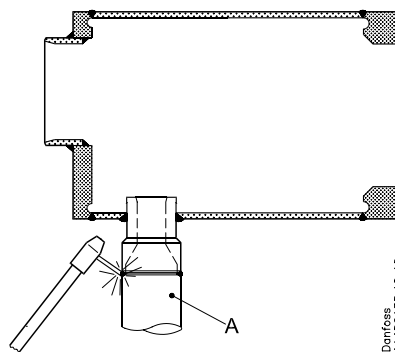


Fig. 2

Danfoss
A148G138.10.10

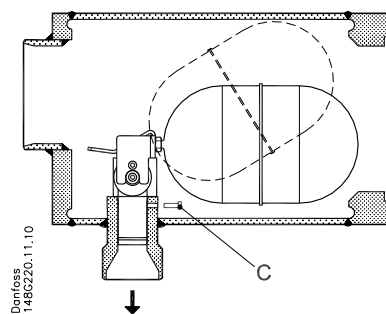
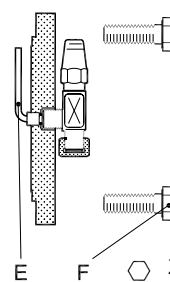


Fig. 3

Danfoss
148G220.11.10



24 mm
183 Nm (135 LB-feet)

Maintenance

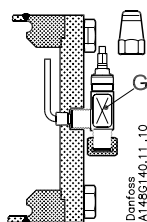


Fig. 4

Danfoss
A148G140.11.10

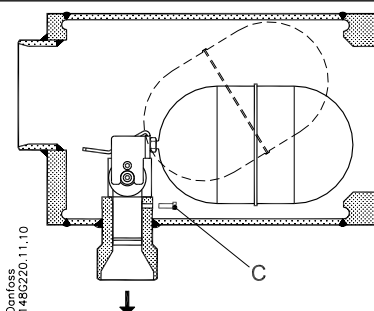
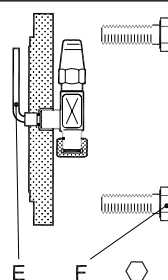
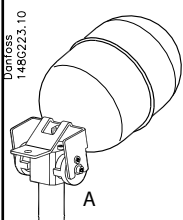


Fig. 5

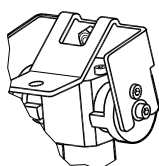
Danfoss
148G220.11.10



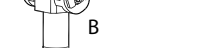
24 mm
183 Nm
(135 LB-feet)



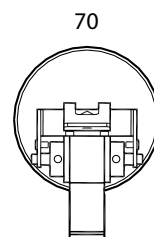
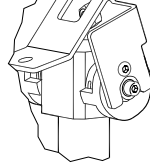
Detail A
Fully closed



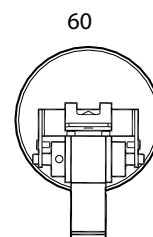
Danfoss
148G226.10



Detail B
Fully open

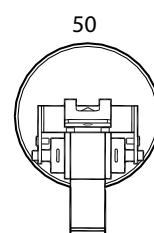


70

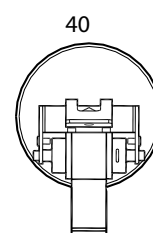


60

Danfoss
148G224.10



50



40

Fig. 6

027R9528

Installation

Refrigerants

Applicable to all common non-flammable refrigerants, including R717 and non-corrosive gases/liquids dependent on sealing material compatibility. As standard the float ball is designed for R717 with a density of 500 through 700 kg/m³. For refrigerants, which have a density outside this range please contact Danfoss. Flammable hydrocarbons are not recommended. The valve is only recommended for use in closed circuits. For further information please contact Danfoss.

Temperature range

HFI: -50/+150°C (-58/+302°F)

Pressure range

The float valves are designed for a max. working pressure of 25 bar g (363 psi g). Strength test without floatball.

Installation

Mount the float valve horizontally with the outlet branch pos. A (fig. 1) vertically downwards.

The flow direction has to be from the flanged inlet as indicated with the arrow (fig. 1).

The valve is designed to withstand a high internal pressure. However, the piping system should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion. It must be ensured that the valve is protected from pressure transients like "liquid hammer" in the system.

Welding

Remove the float assembly before welding as follows:

- Dismount the bonnet and remove the protection packing.
- Unscrew the screw pos. C (fig. 1) and lift up the float assembly from the outlet.
- Weld the outlet branch pos. A (fig. 1) into the plant as shown in fig. 2.

Only materials and welding methods, compatible with the valve housing material, must be welded to the valve housing. The valve should be cleaned internally to remove welding debris on completion of welding and before the valve is reassembled.

Avoid welding debris and dirt in the housing.

NB! When demand is heavy at low temperature operation, we recommend to check the velocity in the outlet branch. If necessary the diameter of the pipe which is welded on to the outlet branch pos. A (fig. 1) can be increased. The valve housing must be free from stresses (external loads) after installation.

Assembly

Remove welding debris and any dirt from

pipes and valve body before assembly. Replace float assembly in the outlet branch and tighten the screw pos. C (fig 3). Check that the float assembly has gone all the way down the outlet branch and that the float ball is positioned in the middle of the housing, so it can move without any restriction.

End cover with purge valve and pipe is remounted in the housing.

NB! The ventilating pipe pos. E (fig 3) has to be placed vertically up-wards.

In cas an insert with a slide (version before 2007) replaced by a present version, an extra threaded hole needs to be made in the connector A to fix the screw (fig.1)

Tightening

Use a torque wrench to tighten the screws pos. F (fig. 3). Tighten with torque of 183 Nm (135 Lb-feet).

Colours and identification

The HFI valves are painted with a red oxide primer in the factory. The external surface of the valve housing must be prevented against corrosion with a suitable protective coating after installation and assembly.

Protection of the ID plate when repainting the valve is recommended.

Maintenance

Purging of incondensable gases

Incondensable gases might accumulate in the upper part of the float valve. Purge these gases by means of the purge valve pos. G (fig. 4).

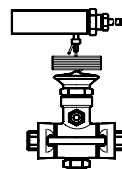
Replacement of complete float assembly (adjusted from factory), follow the steps below:

- 1) **NB!** Before opening up the float valve, the system must be evacuated and the pressure equalized to atmospheric pressure by using the purge valve pos. G (fig. 4)
- 2) Remove the endcover
- 3) Remove float valve assembly by untightening the screw pos. C (fig. 5) and lifting up the complete float valve assembly.
- 4) Place new float assembly in the outlet branch and tighten the screw pos. C (fig. 5)
- 5) Endcover with purge valve and pipe is remounted in the housing.
NB! Ventilating pipe pos. E (fig. 5) has to be placed vertically upwards.
- 6) Use a torque wrench to tighten the screws pos. F (fig. 5). Tighten with torque of 183 Nm (135 LB-feet).

NB! Check that the purge valve is closed before you pressurize the float valve.

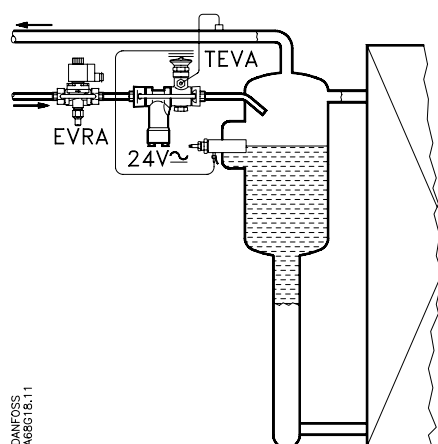
Use only original Danfoss parts for replacement. Materials of new parts are certified for the relevant refrigerant.

In cases of doubt, please contact Danfoss. Danfoss accepts no responsibility for errors and omissions. Danfoss Industrial Refrigeration reserves the right to make changes to products and specifications without prior notice.



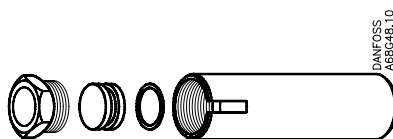
068R9517

068R9517



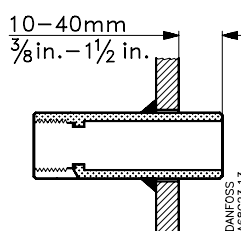
DANFOSS
A68G18.11

Fig. 1



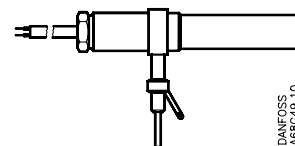
DANFOSS
A68C48.10

Fig. 2



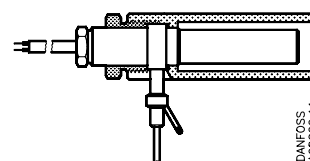
DANFOSS
A68G23.13

Fig. 3



DANFOSS
A68C49.10

Fig. 4



DANFOSS
A68G22.11

Fig. 5

DANSK

Termostatisk niveauregulator

Tekniske data

- Kølemiddel: R 717 (NH₃)
- Max. prøvetryk: p' = 28.5 bar
- Max. driftstryk: PB = 19 bar (Pe)
- Kapillarrørslængde: 5 m
- El-varmelegeme: 24 V, 10 W
- Længde af elkabel: 1.5 m
- Tilspændingsmoment:
 - element ca. 90 Nm (9 kpm)
 - dyseindsats ca. 50 Nm (5 kpm)

Montering

TEVA-regulatoren monteres i væskeledningen i umiddelbar nærhed af fordampere. Kølemiddel-væsken bør – for ikke at give føleren falske impulser – føres ind i fordampere således, at den indsprøjtede væske ikke har direkte kontakt med føleren. Se fig. 1.

Svejsébøsningen adskilles (fig. 2) og monteres vandret (fig. 3) på fordampere (fig. 1) i højde med det ønskede væskeniveau. Kender man ikke erfaringsmæssigt det rigtige niveau, kan man eventuelt anbringe en ekstra svejsébøsning, der kan leveres inkl. omløber, blændprop og pakning på bestillingsnr. 068G0026. Den ikke anvendte svejsébøsning kan afblændes og forblive på fordampere.

Anvendes varmgasafrimning, skal væskeledningen kunne afspærres med en magnetventil eller en afspærringsventil. Grunden hertil er, at varmgassen påvirker føleren på TEVA-regulatoren til åbning.

TEVA-regulatoren udligningsledning skal altid monteres, da ventilen ellers ikke kan regulere.

Varmelegemet (bestillingsnr. 068G0037) i føleren (fig. 4) skal tilsluttes således at det er uden spænding, når kompressoren står stille.

Indstilling

Ventilens fabriksindstillede overhedning bør normalt ikke ændres.

Service

Fungerer regulatoren ikke, undersøg da, om varmelegemet er tilsluttet og i orden. Ligeledes undersøges, om regulatorens fyldning evt. skulle være tabt, f.eks. på grund af brud på kapillarrøret.

ENGLISH

Thermostatic Liquid Level Control

Technical data

- Refrigerant: R 717 (NH₃)
- Max. test pressure: p' = 28.5 bar
- Max. working pressure: PB = 19 bar (Pe)
- Length of capillary tube: 5 m
- Electric heater: 24 V, 10 W
- Length of cable: 5 ft (1.5 m)
- Tightening torque:
 - element, approx. 90 Nm (9 kpm)
 - orifice insert, approx. 50 Nm (5 kpm)

Fitting

The TEVA control should be mounted in the liquid line close to the evaporator.

To prevent the sensor from receiving false impulses the refrigerant must be fed to the evaporator in such a way that the liquid injected does not directly come into contact with the sensor. Please see Fig. 1. The welding connection is disassembled (Fig. 2) and mounted horizontally (Fig. 3) on the evaporator (Fig. 1) at the desired liquid level.

If the correct level is unknown an extra welding connection is available, code number 068G0026, including nut, plug and gasket.

If hot gas defrosting is applied, the requirement is that the liquid line can be cut-off by a solenoid valve or a shut-off valve because the hot gas affects the sensor and the TEVA valve may open. The equalising line on the TEVA valve must always be connected, otherwise the valve cannot operate.

The heater (code number 068G0037) in the sensor (Fig. 4) must be connected in such a way that it is de-energized when the compressor is not running.

Adjustment

As a rule the factory-set superheat of the valve should not be changed.

Service

If the control fails to operate, check that the heating element is connected and is working correctly. Also check that the charge is not lost, e.g. due to a broken capillary tube.

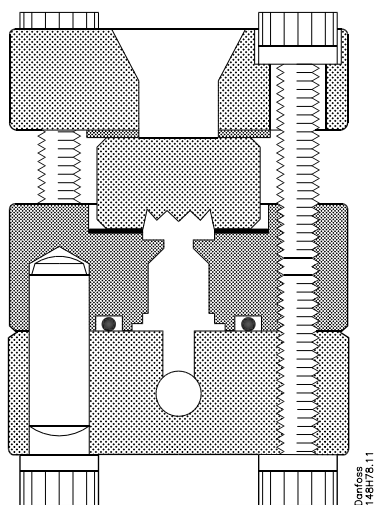


Fig. 1

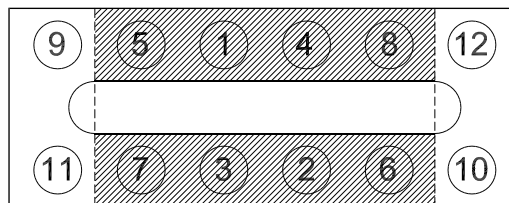


Fig. 2 Segment with 12 screws

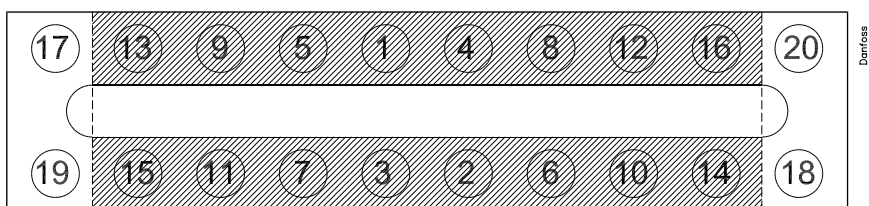


Fig. 3 Segment with 20 screws

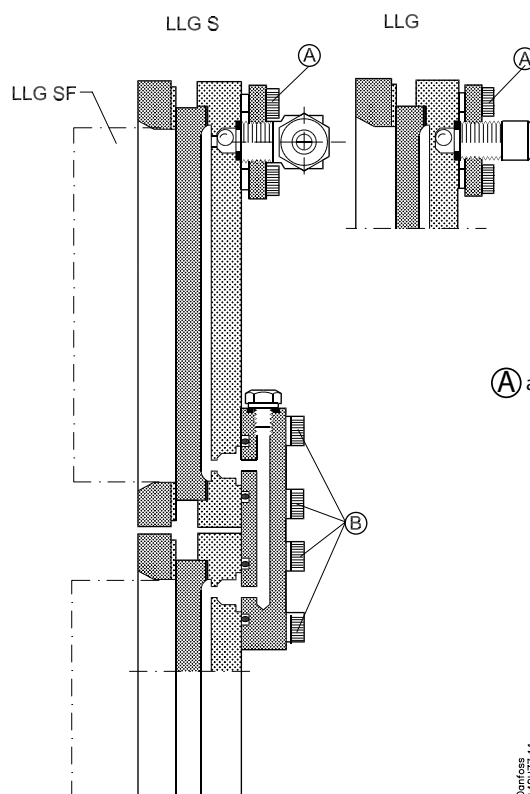


Fig. 4

Ⓐ and Ⓑ

	Nm	LB-feet
LLG	44	32

Ⓐ **Note!**
Bolts for flanges are not tightened from factory. The bolts must be tightened on site.

Installation

Installér LLG 185-1550 på en plade vha. de 4 skruer, der leveres med væskestands-glasset. Brug gevindhullerne på bagsiden til at montere væskestandsglasset på konsollen (leveres ikke af Danfoss).

Tilslut altid rørene efter at LLG er monteret på konsollen. Det er vigtigt, at der efter tilslutning af rør er et minimum af indre spænding i væskestandsglasset.

Sørg for, at der er plads til at isolere bag LLG samt plads til serviceeftersyn osv.

Max. arbejdstryk

25 bar g.

Arbejdstemperatur

LLG, LLG S:

Min. -10°C

Max. +100°C

LLG SF (med synsadapter):

Min. -50°C

Max. +30°C

Der tages forbehold for fejl og mangler. Danfoss forbeholder sig ret til uden forudgående varsel at foretage ændringer af produkter og specifikationer.

Vedligeholdelse**Udskiftning af pakning**

Løsn alle væskestandsglassets skruer ¼ omgang i modsat rækkefølge af tilspændingssekvensen. I samme rækkefølge løsnes alle skruer helt.

Fjern alle rester fra gammelt pakningsmateriale og rengør alle overflader. Overfladen skal være fri for grater og ridser.

Pakningen pakkes ud. Pakningen må ikke beskadiges (bukkes, rides). Den skal holdes ren.

Placer pakningen på bagstykkets pakflade og monter glasset ovenpå (se fig. 1). Beskyttelsespladen placeres på glasset og forstykket monteres ovenpå. (Ved LLG SF fungerer synsadapteren også som beskyttelsesplade).

Tilspænd skruerne. Tilspændingssekvensen (se fig. 2 og 3) skal overholdes. Skruerne spændes med følgende tilspændingsmomenter:

Punkt 1

Med hånden til skruen har kontakt med forstykket.

Punkt 2

Med momentnøgle til 15 Nm.

Punkt 3

12 skruer: Skruerne nr. 1-8 til 30 Nm og 9-12 til 15 Nm.

20 skruer: Skruerne nr. 1-16 til 30 Nm og 17-20 til 15 Nm.

Punkt 3 gentages til ingen af skruerne drejes ved de angivne momenter.

ENGLISH**Installation**

Install LLG 185-1550 on a bracket using the 4 screws delivered together with the glass. Use the threaded holes on the back of the frame to mount the glass on the bracket (no Danfoss delivery).

Always connect the piping after mounting on the bracket. Note the importance of a minimum of stress in the liquid level glasses from the connected pipes.

Make sure that there is sufficient space behind the LLG to secure proper insulation and service inspection etc.

Max. operating pressure

25 bar g (362 psi g).

Working temperature

LLG, LLG S:

Min. -10°C (+14°F)

Max. +100°C (+212°F)

LLG SF (with sight adapter):

Min. -50°C (-58°F)

Max. +30°C (+86°F)

Errors and omissions excepted. The data are subject to change without notice.

Maintenance**Replacement of packing**

Loosen all the screws of the liquid level glass by ¼ of a turn in reverse order of the tightening sequence. Loosen all the screws completely, in the same order.

Remove all remains of old packing material and clean all surfaces. There must be no burrs, marks or scratches on the surface.

Unpack the packing. Do not damage (bend or scratch) the packing. Keep it clean.

Place the packing on the packing surface of the back piece and mount the glass hereon (see fig. 1). Place the protection plate on the glass and mount the front piece on top. (As far as the LLG SF is concerned the sight adapter also serves as protection plate).

Tighten the screws. The sequence of tightening (see fig. 2 and 3) must be observed. Tighten the screws according to the following torque moments:

Point 1

Tighten the screws by hand till they touch the front piece.

Point 2

Use a torque wrench to tighten the screws to 15 Nm (11 ft•lb).

Point 3

12 screws; Tighten the screws number 1-8 to 30 Nm (22 ft•lb) and number 9-12 to 15 Nm (11 ft•lb).

20 screws; Tighten the screws number 1-16 to 30 Nm (22 ft•lb) and number 17-20 to 15 Nm (11 ft•lb).

Repeat point 3 till none of the screws can be turned at the moments stated.

DEUTSCH**Installation**

Die LLG 185-1550 auf einer Platte installieren mittels der mit dem Flüssigkeitsstandglas gelieferten 4 Schrauben. Verwenden Sie die Gewindelöcher auf der Rückseite zur Montierung des Flüssigkeitsstandglases auf der Konsole (die Konsole wird nicht von Danfoss geliefert).

Die Rohre immer nach der Montierung auf der Konsole anschließen. Nach dem Anschließen der Rohre ist es sehr wichtig zu sichern, daß es nur ein Minimum von innerer Spannung im Flüssigkeitsstandglas gibt.

Für genügenden Raum für Isolierung hinter dem LLG und Überholung sorgen.

Max. Betriebsdruck

25 bar g.

Temperaturbereich

LLG, LLG S:

Min. -10°C

Max. +100°C

LLG SF (mit Schauvorsatzgerät):

Min. -50°C

Max. +30°C

Irrtum vorbehalten. Änderungen und Verbesserungen der Produkte sowie Spezifikationen behalten wir uns fristlos vor.

Wartung**Auswechslung der Dichtung**

Alle Schrauben des Flüssigkeitsstandglases um ¼ eines Umganges in entgegengesetzter Zuspännensequenzrichtung lösen. Alle Schrauben in derselben Reihenfolge völlig lösen. All das Übriggebliebene vom alten Dichtungsmaterial entfernen und alle Oberflächen reinigen. Die Oberfläche muß von Graten und Ritzen ganz frei sein.

Die Dichtung auspacken. Die Dichtung nicht beschädigen (biegen oder ritzen). Die Dichtung sauberhalten.

Die Dichtung auf der Dichtungsfläche des Hinterstückes anbringen und das Glas obendrauf montieren (lauf fig. 1). Die Schutzplatte auf dem Glas anbringen und das Vorderstück obendrauf montieren. (Bei

LLG SF dient das Schauvorsatzgerät auch als Schutzplatte).

Die Schrauben zuspinnen. Die Zuspinnen-sequenz (laut fig. 2 und 3) *muß* befolgt werden. Die Schrauben gemäß den folgenden Drehmomenten zuspinnen:

Punkt 1

Die Schrauben mit der Hand zuspinnen, bis sie das Vorderstück anrühren.

Punkt 2

Die Schrauben bis an 15 Nm mit einem Momentschlüssel zuspinnen.

Punkt 3

12 Schrauben: Die Schrauben Nr. 1-8 bis an 30 Nm und Nr. 9-12 an 15 Nm zuspinnen.

20 Schrauben: Die Schrauben Nr. 1-16 bis an 30 Nm und Nr. 17-20 an 15 Nm zuspinnen.

Punkt 3 wiederholen, bis keine Schrauben sich bei den angeführten Momenten drehen lassen.

completamente los tornillos en el mismo orden.

Eliminar los restos de la empaquetadura vieja y limpiar todas las superficies. La superficie debe quedar totalmente libre de grietas y rebabas.

Desembalar la empaquetadura nueva, evitando producirle danos (doblándola o resquebrajándola) y manteniéndola totalmente limpia.

Colocar la empaquetadura sobre la superficie de la pieza trasera y montar el cristal visor encima de ella (fig. 1). Colocar la placa de protección sobre el cristal visor y montar la pieza frontal encima de todo ello. (En el LLG SF el adaptor, el adaptor del visor sirve también como placa de protección).

Apretar los tornillos. Seguir la secuencia de apriete indicada en las figuras 2 y 3. Apretar los tornillos de acuerdo con los momentos de apriete siguientes:

Punto 1

Con la mano hasta que el tornillo entre en contacto con la pieza frontal.

Punto 2

Con una llave dinamométrica hasta 15 Nm.

Punto 3

12 tornillos: Apretar los tornillos núm. 1 al 8 hasta 30 Nm y los núm. 9 al 12 hasta 15 Nm.

20 tornillos: Apretar los tornillos núm. 1 al 16 hasta 30 Nm y los núm. 17 al 20 hasta 15 Nm.

El punto 3 se repite hasta que ninguno de los tornillos pueda apretarse más que al momento indicado.

ESPAÑOL

Instalacion

Montar el LLG 185-1550 sobre una placa soporte utilizando los 4 tornillos que se entregan junto con el indicador de nivel de líquido. Utilizar los taladros roscados situados en la parte posterior del nivel para montar este sobre el soporte (El soporte no es suministro de Danfoss).

No Conectar las tuberías hasta después de efectuar el montaje. Es muy importante evitar se produzcan tensiones internas en el nivel después de efectuar la conexión de las tuberías.

Asegurase de que hay suficiente espacio en la parte trasera del LLG, tanto para su correcto aislamiento como para inspecciones de mantenimiento.

Presión máxima de servicio

25 bar g.

Temperatura de trabajo

LLG, LLG S:

Min. -10°C

Max. + 100°C

LLG SF (con adaptor visual):

Min. -50°C

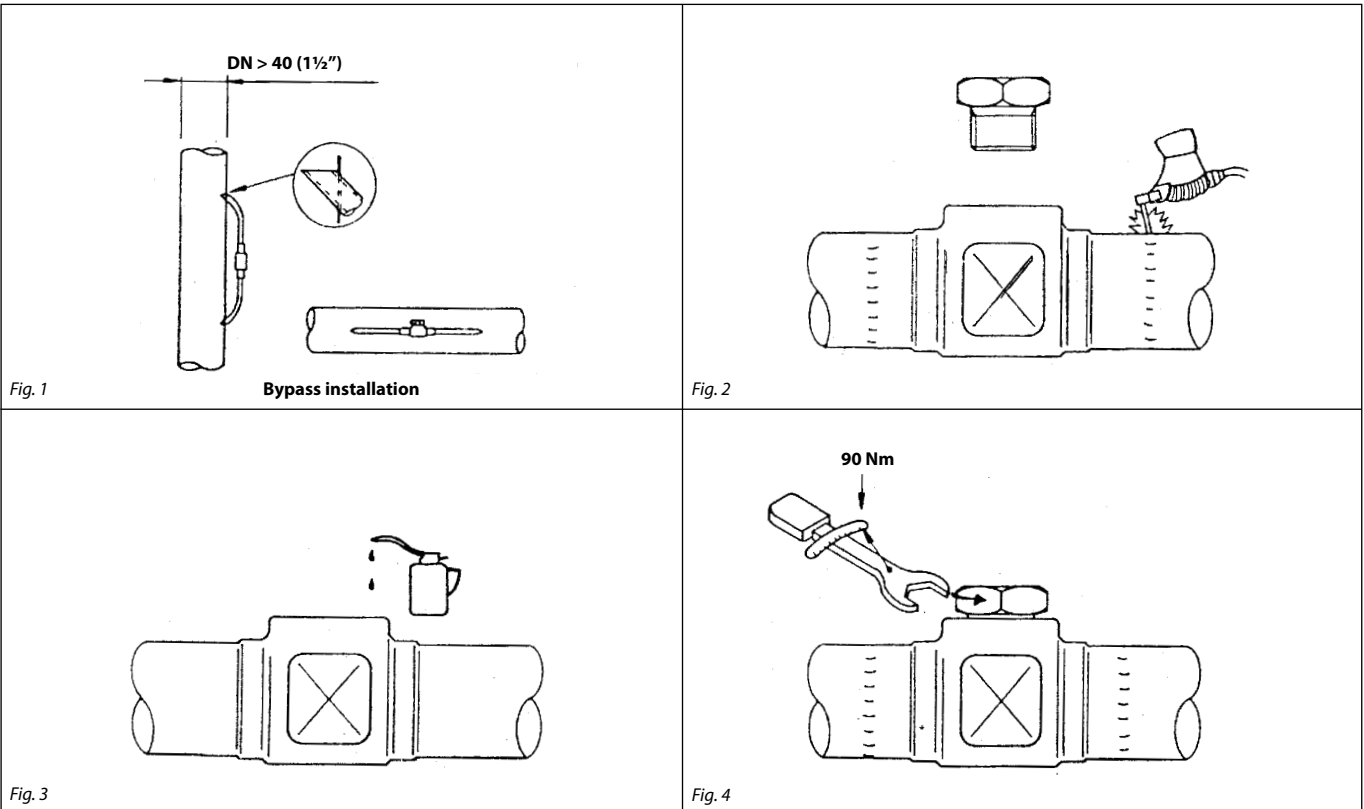
Max. + 30°C

Sin perjuicio de errores y omisiones, Danfoss se reserva el derecho de introducir modificaciones en las especificaciones y en sus productos sin previo aviso.

Mantenimiento

Cambio de empaquetadura

Aflojar todos los tornillos del indicador de nivel ¼ de vuelta, en el orden inverso a la secuencia seguida para el apriete. Aflojar



Moisture content - PPM (mg H₂O / kg refrigerant)
Fugtindhold - PPM (mg H₂O / kg kølemiddel)
Feuchtigkeitsgehalt - PPM (mg H₂O / kg Kältemittel)/
Contenido de humedad - PPM (mg H₂O / kg refrigerante)

MLI Indicates / Indikerer / Zeigt / Indica		Approx. Liquid Temp. / Ca. væsketemp. / Etwa Flüssigkeitstemp. / Aprox. Temp. de Líquido							
		R134a		R22		R500 (Propane, Butane)		R502	
		25°C 77°F	40°C 104°F	25°C 77°F	40°C 104°F	25°C 77°F	40°C 104°F	25°C 77°F	40°C 104°F
Green / Grøn / Grün / Verde DRY / TØR / TROCKEN / SECO	●	0-50	0-80	0-30	0-45	0-40	0-60	0-10	0-20
Chartreuse / Lysgrøn / Hellgrün / Color amarillo verdoso CAUTION / FORSIGTIG / VORSICHT / CAUCIÓN	●	50-150	80-225	30-90	45-130	40-90	60-150	10-45	20-65
Yellow / Gul / Gelb / Amarillo WET / VÅD / NAB / MOJADO	○	>150	>225	>90	>130	>90	>150	>45	>65

Table 1 / Tabel 1 / Tabelle 1 / Tabla 1

ENGLISH

Refrigerants

R22, R134A, Propane, Butane, R500 and R502.

If the moisture indicator is removed the MLI can alternatively be used as a normal sight glass, for R717 (ammonia) also.

Installation

The MLI may be installed anywhere in the liquid line. If the Main liquid line is larger than 40 mm (1½") we recommend the MLI to be installed in by-pass (Fig. 1).

Welding / Soldering

MLI must be disassembled during welding/soldering (Fig. 2).

Assembling

Remove dirt and weld slag, if any, from tubes and housing.

Lubricate the seal face (Fig. 3) before the indicator element is mounted and tightend (Fig. 4).

Colour

From factory the MLI-housing is painted in a reddish brown primer.

Indicator element

When received the indicator may not indicate dry. This phenomenon does not affect operation or calibration of the indicator due to the fact that action of the indicator element is completely reversible. As a result the indicator element will change colour whenever the moisture content of the system changes.

Time of colour change might differ from plant to plant. We recommend that the plant operates for **at least 12 hours** to

allow the system to reach equilibrium before deciding if the drier should be changed.

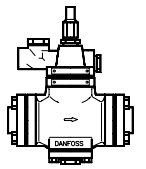
The drying of the system should be continued until the indicator element stays **dark green** (Table 1).

Do not pressure test the MLI by means of water, too much water is liable to damage the indicator.

The indicator element **are not suitable for R717 (ammonia)**.

In case of doubt please contact Danfoss A/S or distributor.

*Errors and omissions excepted.
Subject to change without notice.*



027R9613

027R9613

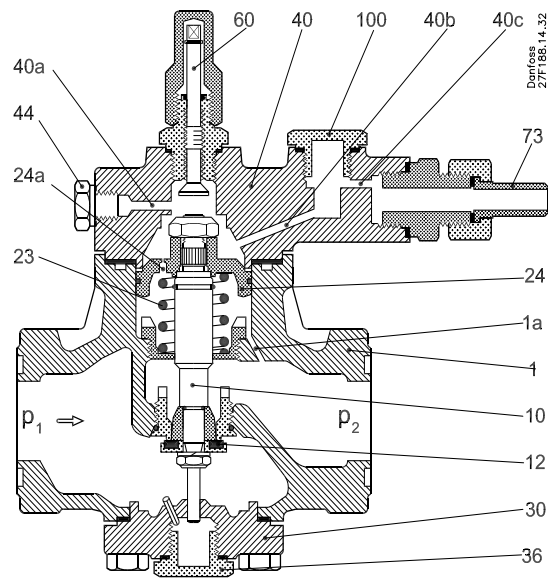


Fig. 1

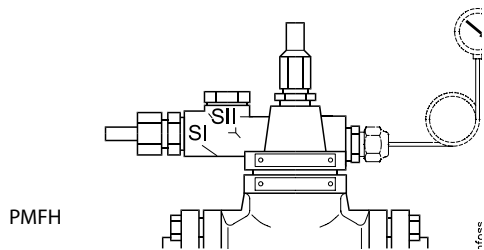


Fig. 2

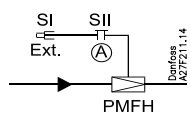


Fig. 3

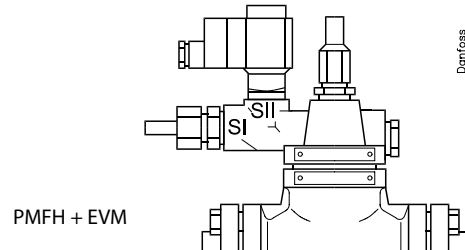


Fig. 4

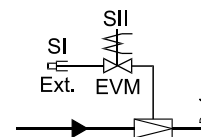


Fig. 5

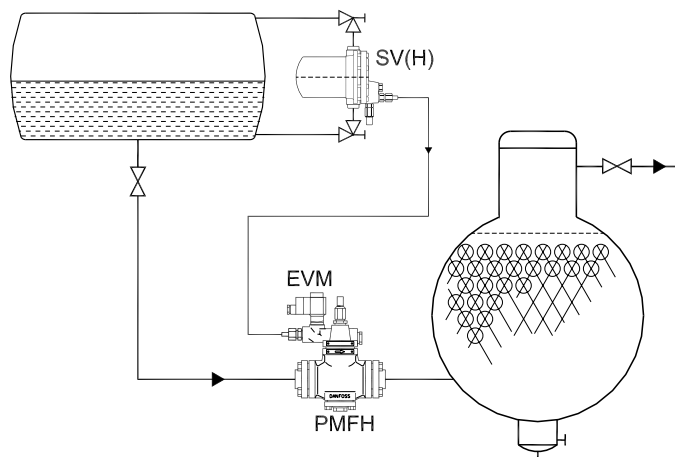


Fig. 6

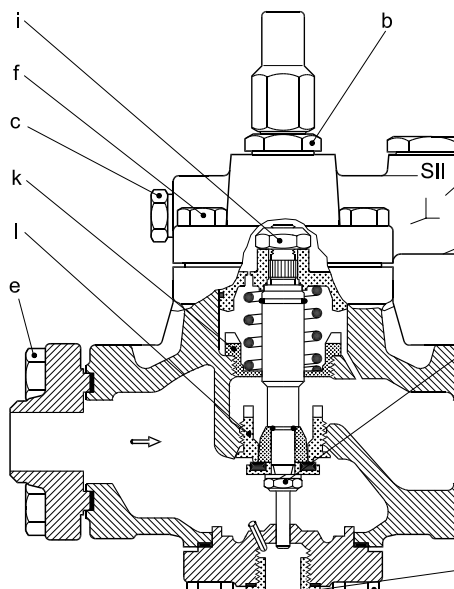


Fig. 7

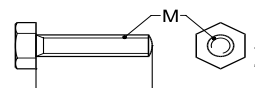


Fig. 8

1

Pos. Item.	Gevind Thread Gewinde Filetage					Tilspændingsmoment i Nm (10 Nm = 1 kpm) Tightening torque in Nm (1 Nm = 0.74 lb force ft) Anzugsmoment in Nm (10 Nm = 1 kpm) Couple de serrage en Nm (10 Nm = 1 kgf.m)				
	PMFH Størrelse Size Größe Dimension									
	80	125	200	300	500	80	125	200	300	500
a	M24 × 1.5					50				
b	M20 × 1.5					50				
c	1/4 RG 1/4 BSP R 1/4 1/4 G					30				
d	M24 × 1.5					50				
e	M12 × 1.75 L = 45			M14×2 L = 65	M14×2 L = 70	60			80	
f	M10 × 1.5 L = 30		M12 × 1.75 L = 35		M14×2 L = 40	40		60		80
g	M10 × 1.5 L = 30		M12 × 1.75 L = 35		M14×2 L = 40	40		60		80
h	M8	M10		M12		17	34		49	
i	M12 × 1.5					30				
k	M39 × 1.5	M48 × 1.5	M52 × 2	M64 × 2	M80 × 2	80	100			120
l	M30 × 1.5	M36 × 1.5	M42 × 1.5	M52 × 1.5	M68 × 1.5	50	60	100		120

Flangesæt Flange sets Flanschsätze Jeu de brides							
Type Typ	Flangeart Flange type Flanschart Nature de bride	Svejse Weld Schweißflansch A souder		Lodde Solder Lötflansch A braser			
		in	Best.nr. Code No. Bestell-Nr. N° de code (*)	in	Best.nr. Code No. Bestell-Nr. N° de code (*)	mm	Best.nr. Code No. Bestell-Nr. N° de code (*)
PMFH 80	12	3/4 1	027N1220 027N1225	7/8 1 1/8	027L1223 027L1229	22 28	027L1222 027L1228
PMFH 125	23	1 1/4 1 1/2	027N2332 027N2340	1 3/8	027L2335	35	027L2335
PMFH 200	24	1 1/2 2	027N2440 027N2450	1 5/8	027L2441	42	027L2442
PMFH 300	25	2 2 1/2	027N2550 027N2565	2 1/8	027L2554	54	027L2554
PMFH 500	26	2 1/2 3	027N2665 027N2680	2 1/8	027L2665	76	027L2676

*) Best.nr. omfatter et sæt med to flanger (tilgang og afgang).

*) The code No. covers one set with two flanges (inlet and outlet).

*) Die Bestell-Nr. umfaßt einen Satz mit zwei Flanschen (Eintritt und Austritt).

*) Le n° de code comprend un jeu de deux brides (entrée et sortie).

Ekspansionshovedventil for module-rende niveauregulering (højtryk)

Tekniske data

Kølemidler

R 717 (NH₃), R 22, R 134a, R 404A, R 407C etc.

Min. medietemperatur

-50°C

Maks. arbejdsdruk (p_e)

28 bar (2800 kPa)

Maks. prøvedruk (p_e)

42 bar (4200 kPa)

Tilspændingsmomenter

Se fig. 7 og tabel 1.

Konstruktion

Se fig. 1.

- | | |
|------------|--------------------------|
| 1. | Ventilhus |
| 1a. | Kanal i ventilhuset 1 |
| 10. | Trykstang |
| 12. | Ventilplade |
| 22. | Låsering |
| 23. | Fjeder |
| 24. | Servostempel |
| 24a. | Kanal i servostemplet 24 |
| 30. | Bunddæksel |
| 36. | Bundprop |
| 40. | Dæksel |
| 40a. b. c. | Kanaler i dækslet |
| 44. | Manometertilslutning |
| 60. | Manuel betjening/Spindel |
| 73. | Pilottilslutning |
| 100. | Blændprop |

Montering

Flangesæt til PMFH leveres separat. Se tabel II. Ventilen monteres med gennemstrømning i pilens retning og med topdækslet opad. Top-dækslet kan drejes i spring på 90° i forhold til ventilhuset. Pilotledningen må være max. 3 m lang og skal være uden væskelommer. Den indvendige dia-meter skal være på 6-10 mm. Pilotledningen tilsluttes SV svømmeren i tilslutning P, når trykfaldet over PMFH er under 10 bar – og i tilslutning S, når trykfaldet er over 10 bar. PMFH ventilen skal placeres således, at der er væske foran ventilen.

Indstilling

Se fig. 6.

- A. Når pilotledningen er monteret i svømmer-ventilens P tilslutning, tiener drøvleventilen C på svømmeren til indstilling af bypass forbi svømmerdysen. Drøvleventilen holdes nor-malt lukket. Hvis svømmerventilen er helt åben, skal PMFH også være helt åben. Hvis den ikke er det, åbnes drøvleventilen med $\frac{1}{4}$ omdrejning ad gangen, indtil PMFH netop er helt åben.

Eksempel på indstilling af drøvleventilen C:

1. Svømmerdysen er lukket, men PMFH er fortsat åben.
– Drej drøvleventilens spindel C med uret.
2. Svømmerdysen er helt åben, men PMFH er kun delvis åben (dvs. systemet pendler).
– Drej drøvleventilens spindel C mod uret.
- B. Når pilotledningen er monteret i svømmer-ventilens S tilslutning, er drøvleventilen C på svømmeren i serie med svømmerdysen. Når svømmerdysen og/eller drøvleventilen er lukket, er PMFH også lukket. Når svømmerdysen er helt åben, åbnes drøvle-ventilen med $\frac{1}{4}$ omdrejning ad gangen, indtil

PMFH netop er helt åben. Manometeret (fig. 2) viser trykket p_s i pilotledningen. Når svømmerdysen er lukket, er $p_s = P_2$ (= afgangstrykket). Når svømmerdysen åbner, stiger trykket p_s , og PMFH åbner. Denne trykstigning er en indirekte indikering af funktionen. Der kan opnås en direkte funktionsindikering ved at fjerne bundproppen 36 og montere en løftehøjdeindikator på bunddækslet 30.

Service/Reserve dele

Ventilen er let at adskille, og de fleste dele kan fås som reservedele. Se Spare Parts katalog.

Tilbehør

Manometertilslutning (44, fig. 2, 9 og tabel III); for fluorerede kølemidler: selvlukkende ventil med flaret tilslutning, 50-53; for ammoniak: svejsestuds, 45-48.

ENGLISH

Main expansion valve for modulating liquid level control (high pressure)

Technical data

Refrigerants

R 717 (NH₃), R 22, R 134a, R 404A, R 407C etc.

Min. temperature of medium

-50°C (-58°F)

Max. operating pressure (p_e)

28 bar (400 psig)

Max. test pressure (p_e)

42 bar (610 psig)

Tightening torques

See fig. 7 and table 1.

Design

See fig. 1.

- | | |
|------------|----------------------------|
| 1. | Valve body |
| 1a. | Channel in valve body 1 |
| 10. | Valve spindle |
| 12. | Valve plate |
| 22. | Locking ring |
| 23. | Spring |
| 24. | Servo piston |
| 24a. | Channel in servo piston 24 |
| 30. | Bottom cover |
| 36. | Drain plug |
| 40. | Cover |
| 40a. b. c. | Channels in cover 40 |
| 44. | Pressure gauge connection |
| 60. | Manual operating spindle |
| 73. | Pilot connection |
| 100. | Blanking plug |

Fitting

Flange sets for the PMFH are supplied separate-ly. See table II.

The valve must be fitted with flow in the direction of the arrow and with the top cover upwards. The top cover can be turned in steps of 90° in relation to the valve body.

The pilot line must be max. 3 m long, without liquid pockets. The inside diameter must be 6-10 mm. The pilot line must be connected to the SV float connection P when the pressure drop across the PMFH is less than 10 bar, and to connection S when the pressure drop is more than 10 bar. The PMFH valve must be located so that there is liquid ahead of the valve.

Setting

See fig. 6.

A. When the pilot line is fitted to the P connection of the float valve, throttle valve C on the float acts to set the bypass around the float orifice. Normally,

the throttle valve is kept closed. If the float orifice is fully open, the PMFH must also be fully open. If this does not occur, open the throttle valve $\frac{1}{4}$ turn at a time until the PMFH is just fully open.

Throttle valve C, setting examples:

1. Float orifice closed, but PMFH remains open. – Turn throttle valve spindle C clockwise.
2. Float orifice fully open, but PMFH only partly open (i.e. system hunts)
– Turn throttle valve spindle counterclockwise.

B. When the pilot line is fitted to float valve connection S, throttle valve C on the float is in series with the float orifice.

When the float orifice and/or the valve is closed, the PMFH is also closed.

When the float orifice is fully open, open the throttle valve $\frac{1}{4}$ turn at a time until the PMFH is just fully open.

The pressure gauge (fig. 2) shows the pressure p_s in the pilot line. When the float orifice is closed, $p_s = p_2$ (= outlet pressure). When the float orifice opens, pressure p_s rises and the PMFH opens. The pressure rise is an indirect indication of function.

Direct function indication can be obtained by removing drain plug 36 and fitting a lifting height indicator on bottom cover 30.

Service/Spare parts

The valve is easy to dismantle and most of the parts are available as spare parts. See Spare Parts catalogue.

Accessories

Pressure gauge connection (44, fig. 2, 9 and table III);
for fluorinated refrigerants: self closing valve with flare connection, 50-53;
for ammonia: weld connector, 45-48.

DEUTSCH

Expansionshauptventil für modulieren-de Niveauregelung (Hochdruck)

Technische Daten

Kältemittel

R 717 (NH₃), R 22, R 134a, R 404A, R 407C usw.

Min. Medientemperatur

-50°C

Max. Betriebsdruck (p_e)

28 bar (2800 kPa)

Max. Prüfdruck (p_e)

42 bar (4200 kPa)

Anzugsmomente

Siehe Fig. 7 und Tabelle I.

Konstruktion

Siehe Fig. 1.

- | | |
|------------|--------------------------|
| 1. | Ventilgehäuse |
| 1a. | Kanal im Ventilgehäuse 1 |
| 10. | Druckstange |
| 12. | Ventilplatte |
| 22. | Verriegelungsring |
| 23. | Feder |
| 24. | Servokolben |
| 24a. | Kanal im Servokolben 24 |
| 30. | Bodendeckel |
| 36. | Bodenstopfen |
| 40. | Deckel |
| 40a. b. c. | Kanäle im Deckel 40 |
| 44. | Manometeranschluß |
| 60. | Handbetätigung/Spindel |
| 73. | Pilotanschluß |
| 100. | Blendstopfen |

Montage

Flanschensätze für PMFH werden separat geliefert. Siehe Tabelle II.

Ventil mit dem Durchfluß in Pfeilrichtung einbauen. Der Kopfdeckel muß dabei nach oben gerichtet sein. Er lässt sich gegenüber dem Ventilgehäuse in Stufen um jeweils 90° drehen. In der Pilotleitung (max. 3 m Länge) dürfen keine Flüssigkeitseinschlüsse vorkommen. Innendurchmesser der Pilotleitung 6-10 mm.

Die Pilotleitung wird am Anschluß P an den Schwimmer SV angeschlossen, wenn der Druckabfall durch PMFH weniger als 10 bar beträgt. Bei einem Druckabfall höher als 10 bar ist die Pilotleitung am Anschluß S anzuschließen.

Das Ventil PMFH ist so anzuordnen, daß vor dem Ventil Flüssigkeit vorhanden ist.

Einstellung

Siehe Fig. 6.

A. Bei einer Montage der Pilotleitung im P-Anschluss des Schwimmerventils dient das Drosselventil C des Schwimmers zur Einstellung des Bypass an der Schwimmerdüse vorbei. Das Drosselventil ist normalerweise geschlossen.

Bei ganz geöffneter Schwimmerdüse muß auch PMFH ganz geöffnet sein. Ist dies nicht der Fall, wird das Drosselventil C um jeweils 1/4 Umdrehung so weit geöffnet, bis PMFH voll geöffnet ist.

Einstellbeispiel für das Drosselventil C:

1. Die Schwimmerdüse ist geschlossen, PMFH jedoch fortgesetzt geöffnet.
– Spindel C des Drosselventils im Uhrzeigersinn drehen.
2. Die Schwimmerdüse ist ganz geöffnet, PMFH jedoch nur teilweise geöffnet (das System pendelt).
– Spindel C des Drosselventils im entgegengesetzten Uhrzeigersinn drehen.

B. Bei der Montage der Pilotleitung im S-Anschluß des Schwimmerventils ist das Drosselventil C des Schwimmers mit der Schwimmerdüse in Serie verbunden. Wenn die Schwimmerdüse und/oder das Drosselventil geschlossen sind, ist auch PMFH geschlossen.

Bei ganz geöffneter Schwimmerdüse wird das Drosselventil stufenweise um jeweils 1/4 Umdrehung so weit geöffnet, bis PMFH voll geöffnet ist. Das Manometer (Fig. 2) zeigt den in der Pilotleitung herrschenden Druck p_s an. Bei geschlossener Schwimmerdüse ist $p_s = P_2$ (= Austrittsdruck). Wenn die Schwimmerdüse öffnet, steigt der Druck p_s an und PMFH öffnet. Dieser Druckanstieg ist eine indirekte Indikation der Funktion.

Eine direkte Funktionsanzeige wird dadurch erreicht, daß der Bodenstopfen 36 entfernt und am Bodendeckel 30 ein Hubhöhen-anzeiger montiert wird.

Service/Ersatzteile

Das Ventil lässt sich einfach zerlegen, die meisten Bauteile sind als Ersatzteile erhältlich. Siehe Ersatzteilkatalog.

Zubehör

Manometeranschluß (44, Fig. 2, 9 und Tabelle III); für fluoridierte Kältemittel: Selbstschliessendes Ventil mit Bördelanschluß, 50-53; für Ammoniak: Schweißstutzen, 45-48.

FRANÇAIS

Détendeur principal pour régulation modulante du niveau (haute pression)

Caractéristiques techniques

Fluides frigorigènes

R 717 (NH₃), R 22, R 134a, R 404A, R407C etc.

Température min. du médium
–50°C

Pression max., de travail (p_e)
28 bar (2800 kPa)

Pression max. d'épreuve (p_e)
42 bar (4200 kPa)

Couples de serrage

Voir fig. 7 et tableau 1.

Construction

Voir fig. 1.

- | | |
|------------|------------------------------------|
| 1. | Corps de détendeur |
| 1a. | Canal dans le corps de détendeur 1 |
| 10. | Poussoir |
| 12. | Clapet de détendeur |
| 22. | Bague de verrouillage |
| 23. | Ressort |
| 24. | Servopiston |
| 24a. | Canal dans le servopiston 24 |
| 30. | Couvercle de fond |
| 36. | Bouchon de fond |
| 40. | Couvercle |
| 40a. b. c. | Canaux dans le couvercle 40 |
| 44. | Prise manométrique |
| 60. | Manoeuvre manuelle/Tige |
| 73. | Raccord pilote |
| 100. | Bouchon obturateur |

Montage

Le jeu de brides pour le PMFH est livré séparément. Voir tableau 11.

Monter le détendeur avec passage du fluide dans le sens de la flèche, le couvercle supérieur étant orienté vers le haut. Le couvercle supérieur peut être tourné de 90° à la fois par rapport au corps du détendeur.

La longueur maximale de la conduite pilote doit être de 3 m, et sans poches de liquide. Son diamètre intérieur doit être de 6 à 10 mm.

La conduite pilote est reliée au flotteur SV sur le raccord P si la chute de pression à travers le PMFH est inférieure à 10 bar – et sur le raccord S si la chute de pression est supérieure à 10 bar. Placer le détendeur PMFH de sorte qu'il y ait du liquide avant le détendeur.

Réglage

Voir fig. 6.

A. Quand la conduite pilote a été montée sur le raccord P de la vanne à flotteur, la vanne d'étranglement C du flotteur sert à régler le passage en dérivation de l'orifice du flotteur. Normalement, la vanne d'étranglement est maintenue fermée.

Si l'orifice du flotteur est complètement ouvert, le PMFH doit lui aussi être entièrement ouvert. Dans le cas où il n'est pas complètement ouvert, ouvrir la vanne d'étranglement de 1/4 de tour à la fois jusqu'à ce que le PMFH soit juste grand ouvert.

Exemple de réglage de la vanne d'étranglement C:

1. L'orifice du flotteur est fermé, mais le PMFH reste ouvert.
– Tourner la tige C de la vanne d'étranglement sens d'horloge.

2. L'orifice du flotteur est complètement ouvert, mais le PMFH n'est que partiellement ouvert (c.-à-d. que le système pompe)
– Tourner la tige C de la vanne d'étranglement sens inverse d'horloge.

B. Quand la conduite pilote a été montée sur le raccord S de la vanne à flotteur, la vanne d'étranglement C du flotteur est en série avec l'orifice du flotteur.

Quand l'orifice du flotteur et/ou que la vanne d'étranglement est fermée, le PMFH est lui aussi fermé.

Quand l'orifice du flotteur est complètement ouvert, ouvrir la vanne d'étranglement de 1/4 de tour à la fois jusqu'à ce que le PMFH soit juste grand ouvert.

Le manomètre (fig. 2) indique la pression p_s dans la conduite pilote. Lorsque l'orifice du flotteur est fermé, $p_s = P_2$ (= la pression de sortie). Quand l'orifice du flotteur s'ouvre, la pression p_s augmente et le PMFH s'ouvre. Cette augmentation de la pression est une indication directe de la fonction.

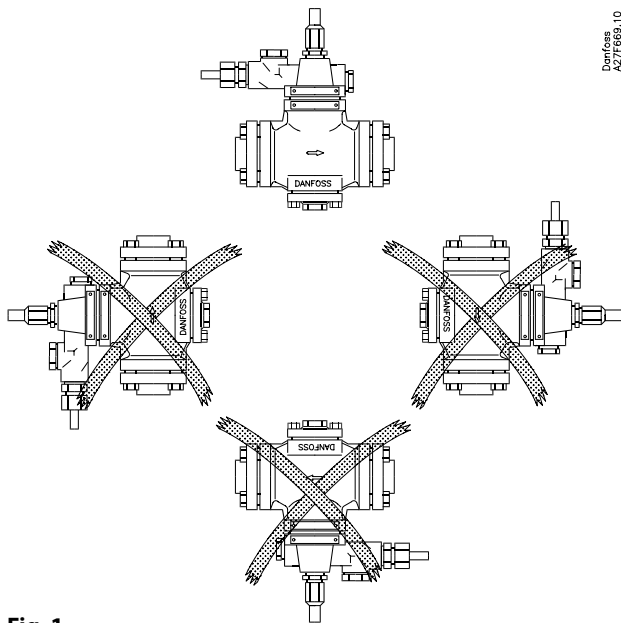
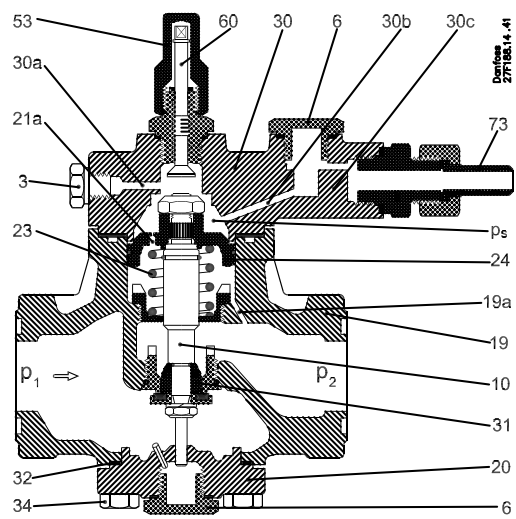
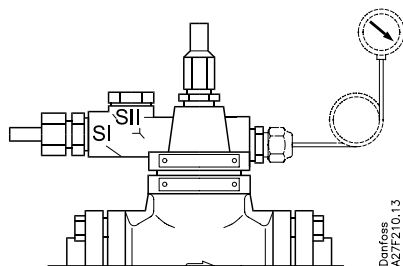
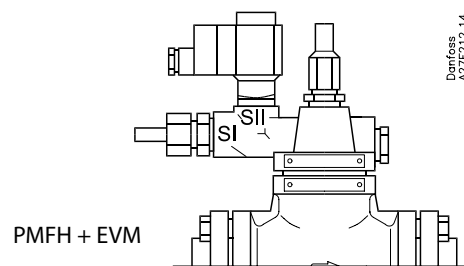
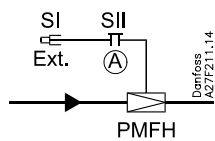
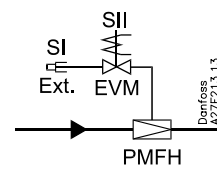
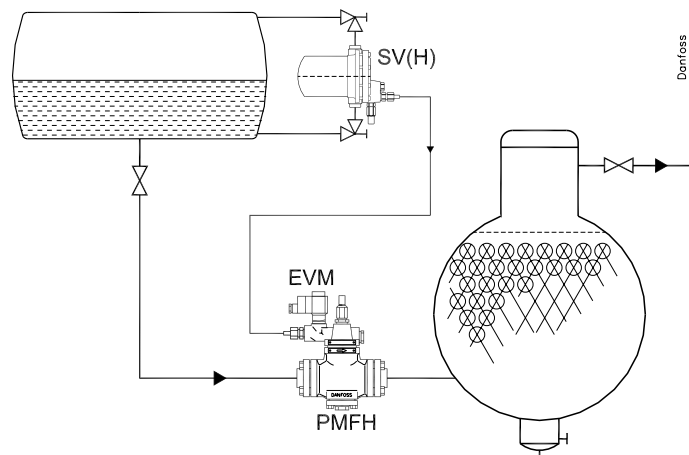
Il est possible d'obtenir une indication directe de la fonction en enlevant le bouchon de fond 36 et en montant un indicateur de déplacement en hauteur sur le couvercle de fond 30.

Entretien/Pièces de rechange

La vanne est facile à désassembler, et la plupart des pièces sont disponibles comme pièces de rechange. Voir dans le catalogue de pièces détachées.

Accessoires

Prise manométrique (44, fig. 2, 9 et tableau III); pour fluides frigorigènes fluorés: vanne auto-fermant avec raccord flare, 50-53; pour ammoniac: tubulure à souder, 45-48.


Danfoss
A27F108.10

Danfoss
27F108.14.41

Danfoss
A27F210.13

Danfoss
A27F212.14

Danfoss
A27F211.14

Danfoss
A27F213.13

Danfoss
27F137.16

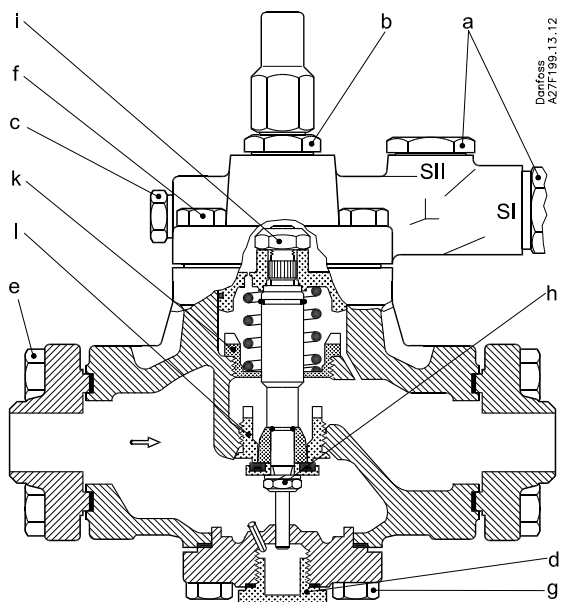


Fig. 8

Pos. Item.	Tilspændingsmoment i Nm (10 Nm = 1 kpm) Tightening torque in Nm (1 Nm = 0.74 lb force ft) Anzugsmoment in Nm (10 Nm = 1 kpm) Couple de serrage en Nm (10 Nm = 1 kgf.m)				
	PMFH Størrelse Size Größe Dimension				
	80	125	200	300	500
a	50				
b	50				
c	30				
d	50				
e	60			80	
f	40		60		80
g	40		60		80
h	17	34		49	
i	30				
k	80	100			120
l	50	60	100		120

Table 1

Installation

Refrigerants

Applicable to all common non-flammable refrigerants, including R717 and non-corrosive gases/liquids dependent on sealing material compatibility. Flammable hydrocarbons are not recommended. The valve is only recommended for use in closed circuits. For further information please contact Danfoss.

Temperature range

PMFH: -60/+120°C (-76/+248°F)

Pressure range

PMFH: The valves are designed for a max. working pressure of 28 bar g (406 psi g).

Technical data

PMFH can be used in suction, liquid, hot-gas and liquid/vapour lines. The PMFH regulates the flow of the medium by two step on/off function, depending on the control impulse from the screwed-on pilot valves.

Design

See fig. 2

1. Valve body
 1. a. Channel in valve body 1
10. Valve spindle
12. Valve plate
23. Spring
24. Servo piston
24. a. Channel in servo piston 24
30. Bottom cover
36. Drain plug
40. Cover
40. a. b. c. Channels in cover 40
44. Pressure gauge connection
60. Manual operating spindle
73. Pilot connection
100. Blanking plug

Installation

Flange set for the PMFH is delivered separately. The valve must be installed with the arrow in the direction of the flow and the top cover upwards (fig. 1). The top cover can be rotated 4 X 90° in relation to the valve body.

The valve is fitted with a spindle for manual opening.

When an external pilot valve is used, the pilot line must be connected to the upper side of the main line so that any dirt and oil from the plant will not find its way into the pilot line.

The PMFH valve can be controlled by the SV float valve as shown on fig. 7. Please refer to SV instruction guidelines.

The valve is designed to withstand a high internal pressure. However, the piping system should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion. It must be ensured that the valve is protected from pressure transients like "liquid hammer" in the system.

Welding

If using welding flanges, only materials and welding methods, compatible with the flange material must be welded to the flanges. The flanges should be cleaned internally to remove welding debris on completion of welding and before the valve is inserted.

The valve housing and flanges must be free from stresses (external loads) after installation.

PMFH valves must not be mounted in systems where the outlet side of the valve is open to atmosphere. The outlet side of the valve must always be connected to the system or properly capped off, for example with a welded-on end plate.

Colours and identification

The PMFH valves are Zinc-Chromated in the factory. If further corrosion protection is required, the valves can be painted. Precise identification of the valve is made via the ID plate on the top cover. The external surface of the valve housing must be prevented against corrosion with a suitable protective coating after installation and assembly.

Protection of the ID plate when repainting the valve is recommended.

Maintenance

Service

The PMFH valves are easy to dismantle and most of its parts are replaceable. When the bottom cover is removed, the strainer can be taken out for cleaning. Do not open the valve while the valve is still under pressure.

- Check that the O-ring or gaskets have not been damaged.
- Check that the spindle is free of scratches and impact marks.
- If the teflon ring has been damaged, the parts must be replaced.

Assembly

Remove any dirt from the body before the valve is assembled. Check that all channels in the valve are not blocked with particles or similar.

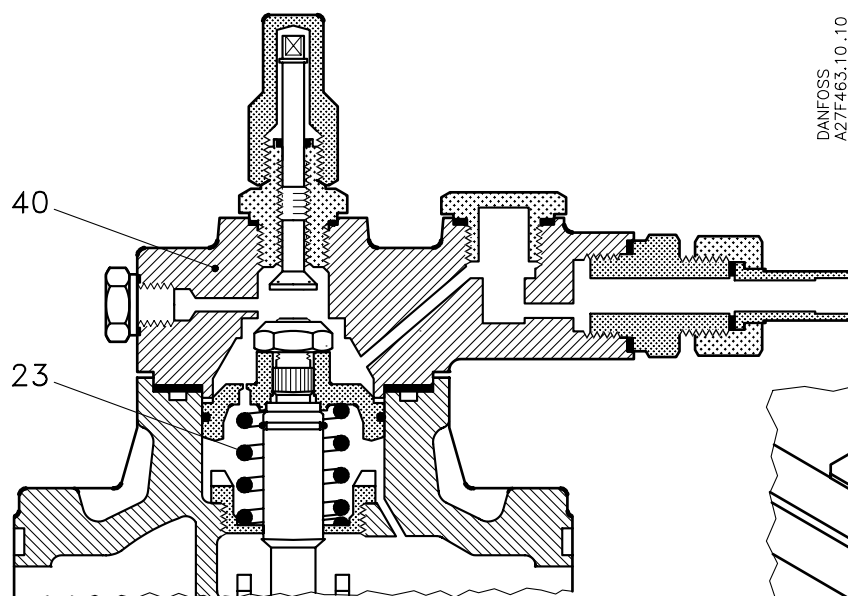
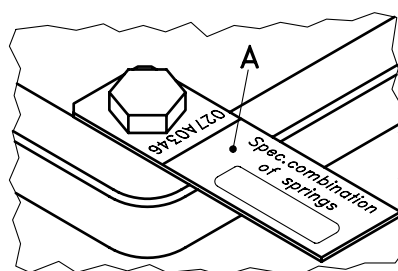
Tightening

Tightening torques

See fig. 8 and table 1.

Use only original Danfoss parts, including packing glands, O-rings and gaskets for replacement. Materials of new parts are certified for the relevant refrigerant.

In cases of doubt, please contact Danfoss. Danfoss accepts no responsibility for errors and omissions. Danfoss Industrial Refrigeration reserves the right to make changes to products and specifications without prior notice.


DANFOSS
A27F463.10.10

DANFOSS
A27F464.10.10

Pos. Item.	PMFH	"WEAK" svag/weak/Schwach/faible
		Best.nr./Code No./Bestell-Nr./N° de code
23 + A	80	027F2190
	125	027F2191
	200	027F2192
	300	027F2193
	500	027F2194

DANSK

Montering

Demonter topdæksel 40.
 Demonter STANDARD fjeder 23.
 Monter spec. fjeder 23.
 Monter topdæksel 40.
 Monter skilt A ved topdækselbolt.
 Skiltet A har betegnelsen WEAK.

ENGLISH

Fitting

Remove top cover 40.
 Remove STANDARD spring 23.
 Fit special spring 23.
 Fit top cover 40.
 Fit label A by top cover bolt.
 Label A carries the designation WEAK.

DEUTSCH

Montage

Kopfdeckel 40 demontieren.
 STANDARD-Feder 23 demontieren.
 Special-Feder 23 montieren.
 Kopfdeckel 40 montieren.
 Schild A am Bolzen des Kopfdeckels montieren.
 Das Schild A ist WEAK gekennzeichnet.

FRANÇAIS

Montage

Démontez le couvercle supérieur 40.
 Démontez le jeu de ressorts STANDARD 23.
 Montez le jeu de ressorts spéciaux 23.
 Remontez le couvercle supérieur 40.
 Montez la plaque A du boulon du couvercle supérieur.
 La plaque A porte la désignation WEAK.

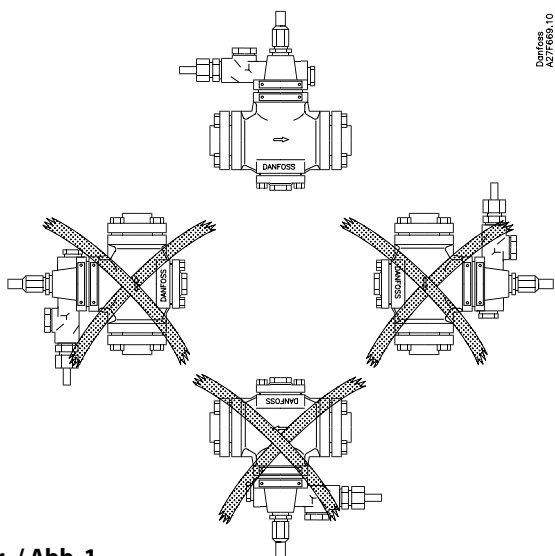


Fig. / Abb. 1

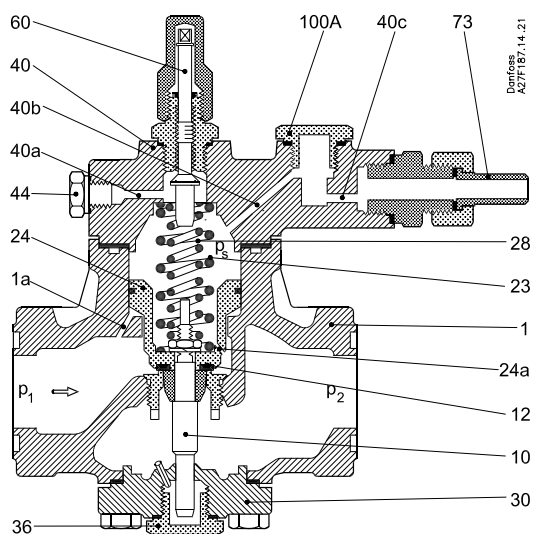


Fig. / Abb. 2

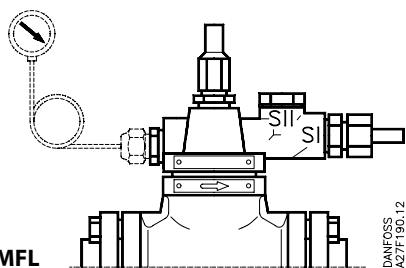


Fig. / Abb. 3

PMFL + EVM

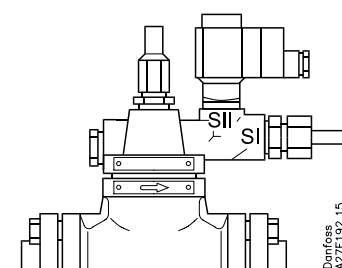


Fig. / Abb. 5

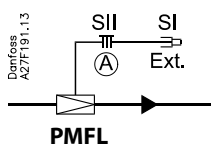


Fig. / Abb. 4

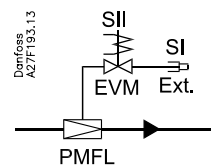


Fig. / Abb. 6

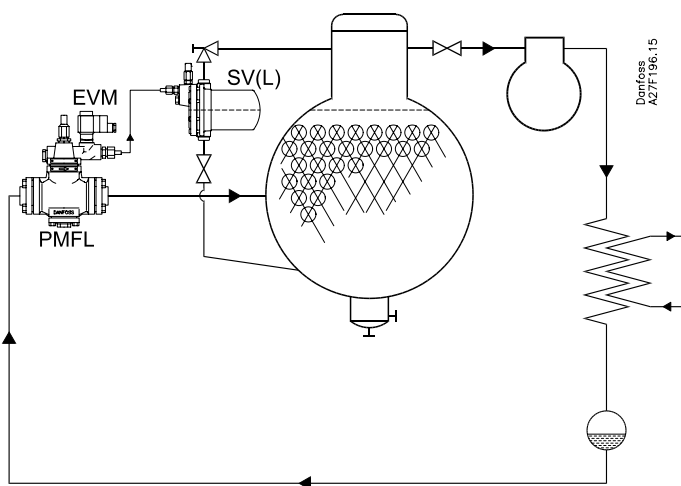
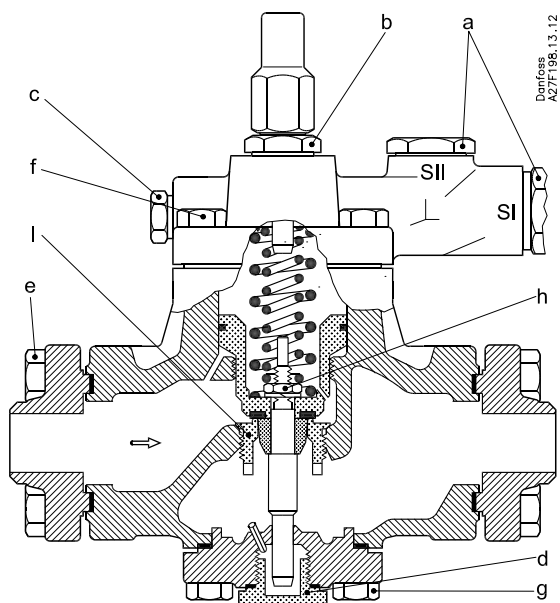


Fig. / Abb. 7



Tabel / Table / Tabelle / Tableau / Tabella 1

Pos. Item Elemento	Tilspændingsmoment i Nm (10 Nm = 1 kpm) Tightening torque in Nm (1 Nm = 0.74 lb force ft) Anzugsmoment in Nm (10 Nm = 1 kpm) Couple de serrage en Nm (10 Nm = 1 kgf.m) Coppia di serraggio in Nm (1 Nm = 0,74 lb forza ft)			
	PMFL Størrelse Size Größe Dimension Dimensioni			
	80-1...7	125	200	300
a	50			
b	50			
c	25			
d	50			
e	60			80
f	35		60	
g	35		60	
h	17	34		
i	80	120	150	

Installation

Kølemidler

Kan anvendes med alle almindelige, ikke-brændbare kølemidler, herunder R 717, og ikke-korroderende gasser/væsker under passende hensyntagen til tætningsmateriale-lernes beskaffenhed. Brændbare kulbrinter bør ikke anvendes. Det anbefales, kun at anvende ventilen i lukkede kredsløb. Yderligere informationer fås ved at kontakte Danfoss.

Temperaturområde

PMFL: -60/+120°C (-76/+248°F)

Trykområde

PMFL: Ventilerne er beregnet til et maks. arbejdstryk på 28 bar g (406 psi g).

Tekniske data

PMFL-ventiler kan anvendes i suge-, væske-, varmgas- og væske-/dampledninger. PMFL regulerer mediefLOWet ved hjælp af en tottrins on/off-funktion afhængigt af styreimpulsen fra de påskruede pilot-ventiler.

Konstruktion

Se fig. 2

- | | |
|------------|---------------------------|
| 1. | Ventilhus |
| 1a. | Kanal i ventilhus 1 |
| 10. | Ventilspindel |
| 12. | Ventilplade |
| 23. | Drivfjeder |
| 24. | Servostempel |
| 24a. | Kanal i servostempel 24 |
| 28. | Hjælpefjeder |
| 30. | Bunddæksel |
| 36. | Bundprop |
| 40. | Dæksel |
| 40a. b. c. | Kanaler i dæksel 40 |
| 44. | Manometertilslutning |
| 60. | Spindel for manuel åbning |
| 73. | Pilottilslutning |
| 100A. | Blændprop |

Installation

Flangesæt til PMFL leveres separat. Ventilen monteres, så pilen peger i flowretningen og topdækslet vender opad (fig. 1). Topdækslet kan roteres 4 × 90° i forhold til ventilhuset. Ventilen er udstyret med en spindel for manuel åbning. Hvis der anvendes en ekstern pilotventil, skal pilotledningen tilsluttes den øverste side af hovedledningen, så eventuelt snavs og olie fra anlægget ikke trænger ind i pilotledningen.

PMFL-ventilen kan styres ved hjælp af en SV-svømmerventil, som vist i fig. 7. Se instruktioner og retningslinier for SV-ventiler.

Ventilen kan modstå et højt indvendigt tryk. Rørsystemet bør imidlertid konstrueres, så væskefælder undgås og risikoen for hydraulisk tryk forårsaget af termisk ekspansion reduceres. Ventilen skal beskyttes mod tryktransienter såsom væskeslag i systemet.

Svejsning

Hvis der bruges svejseflanger, må der kun anvendes materialer og svejsemetoder, der er kompatible med flangematerialet. Før ventilen sættes på plads, bør flangerne rengøres indvendigt efter svejsning for at fjerne svejseslagger.

Efter installation skal ventilhuset og flangerne være uden spænding (ekstern belastning).

Der må ikke installeres PMFL-ventiler i systemer, hvor ventilens udløbsside er åben til atmosfæren. Ventilens udløbsside skal altid tilsluttes systemet eller blændes korrekt af, for eksempel med en påsvejet endebund.

Farver og identifikation

PMFL-ventilerne er zinkkromateret fra fabrikken. Hvis yderligere korrosionsbeskyttelse er påkrævet, kan ventilerne males.

Ventilerne kan identificeres nøjagtigt ved hjælp af typeskiltet på topdækslet. Når ventilhuset er installeret og monteret, skal dets udvendige overflade beskyttes mod korrosion med et velegnet antikorrosionsmiddel.

Det anbefales at afdække typeskiltet ved ommaling af ventilen.

Vedligeholdelse

Service

PMFL-ventilerne er lette at demontere og består primært af udskiftelige dele. Når bunddækslet fjernes, kan smudsfilteret afmonteres og rengøres. Undlad at åbne ventilen, mens den stadig er under tryk.

- Kontroller, at O-ringen eller pakningerne ikke er beskadiget.
- Kontroller, at spindlen er fri for ridser og slagmærker.
- Udskift delene, hvis teflonringen er beskadiget.

Montering

Fjern eventuelt snavs fra huset, før ventilen samles. Kontroller, at kanalerne i ventilen ikke er tilstoppet med partikler eller lignende.

Tilspænding

Tilspændingsmomenter

Se fig. 3 og tabel 1.

Anvend kun originale Danfoss-dele, herunder pakdåser, O-ringe og pakninger. De materialer, som er anvendt til nye dele, er certificeret til det pågældende kølemiddel.

Kontakt venligst Danfoss i tilfælde af tvivl. Danfoss påtager sig intet ansvar for fejl og undladelser. Danfoss Industrial Refrigeration forbeholder sig retten til at foretage ændringer i produkter og specifikationer uden forudgående varsel.

Installation

Refrigerants

Applicable to all common non-flammable refrigerants, including R717 and non-corrosive gases/liquids dependent on sealing material compatibility. Flammable hydrocarbons are not recommended. The valve is only recommended for use in closed circuits. For further information please contact Danfoss.

Temperature range

PMFL: -60/+120°C (-76/+248°F)

Pressure range

PMFL: The valves are designed for a max. working pressure of 28 bar g (406 psi g).

Technical data

PMFL can be used in suction, liquid, hot-gas and liquid/vapour lines.

The PMFL regulates the flow of the medium by two step on/off function, depending on the control impulse from the screwed-on pilot valves.

Design

See fig. 2

- | | |
|------------|----------------------------|
| 1. | Valve body |
| 1a. | Channel in valve body 1 |
| 10. | Valve spindle |
| 12. | Valve plate |
| 23. | Main spring |
| 24. | Servo piston |
| 24a. | Channel in servo piston 24 |
| 28. | Supplementary spring |
| 30. | Bottom cover |
| 36. | Drain plug |
| 40. | Cover |
| 40a. b. c. | Channels in cover 40 |
| 44. | Pressure gauge connection |
| 60. | Manual operating spindle |
| 73. | Pilot connection |
| 100A. | Blanking plug |

Installation

Flange set for the PMFL is delivered separately. The valve must be installed with the arrow in the direction of the flow and the top cover upwards (fig. 1). The top cover can be rotated 4 × 90° in relation to the valve body.

The valve is fitted with a spindle for manual opening.

When an external pilot valve is used, the pilot line must be connected to the upper side of the main line so that any dirt and oil from the plant will not find its way into the pilot line.

The PMFL valve can be controlled by the SV float valve as shown in fig. 7. Please refer to SV instruction guidelines.

The valve is designed to withstand a high internal pressure. However, the piping system should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion. It must be ensured that the valve is protected from pressure transients like "liquid hammer" in the system.

Welding

If using welding flanges, only materials and welding methods, compatible with the flange material must be welded to the flanges. The flanges should be cleaned internally to remove welding debris on completion of welding and before the valve is inserted.

The valve housing and flanges must be free from stresses (external loads) after installation.

PMFL valves must not be mounted in systems where the outlet side of the valve is open to atmosphere. The outlet side of the valve must always be connected to the system or properly capped off, for example with a welded-on end plate.

Colours and identification

The PMFL valves are Zinc-Chromated in the factory. If further corrosion protection is required, the valves can be painted.

Precise identification of the valve is made via the ID plate on the top cover. The external surface of the valve housing must be prevented against corrosion with a suitable protective coating after installation and assembly.

Protection of the ID plate when repainting the valve is recommended.

Maintenance

Service

The PMFL valves are easy to dismantle and most of its parts are replaceable. When the bottom cover is removed, the strainer can be taken out for cleaning. Do not open the valve while the valve is still under pressure.

- Check that the O-ring or gaskets have not been damaged.
- Check that the spindle is free of scratches and impact marks.
- If the teflon ring has been damaged, the parts must be replaced.

Assembly

Remove any dirt from the body before the valve is assembled. Check that all channels in the valve are not blocked with particles or similar.

Tightening

Tightening torques

See fig. 3 and table 1.

Use only original Danfoss parts, including packing glands, O-rings and gaskets for replacement. Materials of new parts are certified for the relevant refrigerant.

In cases of doubt, please contact Danfoss. Danfoss accepts no responsibility for errors and omissions. Danfoss Industrial Refrigeration reserves the right to make changes to products and specifications without prior notice.

DEUTSCH

Installation

Kältemittel

Anwendbar für alle herkömmlichen, nicht entflammenden Kältemittel, einschließlich R 717, und nicht korrodierenden Gase/Flüssigkeiten, sofern die Dichtungsmaterialien geeignet sind. Entflammbare Kohlenwasserstoffe werden nicht empfohlen. Das Ventil wird nur für den Einsatz in geschlossenen Kreisläufen empfohlen. Für weitere Informationen wenden Sie sich bitte an Danfoss.

Temperaturbereich

PMFL: -60/+120°C (-76/+248°F)

Druckbereich

PMFL: Die Ventile sind für einen max. Arbeitsdruck von 28 bar (406 psi) ausgelegt.

Technische Daten

PMFL kann in Saug-, Flüssigkeits-, Heißgas- und Flüssigkeits-/Dampfleitungen eingesetzt werden. PMFL regelt den Medienstrom mittels zweistufiger Ein-Aus-Funktion, abhängig vom Steuerimpuls der aufgeschraubten Pilotventile.

Konstruktion

Siehe Abb. 2

1. Ventilkörper
- 1a. Kanal im Ventilkörper 1
10. Ventilspindel
12. Ventilplatte
23. Hauptfeder
24. Servokolben
- 24a. Kanal im Servokolben 24
28. Zusatzfeder
30. Bodendeckel
36. Ablassschraube
40. Verschluss
- 40a. b. c. Kanäle im Gehäuse 40
44. Manometeranschluss
60. Manuelle Einstellspindel
73. Pilotanschluss
- 100A. Blindstopfen

Installation

Flanschsätze für PMFL werden separat geliefert. Das Ventil muss mit dem Pfeil in Durchflussrichtung und dem Kopf nach oben installiert werden (Abb. 1). Der Ventilkopf lässt sich gegenüber dem Ventilgehäuse um 4 × 90° drehen. Das Ventil ist mit einer Spindel zum manuellen Öffnen ausgestattet. Kommt ein externes Pilotventil zum Einsatz, muss die Pilotleitung mit der Oberseite der Hauptleitung verbunden sein, um das Eindringen von in der Anlage befindlichem Schmutz und Öl in die Pilotleitung zu verhindern. Das PMFL-Ventil kann vom SV-Schwimmerventil, wie in Abb. 7 dargestellt, geregelt werden. Bitte die Richtlinien in der SV-Anleitung beachten.

Das Ventil ist für sehr hohe Innendrucke dimensioniert. Jedoch ist bei der Auslegung des Rohrsystems darauf zu achten, dass Kältemittelschläge vermieden werden, und dass das Risiko von durch thermische Expansion verursachtem hydraulischem Druck herabgesetzt wird. Es ist sicherzustellen, dass das Ventil gegen Druckschwingungen in der Anlage, wie "Flüssigkeitsschläge", geschützt ist.

Anschweißenden

Werden Anschweißenden benutzt, dürfen nur mit dem Flanschwerkstoff verträgliche Materialien und Schweißmethoden angewandt werden. Die Flansche müssen nach Abschluss der Schweißarbeiten und vor dem Einsetzen des Ventils innen von Schweißabfällen gereinigt werden.

Das Ventilgehäuse und die Flansche sind nach der Installation frei von Belastungen (externen Kräften) zu sein.

PMFL-Ventile dürfen nicht in Anlagen eingebaut werden, in denen die Ausgangsseite des Ventils zur Atmosphäre offen ist. Die Ausgangsseite des Ventils muss immer an die Anlage angeschlossen oder korrekt verschlossen sein, beispielsweise mit einem aufgeschweißten Enddeckel.

Farben und Kennzeichnung

Die PMFL-Ventile werden im Werk zinkchromatiert. Ist zusätzlicher Korrosionsschutz erforderlich, empfiehlt sich ein Anstrich der Ventile.

Die genaue Identifikation des Ventils kann dem Typenschild am Ventilkopf entnommen werden. Die Außenoberfläche des Ventilgehäuses muss mit einer passenden Schutzschicht nach Installation und Zusammenbau gegen Korrosion geschützt werden.

Beim Anstreichen ist das Typenschild zum Schutz abzudecken.

Instandhaltung

Service

PMFL-Ventile sind einfach auseinander zu nehmen, und die meisten Teile sind austauschbar. Nach Entfernen der Bodenabdeckung lässt sich der Schmutzfänger zum Reinigen herausnehmen. Das Ventil nicht öffnen, solange es unter Druck steht.

- Kontrollieren, dass der O-Ring oder die Dichtungen nicht beschädigt sind.
- Kontrollieren, dass die Spindel frei von Riefen und Schlagkerben ist.
- Ist der Teflonring beschädigt, muss er ausgetauscht werden.

Zusammenbau

Vor dem Zusammenbau das Gehäuse sorgfältig von Schmutz reinigen. Kontrollieren, dass keiner der Kanäle durch Partikel etc. blockiert wird.

Festspannen

Anzugsmomente

Siehe Abb. 3 und Tabelle 1.

Zum Austausch nur Originalteile von Danfoss, einschließlich Stopfbuchsen, O-Ringe und Dichtungen, benutzen. Die Werkstoffe von Neuteilen sind für das betreffende Kältemittel zertifiziert.

Im Zweifelsfall bitte mit Danfoss Kontakt aufnehmen. Danfoss lehnt jede Verantwortung für Fehler und Auslassungen ab. Danfoss Industrial Refrigeration behält sich das Recht zu Produkt- und Spezifikationsänderungen ohne vorherige Ankündigung vor.

DECLARATION OF CONFORMITY
The Pressure Equipment Directive 97/23/EC



Name and Address of Manufacturer within the European Community

Danfoss Industrial Refrigeration A/S
Stormosevej 10
PO Box 60
DK-8361 Hasselager
Denmark

Declaration

We hereby declare that below-mentioned equipment are classified for Fluid Group I (all refrigerants (toxic, non-toxic, flammable and non-flammable)), and that all are covered by Article 3, paragraph 3.

For further details / restrictions – see Installation Instruction

Description of Pressure Equipment

Refrigerant main regulating valves
Type **PM, PMC, PMFH, PMFL, MRV, MEV**

Nominal bore **DN ≤ 25 mm.** (1 in)

References of other Technical Standards and Specifications used

prEN 12284 DIN 3158
EN 1563 AD-Merkblätter

Authorised Person for the Manufacturer within the European Community

Name: Morten Steen Hansen **Title:** Production Manager

Signature:

Date: 14/08/2002

148B9715 - rev. 1

DECLARATION OF CONFORMITY
The Pressure Equipment Directive 97/23/EC

Danfoss

Name and Address of Manufacturer within the European Community

Danfoss Industrial Refrigeration A/S
Stormosevej 10
PO Box 60
DK-8361 Hasselager
Denmark

Description of Pressure Equipment

Refrigerant main regulating valves
Type PM, PML, PMLX, PMFH, PMFL, MRV, MEV

Nominal bore	DN 32-150 mm (1 $\frac{1}{4}$ - 6 in.)	
Classified for	Fluid Group I (all refrigerants (toxic, nontoxic, flammable and nonflammable)). For further details / restrictions – see Installation Instruction.	
Temperature range	All	-60°C (-76°F) to 120°C (248°F)
Maximum allowable working pressure		28 bar (406 psi)

Conformity and Assessment Procedure Followed

Category	II	III
Module	D1	B1 + D
Certificate ID	<i>D1: 07 202 0511 Z 0009/1/H-0002</i>	<i>B1: 07 202 0511 Z 0074/1/H-0001</i> <i>D: 07 202 0511 Z 0009/1/H-0001</i>
Nominal bore	DN 32-125 mm (1 $\frac{1}{4}$ - 5 in)	DN 150 mm (6 in)

Name and Address of the Notified Body which carried out the Inspection

TÜV-Nord e.V.
Grosse Bahnstrasse 31
22525 Hamburg, Germany



Name and Address of the Notified Body monitoring the Manufacturer's Quality Assurance System

TÜV-Nord e.V.
Grosse Bahnstrasse 31
22525 Hamburg, Germany

References of Harmonised Standards used

References of other Technical Standards and Specifications used

prEN 12284 DIN 3158
EN 1563 AD-Merkblätter

Authorised Person for the Manufacturer within the European Community

Name: Morten Steen Hansen

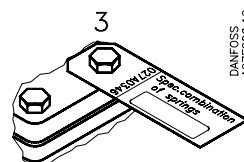
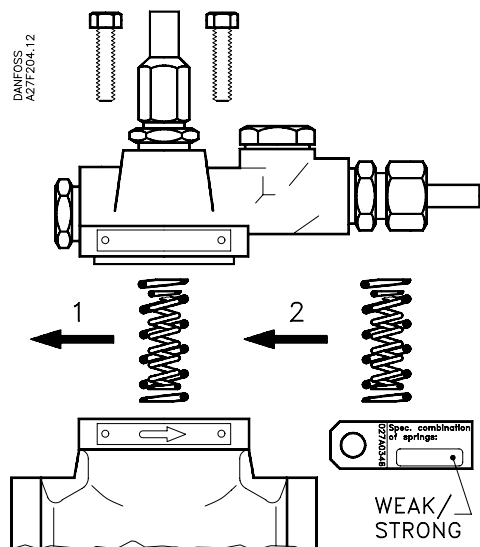
Title: Production Manager

Signature:

Morten Steen Hansen

Date: 14/08/2002

148B9704 - rev. 1



Item.	PMFL	"WEAK" svag/weak/Schwach/faible	"STRONG" kraftig/strong/stark/fort
		Best.nr./Code No./Bestell-Nr./N° de code	
Fjedersæt / skilt	80-1...7	027F0123	027F0118
Springset / label	125	027F0124	027F0119
Federsatz / Schild	200	027F0125	027F0120
Jeu de ressorts / plaque	300	027F0126	027F0121

DANSK

Montering

Demonter topdæksel.
 Demonter STANDARD fjedersæt (1).
 Monter spec. fjedersæt (2).
 Monter topdæksel.
 Monter skilt ved topdækselbolt (3).
 Skiltet har betegnelsen WEAK eller STRONG.

ENGLISH

Fitting

Remove top cover.
 Remove STANDARD spring set (1).
 Fit special spring set (2).
 Fit top cover.
 Fit label by top cover bolt (3).
 The label carries the designation WEAK or STRONG.

DEUTSCH

Montage

Kopfdeckel demontieren.
 STANDARD-Federsatz demontieren (1).
 Special-Federsatz montieren (2).
 Kopfdeckel montieren.
 Schild am Bolzen des Kopfdeckels montieren (3).
 Das Schild ist WEAK oder STRONG gekennzeichnet.

FRANÇAIS

Montage

Démonter le couvercle supérieur.
 Sortir le jeu de ressorts STANDARD (1).
 Monter le jeu de ressorts spéciaux (2).
 Remonter le couvercle supérieur.
 Monter la plaque sur le boulon du couvercle supérieur (3).
 La plaque porte la désignation WEAK ou STRONG.

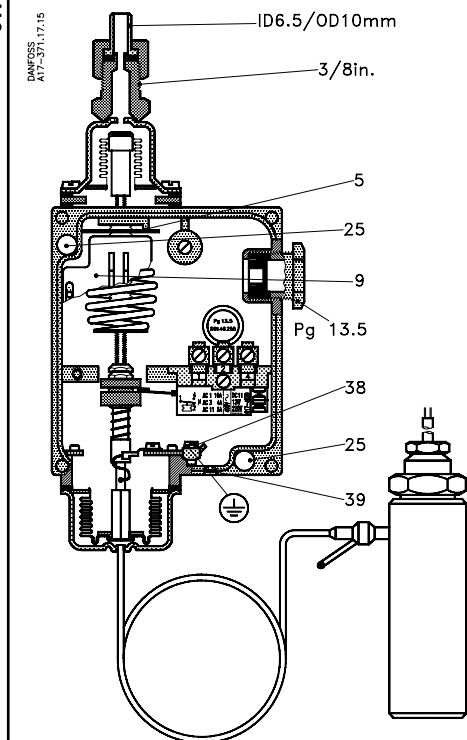


Fig. 1

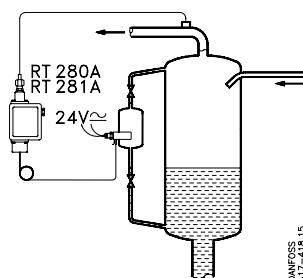


Fig. 2

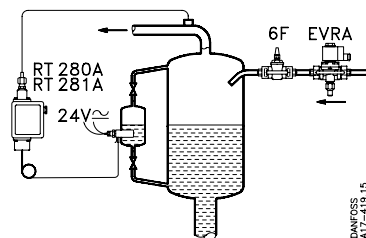


Fig. 3

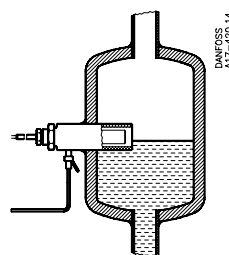


Fig. 4

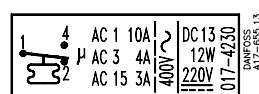


Fig. 5

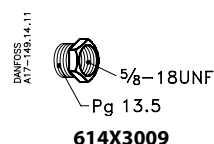


Fig. 6

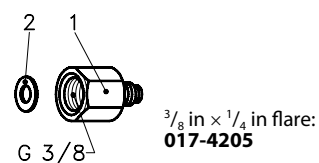


Fig. 7

DANSK

Sikkerhedsafbryder Niveauregulator

Tekniske data

1. Generelt

Funktionsområder for RT 280A:
R 12 -50°C til +10°C
R 22, R 717 -50°C til 0°C
R 502 -65°C til -5°C

Funktionsområde for RT 281A:

R 22, R 502, R 717: -30°C til +20°C

Niveaudifferens: maks. ±20 mm ved maks. funktions-
temp. og niveauændringshastighed mindre end ca.
40 mm/minut.

Omgivelsestemperatur: -50°C til +70°C (-50T70).

Tæthedegrad: IP 66 iht. IEC 529.

Kontaktbelastning: Se kontaktdækslet eller fig. 5.

Mærkningen, f.eks. 10(4) A, 400V~, angiver, at der maks.
må tilsluttes 10 A ohmsk eller 4 A induktiv belastning
ved 400 V~.

Den maksimale startstrøm ved indkobling af motor (L.R.)
må være op til syv gange den induktive belastning – dog
maks. 28 A. RT opfylder betingelserne i VDE* 0660.

VDE* = Verband Deutscher Elektrotechniker

2. Termostatisk element

Adsorptionsfyldning

3 m kapillarrør,

Maks. till. følertemp.: +100°C.

3. Varmeføler

Varmelegeme 10 W for 24 V jævn- og vekselstrøm 1.5
m tilslutningskabel.

4. Trykelement

Tryktilslutning: 3/8 RG med Ø6.5/Ø10 mm svejsen-
nippel.

Tilladeligt driftstryk, PB: 22 bar

Max. prøvetryk, p: 25 bar

Montering. Se fig. 2, 3 og 4.

Benytt monteringshullerne 25.

Svejsébøsningen monteres vandret, således at følerens
underkant er i højde med maks. tilladeligt væskenniveau
(fig. 2) eller ved anvendelse som niveauregulator i højde
med det ønskede væskenniveau (fig. 3)

Følerens varmelegeme tilsluttes 24V jævn- eller veksel-
strøm. Det vil derfor i de tilfælde, hvor 24 V jævn- eller
vekselstrøm ikke er til rådighed, være nødvendigt at
anvende en transformer.

**Vigtigt: Følerens varmelegeme skal være konstant
indkoblet, når strømforsyningen til anlægget er
sluttet.**

Ved opstart af anlægget efter stilstand anbefales det at
lade varmelegemet være indkoblet i få minutter, inden
kølekompresoren startes.

Er fordampningstemperaturen – og dermed refe-
rencetrykket – større end maks. områdetemperatur, vil
RT apparatet registrere dette, som om væskenniveauet
er for højt.

Trykelementet tilsluttes således, at elementtrykket
(referencetrykket) svarer til trykket i den beholder, hvor
varmeføleren er anbragt.

Af hensyn til eventuelle pulsationer, hidrørende fra
væskeindsprøjtningen, bør tryktilslutningen placeres
længst muligt væk fra væsketilgangsørret.

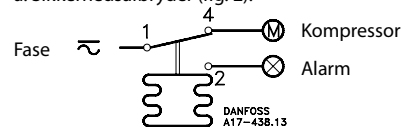
Tilslutningen anbefales monteret direkte på behol-
derens top eller på sugeledningen umiddelbart efter
beholderen.

Under forhold, hvor kraftige pulsationer kan forekom-
me, anbefales det at indskyde en dæmpedysse i tryk-
ledningen til elementet.

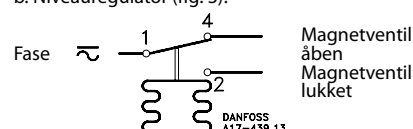
Tilbehør. Se fig. 6 og 7.

El-tilslutning

a. Sikkerhedsafbryder (fig. 2):



b. Niveauregulator (fig. 3):



Kabeldiameter: 6 til 14 mm

Jordforbindelse tilsluttes jordskruen 38.

Indstilling

Indstillingen til det ønskede kølemiddel foretages
ved at dreje den indvendige indstillingskive 5 ud for
det på skalaen 9 angivne mærke for det pågældende
kølemiddel.

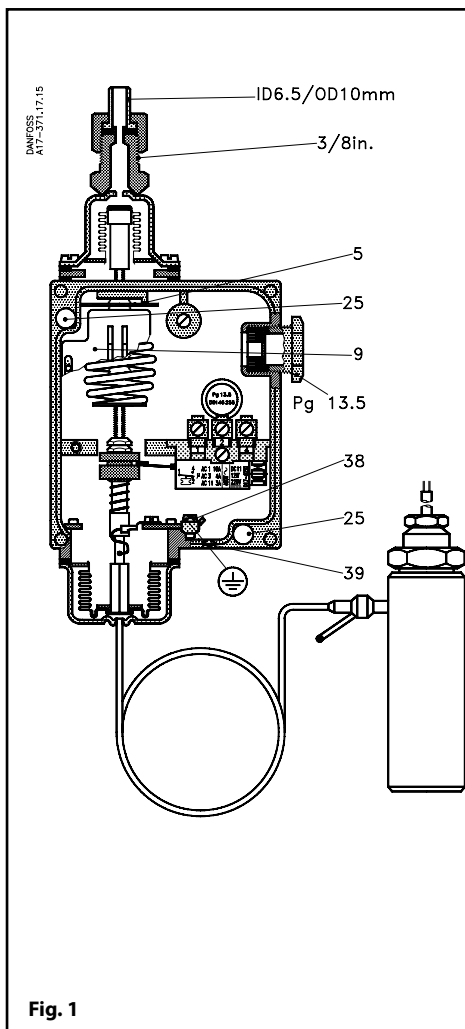


Fig. 2

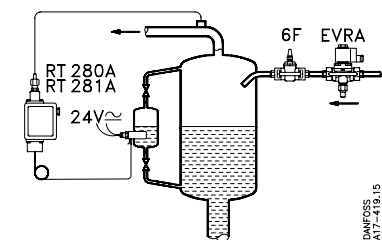


Fig. 3

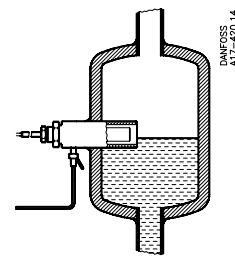


Fig. 4

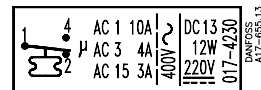


Fig. 5

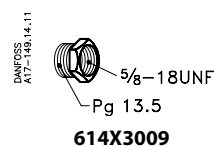


Fig. 6

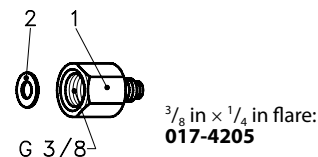


Fig. 7

ENGLISH

Safety cut-out Liquid level control

Technical data

1. General

Function ranges for RT 280A:
R 12 -50°C to +10°C
R 22, R 717 -50°C to 0°C
R 502 -65°C to -5°C

Function range for RT 281 A:
R 22 R 502, R 717 -30°C to +20°C
Liquid level differential: max. ±20 mm at max. function temp. and level change rate less than approx. 40 mm/minute.
Ambient temperature: -50°C to +70°C (-50°F to 70°F).
Enclosure: IP 66 to IEC 529.
Contact load: See switch cover or fig. 5.
The marking, e.g. 10(4) A, 400 V ~ means that max. connection current is 10 A ohmic or 4 A inductive at 400 V ~.
The max. starting current on motor cut-in (L.R.) may be up to seven times the inductive load – but max. 28A.
RT complies with conditions specified in VDE* 0660.
VDE* = Verband Deutscher Elektrotechniker

2. Power element

Adsorption charge
3 m capillary tube
Max. permissible bulb temperature: + 100°C

3. Heat-sensing element

Electric heater 10 W for 24 V d. c. and a. c.
1.5 m cable.

4. Pressure element

Pressure connection: 3/8 BSP with Ø6.5/Ø10 mm weld nipple.
Max. working pressure, PB/MWP: 22 bar/315 psig
Max. test pressure, p_t: 25 bar/355 psig.

Fitting. See figs. 2, 3, and 4.

Use the mounting holes 25.

The weld bushing should be mounted vertically so that the lower edge of the bulb is at the same height as the max. permissible liquid level (fig. 2) or, when used as a liquid level control, at the same height as the liquid level required (fig. 3).

The electric bulb heater should be connected to 24 V d.c. or a.c. When 24 V d.c. or a.c. is not available it will, therefore, be necessary to use a transformer.

Important: The electric bulb heater must be constantly cut in when the current supply to the system is on.

To start up the system after standstill, it is recommended that the electric heater should be cut in for a few minutes before starting the refrigeration compressor.

If the evaporating temperature – and with it the reference pressure – is greater than the max. range temperature, RT units will register this as if the liquid level were too high.

The pressure element should be connected in such a way that the element pressure (reference pressure) corresponds to the pressure in the vessel in which the heat-sensing element is located.

To take into account pulsations originating from the liquid injection, the pressure connection should be located as far away from the liquid supply pipe as possible.

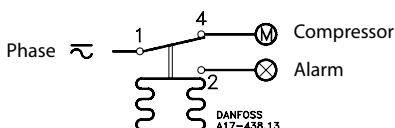
It is recommended that the connection should be direct on the top of the vessel or the upper side of the suction line immediately after the vessel.

Under conditions where strong pulsations may occur, it is recommended that a damping orifice should be inserted in the delivery line to the element.

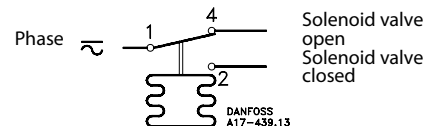
Accessories. See figs. 6 and 7.

Mains connection

a. Safety cut-out (fig. 2):



b. Liquid level control (fig. 3):



Cable diameter: 6 to 14 mm. The earth terminal 38 should be connected to earth.

Adjustment

Adjustment to the refrigerant required is effected by setting the internal setting disc 5 at the mark indicating the refrigerant in question on the scale 9.

027R9529

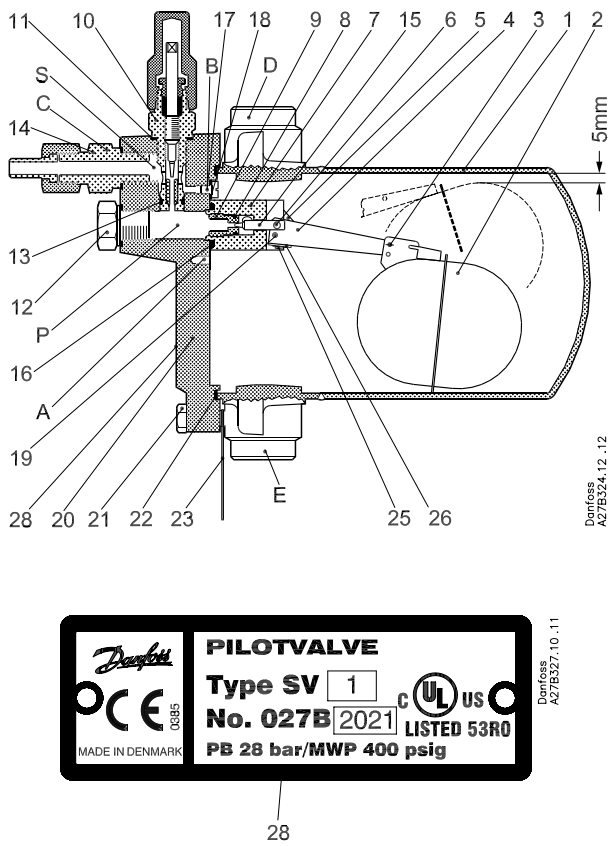


Fig. 1

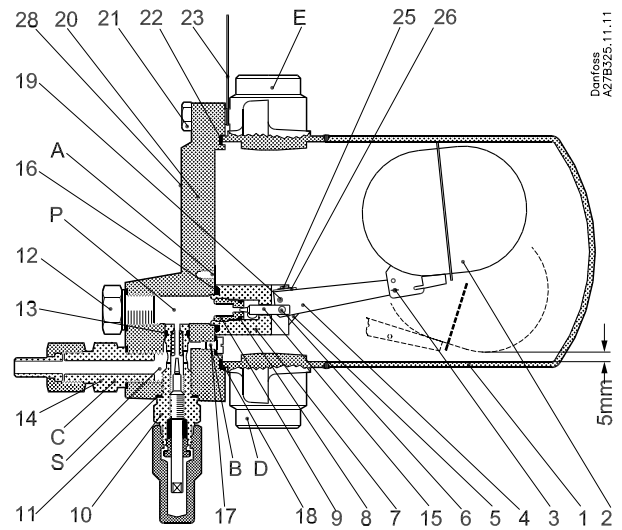


Fig. 2

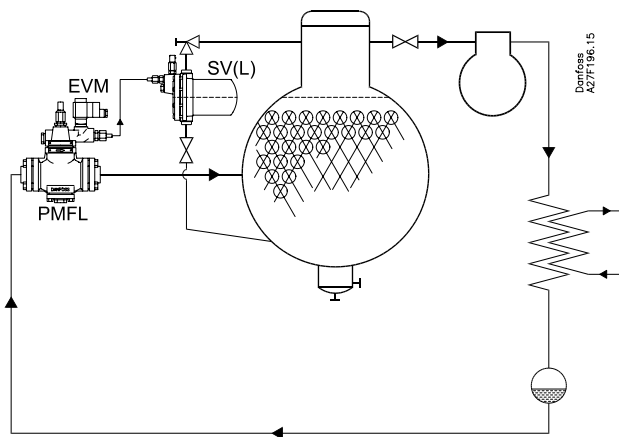


Fig. 3

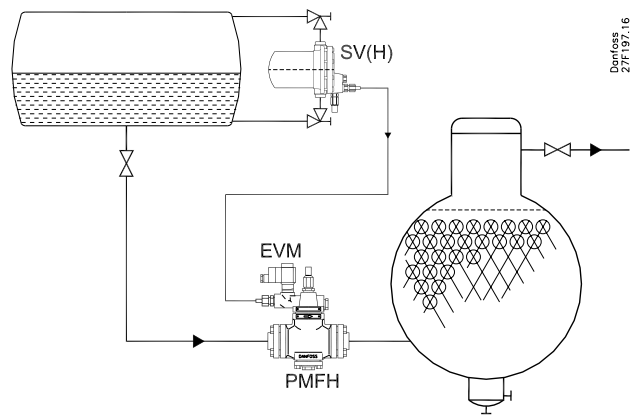


Fig. 4

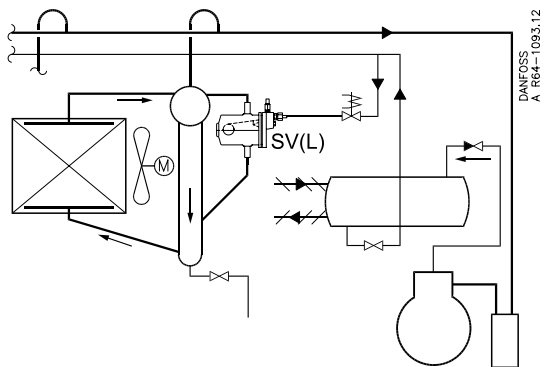


Fig. 5

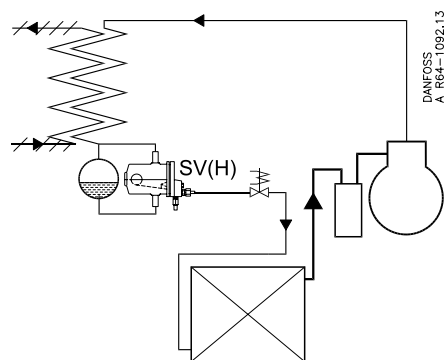


Fig. 6

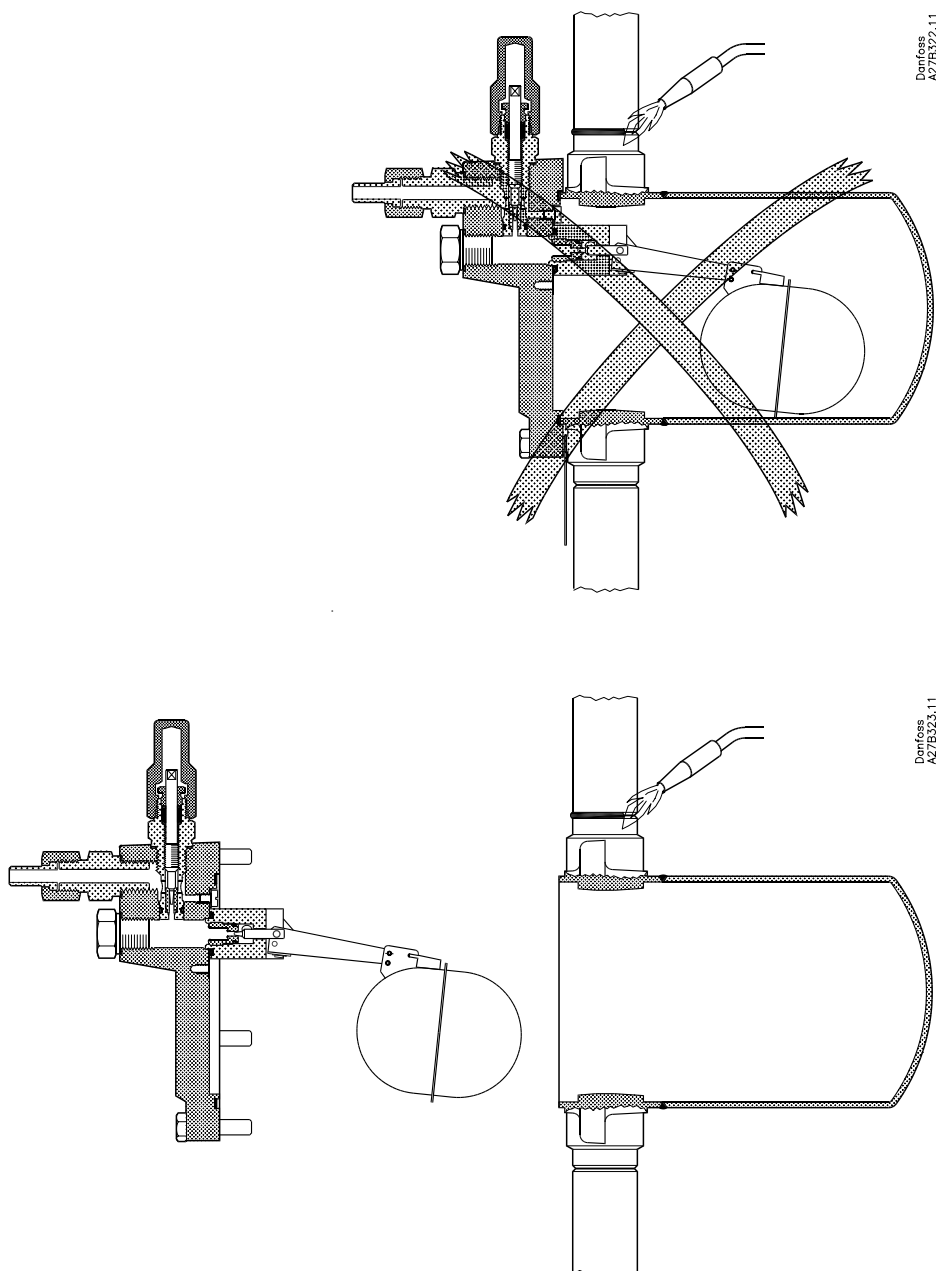


Fig. 7

Installation

Low pressure and high pressure float valves + high pressure defrost drain float valves

Refrigerants

Applicable to all common non-flammable refrigerants, including R717 and non-corrosive gases/liquids dependent on sealing material compatibility. Flammable hydrocarbons are not recommended. The valve is only recommended for use in closed circuits. For further information please contact Danfoss.

Temperature range

SV 1-3: -50/+65°C (-58/+149°F)

Pressure range

SV valves are designed for a max. working pressure of 28 bar g (406 psi g).
Max. test pressure: $p_e = 37 \text{ bar} = 3700 \text{ kPa} (537 \text{ psig})$

Design

1. Float Housing
2. Float
3. Split pin
4. Float arm
5. Link
6. Pin
7. Valve housing
8. O-ring
9. Float orifice
10. Manual regulation unit, throttle valve
11. Gasket
12. Plug
13. O-ring
14. Pilot connection (spare part)
15. Orifice needle
16. O-ring
17. Screw
18. Gasket
19. Pin
20. Cover
21. Screw
22. Gasket
23. Label
25. Screw
26. Spring washer
28. Sign

Installation

Low pressure float valve SV (fig 1,3 and 5).
When SV is to be used as a low pressure float valve it must be fitted with its longitudinal axis horizontal at the same height as the liquid level required (fig. 3).

Manual regulation unit **10** must point vertically upwards. The vapour connection **D** must point vertically upwards.

The low pressure float valve is connected to the evaporator through a liquid line **E** and a vapour line **D**.

When delivered, the float **2** is made secure for transport by a carton sleeve which must be removed prior to fitting. See label **23**.

High pressure float valve SV (fig. 2, 4 and 6).
When SV is to be used as a high pressure float valve it must be fitted with its longitudinal axis horizontal at the same height as the liquid level required (fig. 4).
Manual regulating unit **10** must point vertically downwards. The vapour connection **D** must point vertically upwards.

The high pressure float is connected to the condenser/receiver or a vertical adequately dimensioned section of the liquid line from the condenser via a liquid line **E** and a vapour line **D**.

When delivered, the float **2** is made secure for transport by a carton sleeve which must be removed prior to installation. See label **23**.

Installation to the system

The low pressure or high pressure float valve can be connected to the main valve (PMFL or PMFH) with a pilot line not more than 3 m in length, without "pockets", and with an inside diameter of between 6 and 10 mm.

The piping system should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion. It must be ensured that the valve is protected from pressure transients like "liquid hammer" in the system.

When an SV(L) is used as a separate expansion valve (fig. 5), the liquid inlet line is connected to nipple C (delivered separately). To avoid false level, the pressure drop in the suction vapour connection must be as small as possible.

When an SV(H) is used as a separate expansion valve (fig. 6), the liquid outlet line must be connected to nipple C (delivered separately).

At delivery the SV house is positioned for low pressure function SV(L) when the type label can be read normally.

The label is thus placed on the cover in the way that its top edge indicates the centre of the cover.

Welding

As shown in fig. 7, the complete float assembly must be removed prior to welding.

Only materials and welding methods, compatible with the valve housing material, must be welded to the valve housing. The valve should be cleaned internally to remove welding debris on completion of welding and before the valve is reassembled.

Avoid welding debris and dirt in the housing including all orifices.

The valve housing must be free from stresses (external loads) after installation.

Valves must not be mounted in systems where the outlet side of the valve is open to atmosphere. The outlet side of the valve must always be connected to the system or properly capped off, for example with a welded-on end plate.

Pilot connection

The cover **20** is fitted with a manual regulation unit **10**. There are two possibilities, P and S, for the pilot connection **14**.

When the pilot connection is fitted in position P, the pilot flow travels in parallel through either the bypass orifice **10** or float orifice **9**. The screw **17** must be moved to position A so that the by-pass hole B is open.

When the pilot connection is fitted in pos. S, the pilot flow travels in series through manual regulating unit **10** and float orifice **9**. The screw **17** must then be kept in position B.

Instruction for PMFL shows the pilot connection on SV for the low pressure float system.

Instruction for PMFH shows the pilot connection on SV for the high pressure float system.

Setting

On delivery, the pilot connection is fitted with a red plastic cap. After removal of the cap the pilot connection, either 10 mm weld or 3/8" flare, can be fitted. Connection S is open on delivery.

When SV is used as a pilot float valve in the low pressure system: PMFL + SV, or in the high pressure system: PMFH + SV. Make the settings as described in these instructions.

P-mounting for SV as separate valve

With the float valve closed the SV has a minimum capacity corresponding to the degree of opening of the throttle valve **10**. Opening of the throttle valve can be used for service to manually open the SV.

S-mounting for SV as separate valve

On SV(L) the throttle valve **10** functions as a pre-orifice and on SV(H) as a post-orifice, corresponding to the degree of opening of the throttle valve.

With the throttle valve closed, the liquid inlet on SV(L) and liquid outlet on SV(H) are shut off.

Assembly

Remove welding debris and any dirt from pipes and valve body before assembly.

Colours and identification

The SV valves are painted with a blue primer in the factory. Precise identification of the valve is made via the ID plate. The external surface of the valve housing must be prevented against corrosion with a suitable protective coating after installation and assembly.

Protection of the ID plate when repainting the valve is recommended.

Maintenance

Dismantling the valve (fig. 1)

Do not remove the cover **20** or the plug **12** while the valve is still under pressure.

- Check that the gasket **22** has not been damaged
- Unscrew the orifice **9** and check that the orifice needle **15** is intact
- Check that the float **2** is intact
- Check that the pin **19** is intact

Assembly

Remove any dirt from the interior before the valve is assembled. Check that the valve is positioned according to the function before re-installation.

Tightening

Tighten the cover **20** according to the following table:

	□	Tightening Torque
SV 1:	13 mm	20 Nm
SV 3:	13 mm	20 Nm

Use only original Danfoss parts, including packing glands, O-rings and gaskets for replacement. Materials of new parts are certified for the relevant refrigerant.

In cases of doubt, please contact Danfoss. Danfoss accepts no responsibility for errors and omissions. Danfoss Industrial Refrigeration reserves the right to make changes to products and specifications without prior notice.

DECLARATION OF CONFORMITY
The Pressure Equipment Directive 97/23/EC



Name and Address of Manufacturer within the European Community

Danfoss Industrial Refrigeration A/S
Stormosevej 10
PO Box 60
DK-8361 Hasselager
Denmark

Description of Pressure Equipment

Refrigerant float valve

Type SV 1-3

Classified for	Fluid Group I (all refrigerants (toxic, nontoxic, flammable and nonflammable)). For further details / restrictions – see Installation Instruction.	
Temperature range	SV 1 and SV 3	-50°C/+65°C (-58°F/+149°F)
Maximum allowable working pressure	SV 1 and SV 3	28 bar (406 psi) -50°C/+65°C (-58°F/+149°F)

Conformity and Assessment Procedure Followed

Category	I
Module	A
Certificate ID	-

Name and Address of the Notified Body which carried out the Inspection

TÜV-Nord e.V.
Grosse Bahnstrasse 31
22525 Hamburg, Germany

Name and Address of the Notified Body monitoring the Manufacturer's Quality Assurance System

TÜV-Nord e.V.
Grosse Bahnstrasse 31
22525 Hamburg, Germany

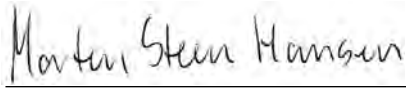
References of Harmonised Standards used

References of other Technical Standards and Specifications used

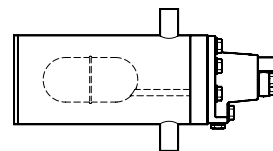
prEN 12284 DIN 3158
AD-Merkblätter DIN 17173

Authorised Person for the Manufacturer within the European Community

Name: Morten Steen Hansen **Title:** Production Manager

Signature:  **Date:** 08/11/2002

148B9721 - rev. 0



027R9508

027R9508

Danfoss
AZ/5263.1.1.10

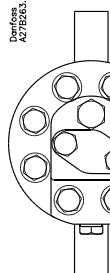
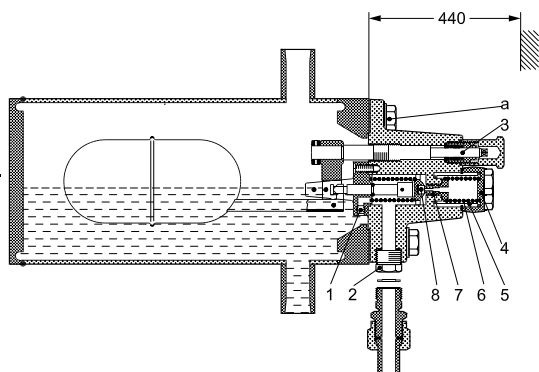


Fig. 1



Danfoss
AZ/5263.1.1.10

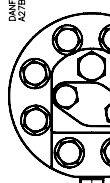
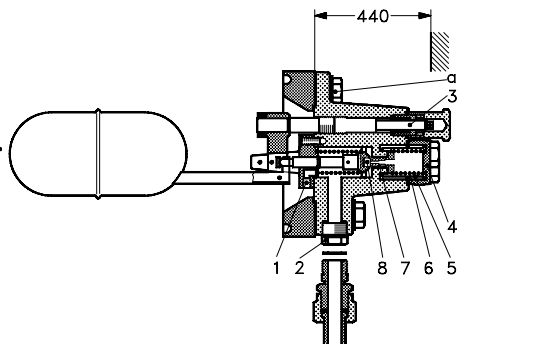


Fig. 2



Kølemiddel, Refrigerant, Kältemittel,
Réfrigérants, Refrigerante:
R 717, R 22, R 134a
R 404A, R 407C

Tilspændingsmoment, Torque, Drehmoment,
Couple de serrage, Coppia di serraggio:
a: = 70 Nm

Tilladeligt driftstryk,
Max. working pressure,
Zul. Betriebsüberdruck,
Pression de service maxi,
Pressione di funzionamento massima:
PB = 28 bar (Pe) (MWP= 400 psig)

Max. prøvetryk,
Max. test pressure,
Max. Prüfdruck,
Pression d'essai maxi,
Pressione di prova massima:
p' = max 42 bar (Pe) (610 psig)

Fig. 1 + Fig. 2

Bemærk: Pos.1 og 2 ved tilslutninger

Note: Pos.1 and 2 when connecting

Achtung: Bitte beachten Sie Pos. 1 und 2 bei der Montage

Noter: Les rep. 1 et 2 lors du raccordement

Nota: Pos.1 e 2 durante la connessione

DANSK

Indstilling:

1. Drej spindelen (pos. 3) mod uret, indtil ventilen er lukket (kan høres).
2. Drej spindelen (pos. 3) med uret, indtil ventilen åbner (kan høres og føles). Drej herefter endnu ½ omdrejning, og svømmeren er indstillet. Stillingen kan afmærkes på spindelen.

Rensning af filter:

1. Drej spindelen (pos. 3) mod uret, indtil ventilen er lukket (kan høres).
2. Luk væsketilgangen.
3. Dæksel (pos. 4) kan demonteres og filter (pos. 5) kan renses.

Udskiftning af dyse og teflon-ventilplade:

1. Følg ovenfor nævnte punkt 1-3.
2. Fjeder (pos. 6) og dyse (pos. 7) kan udtages.
3. Ønskes teflon-ventilpladen udskiftet (pos. 8), kontakt venligst Danfoss.

Manuel åbning:

Spindelen (pos.3) drejes med uret så langt som muligt, og ventilen er tvangsåbnet.

Manuel lukning:

Spindelen (pos.3) drejes mod uret, indtil ventilen er lukket (kan høres).

ENGLISH

Setting:

1. Turn the spindle (pos. 3) counter-clockwise until the valve is closed (audible).
2. Turn the spindle (pos. 3) clockwise until the valve opens (audible and perceptible). Then turn once more ½ rotation and the float is set. The setting can be marked on the spindle.

Cleaning of strainer:

1. Turn the spindle (pos. 3) counter-clockwise until the valve is closed (audible).
2. Close liquid inlet

3. Cover (pos. 4) can be dismantled and the strainer (pos. 5) can be cleaned.

Change of orifice and teflon valve plate:

1. Follow the above mentioned points 1-3.
2. Spring (pos. 6) and orifice (pos. 7) can be removed.
3. If the change of the teflon valve plate (pos. 8) is required, please contact Danfoss.

Manual opening:

The spindle (pos. 3) is turned clockwise as far as possible and the valve is forced-opened.

Manual closing:

The spindle (pos.3) is turned counter-clockwise until the valve is closed (audible).

DEUTSCH

Einstellung:

1. Die Spindel (Pos. 3) entgegen dem Uhrzeigersinn drehen, bis das Ventil geschlossen ist (hörbar).
2. Die Spindel (Pos. 3) im Uhrzeigersinn drehen, bis das Ventil öffnet (hör- und fühlbar). Danach noch eine halbe Umdrehung und der Schwimmer ist eingestellt. Die Einstellung kann auf der Spindel markiert werden.

Reinigung des Filters:

1. Die Spindel (Pos. 3) entgegen dem Uhrzeigersinn drehen, bis das Ventil geschlossen ist (hörbar).
2. Den Flüssigkeitseintritt schließen.
3. Deckel (Pos. 4) kann abgenommen und der Filter (Pos. 5) gereinigt werden.

Auswechseln der Düse und der Teflon-Ventilplatte:

1. Folgen Sie den oben genannten Punkten 1-3.
2. Feder (Pos. 6) und Düse (Pos. 7) können herausgenommen werden.
3. Falls die Teflon Ventilplatte ausgewechselt werden soll (Pos. 8), wenden Sie sich bitte an Danfoss.

Zwangsöffnen:

Die Spindel (Pos. 3) wird so weit wie möglich im Uhrzeigersinn gedreht und das Ventil ist zwangsgeöffnet.

Zwangsschließen

Die Spindel (Pos. 3) entgegen dem Uhrzeigersinn drehen bis das Ventil geschlossen ist (hörbar).

FRANÇAIS

Réglage:

1. Tourner la tige (rep. 3) dans le sens anti-horaire jusqu'à ce que la vanne se ferme (on entend la fermeture).
2. Tourner la tige (rep. 3) dans le sens horaire jusqu'à ce que la vanne s'ouvre (on entend et on sent l'ouverture). Tourner la tige d'un demi-tour encore et le réglage du flotteur est terminé. Marquer éventuellement la position sur la tige.

Nettoyage du filtre:

1. Tourner la tige (rep. 3) dans le sens anti-horaire jusqu'à ce que la vanne se ferme (on entend la fermeture).
2. Fermer l'amenée de liquide.
3. Démonter le couvercle (rep. 4) et nettoyer le filtre (rep. 5).

Remplacement de l'orifice et de la plaque de vanne en téflon:

1. Suivre les points 1 à 3 ci-dessus.
2. Sortir le ressort (rep. 6) et l'orifice (rep. 7).
3. Pour remplacer la plaque de vanne en téflon (rep. 8), veuillez contacter Danfoss.

Ouverture manuelle:

Tourner la tige (rep. 3) dans le sens horaire autant que possible pour forcer la vanne à s'ouvrir.

Fermeture manuelle

Tourner la tige (rep. 3) dans le sens antihoraire jusqu'à ce que la vanne se ferme (on entend la fermeture).

Regolazione:

1. Girare il perno (pos. 3) in senso antiorario fino alla chiusura della valvola (udibile).
2. Girare il perno (pos. 3) in senso orario fino all'apertura della valvola (udibile e percepibile).
Quindi eseguire un altro mezzo giro e la valvola galleggiante è regolata.
L'impostazione può essere eventualmente segnalata sul perno.

Pulizia del filtro:

1. Girare il perno (pos. 3) in senso antiorario fino alla chiusura della valvola (udibile).
2. Chiudere l'entrata del liquido
3. Il coperchio (pos. 4) può essere smontato e il filtro (pos. 5) può essere pulito.

Sostituzione dell'ugello e del disco della valvola in teflon:

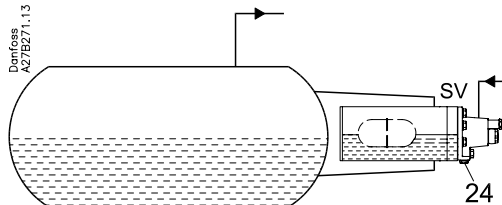
1. Seguire i punti sopraindicati da 1 a 3.
2. La molla (pos. 6) e l'ugello (pos. 7) possono essere rimossi.
3. Se la sostituzione del disco della valvola in teflon (pos. 8) è necessaria, contattare Danfoss.

Apertura manuale:

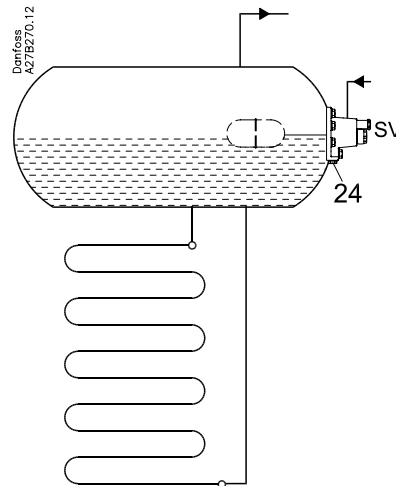
Il perno (pos. 3) viene girato in senso orario fino al massimo punto possibile e la valvola viene aperta.

Chiusura manuale:

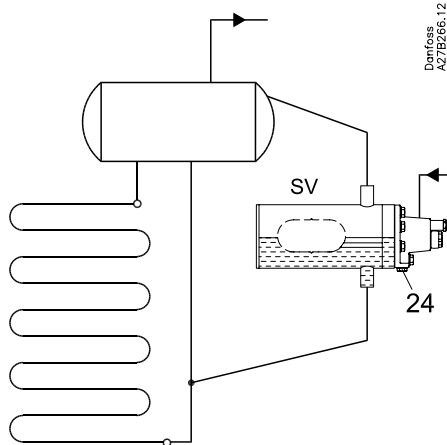
Il perno (pos. 3) viene girato in senso antiorario fino alla chiusura della valvola (udibile).

**Fig. 3**

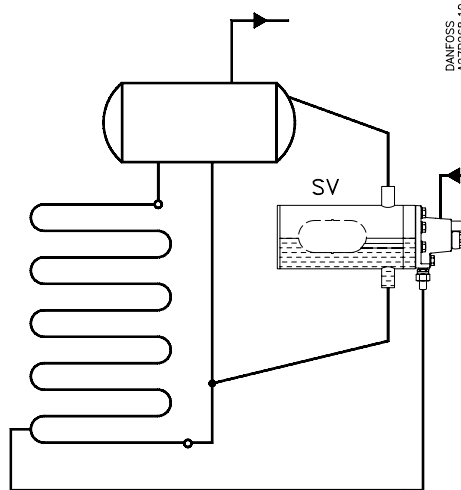
4 stk. M6 (pos. 1, fig. 1 fjernes).
4-off M6 (remove pos. 1, fig. 1).
4 Stck. M6 (Pos. 1, Abb. 1 entfernen).
Enlever les 4 vis M6 (rep.1 fig. 1).
Rimuovere le 4 viti M6 (pos. 1, fig. 1).

**Fig. 4**

4 stk. M6 (pos. 1, fig. 1 fjernes).
4-off M6 (remove pos. 1, fig. 1).
4 Stck. M6 (Pos. 1, Abb. 1 entfernen).
Enlever les 4 vis M6 (rep.1 fig. 1).
Rimuovere le 4 viti M6 (pos. 1, fig. 1).

**Fig. 5**

4 stk. M6 (pos. 1, fig. 1 fjernes).
4-off M6 (remove pos. 1, fig. 1).
4 Stck. M6 (Pos. 1, Abb. 1 entfernen).
Enlever les 4 vis M6 (rep.1 fig. 1).
Rimuovere le 4 viti M6 (pos. 1, fig. 1).

**Fig. 6**

Pos. 2, fig. 1 fjernes, pos. 1, fig. 1 forbliver iskruet.
Remove pos. 2 fig. 1, pos. 1, fig. 1 remains screwed.
Pos. 2, Abb. 1 entfernen, Pos. 1 Abb. 1 bleibt verschraubt.
Enlever le bouchon (rep. 2 fig.1), conserver les vis (rep.1 fig. 1).
Rimuovere il dado (pos. 2, fig. 1), le viti rimangono avvitate (pos. 1, fig. 1).

Reservelede:

- Pakningssæt: 027B2070
- Øvrige reservelede, se reservedelskatalog.

Spare parts:

- Seal kit: 027B2070
- Other spare parts, see Spare Parts catalogue.

Ersatzteile:

- Dichtungssatz: 027B2070
- Andere Ersatzteile, siehe Ersatzteilkatalog.

Pièces de rechange :

- Kit d'étanchéité 027B2070
- Autres pièces de rechange : Voir dans le catalogue de pièces détachées.

Parti di ricambio:

- Kit guarnizioni: 027B2070
- Per altre parti di ricambio, consultare il catalogo dei pezzi di ricambio.



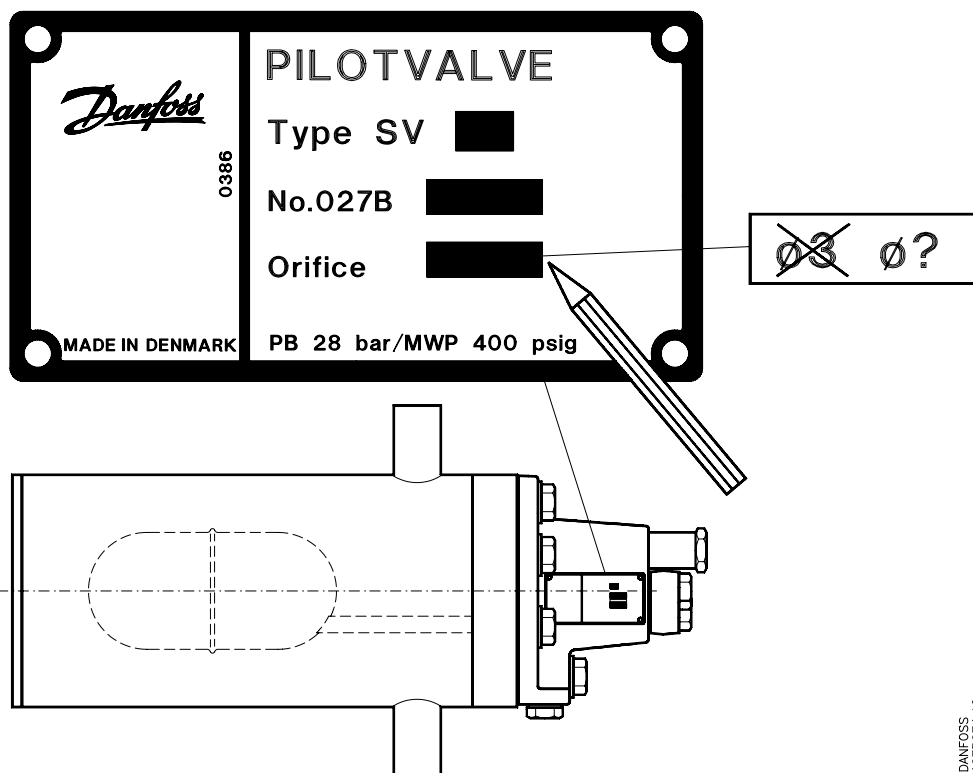
INSTRUCTIONS

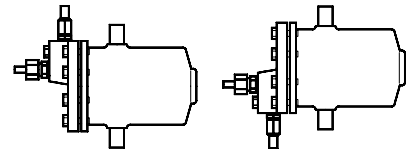
SV 4, 5, 6

Orifice

027R9513

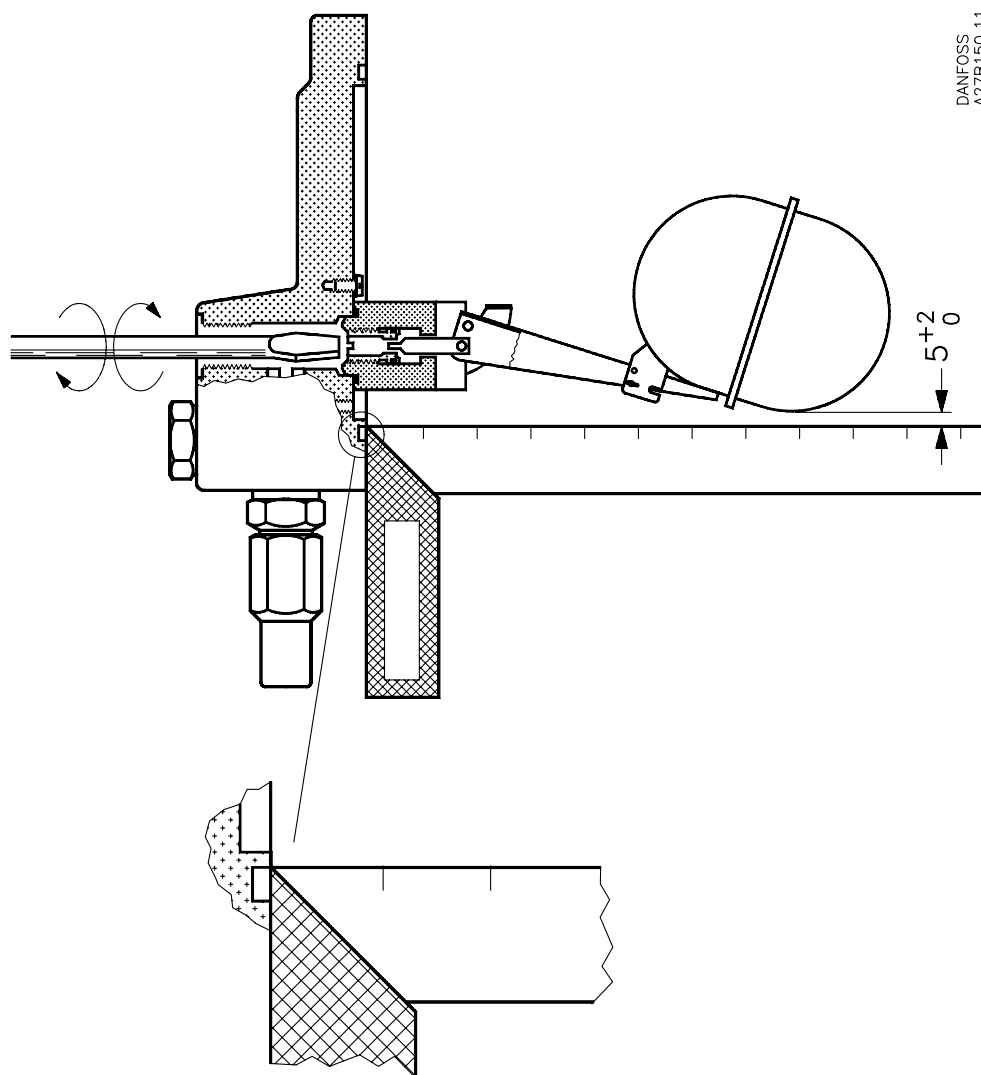
027R9513





027R9634

027R9634



DANFOSS
A27B150.11

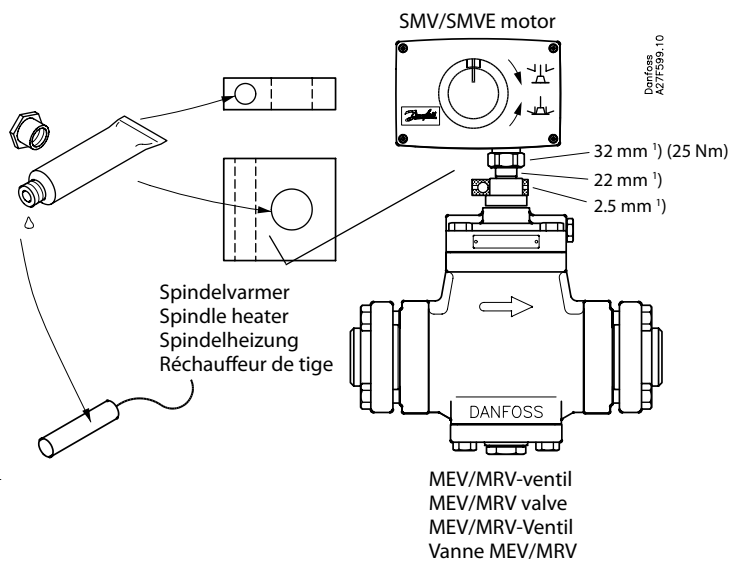


Fig. 1

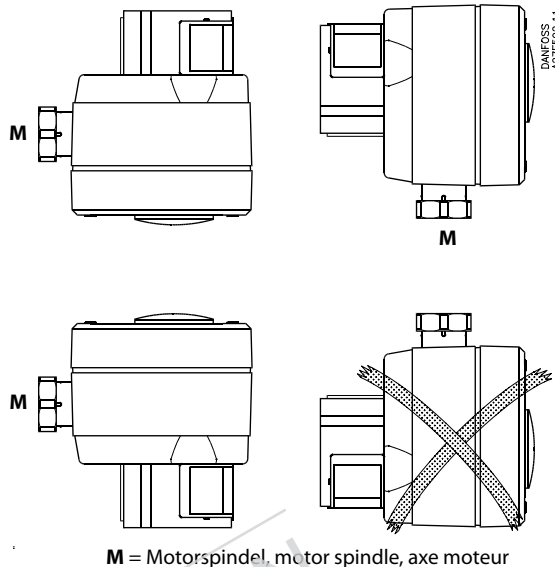
¹⁾ NV, A/F, SW


Fig. 2

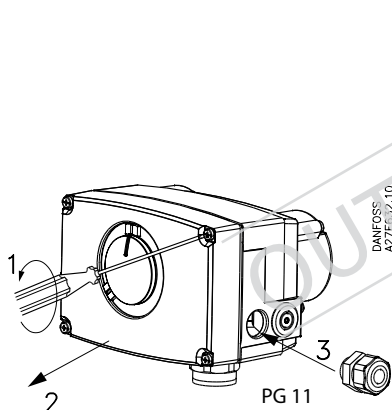


Fig. 3

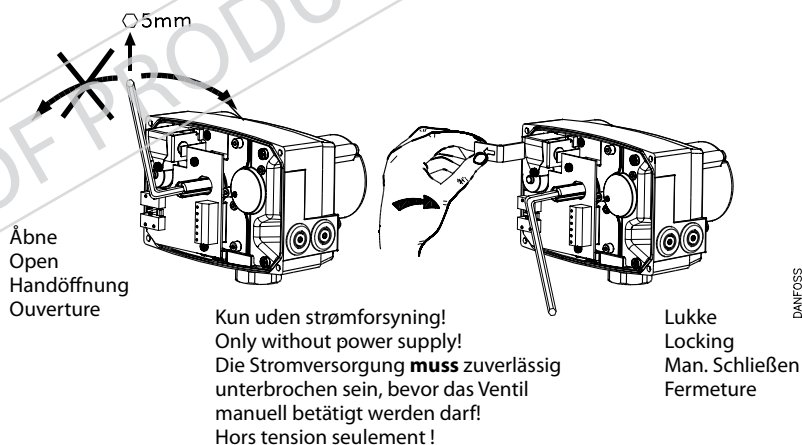


Fig. 4

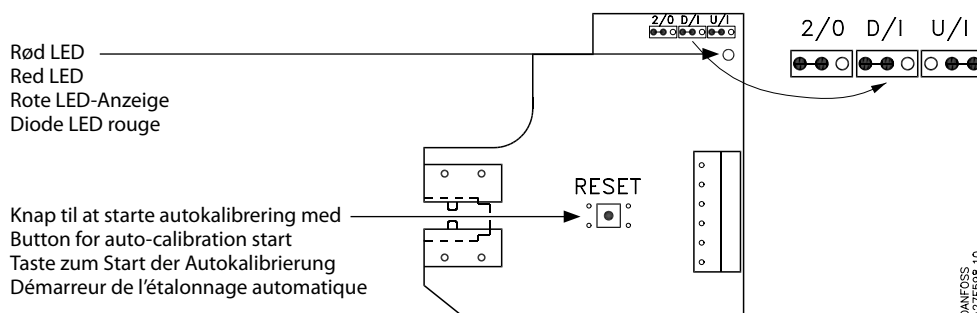


Fig. 5

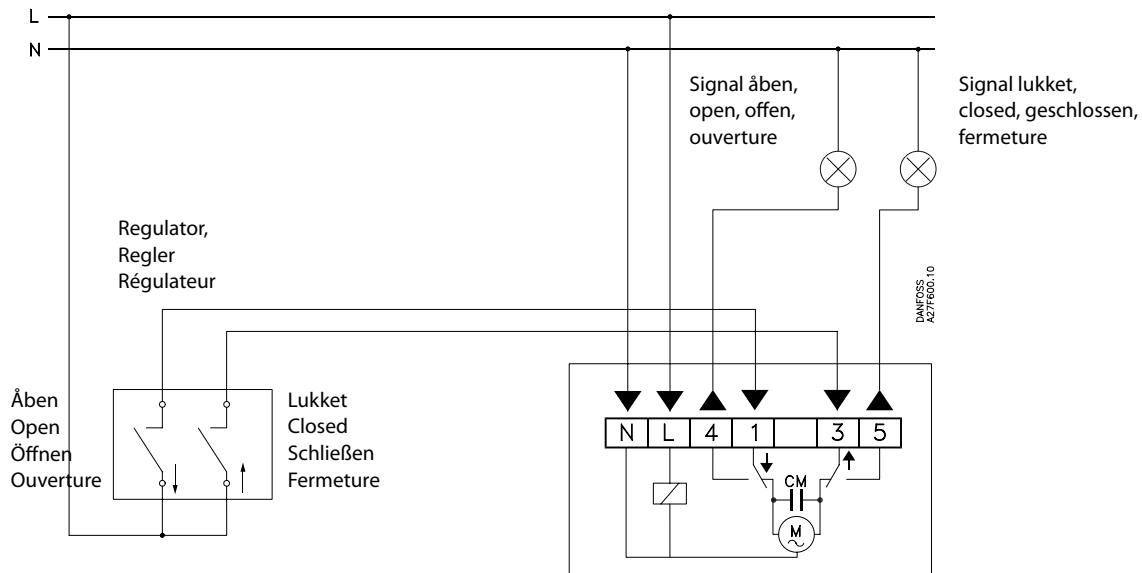


Fig. 6,
SMV-Motor

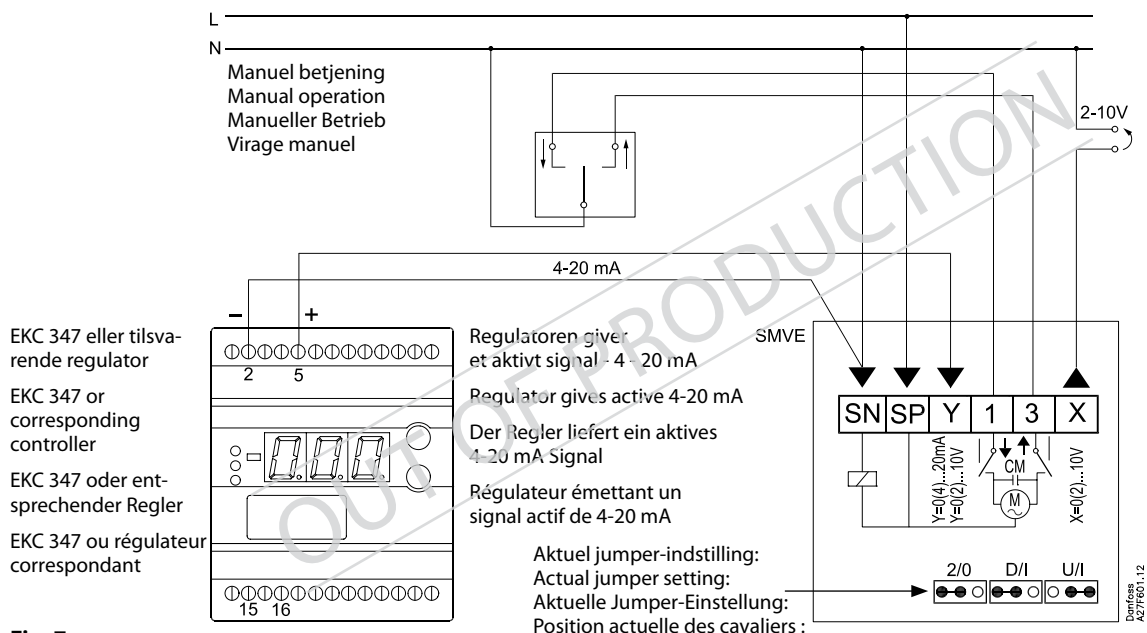


Fig. 7
SMVE-Motor

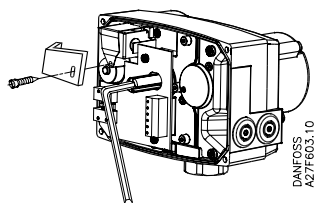


Fig. 8

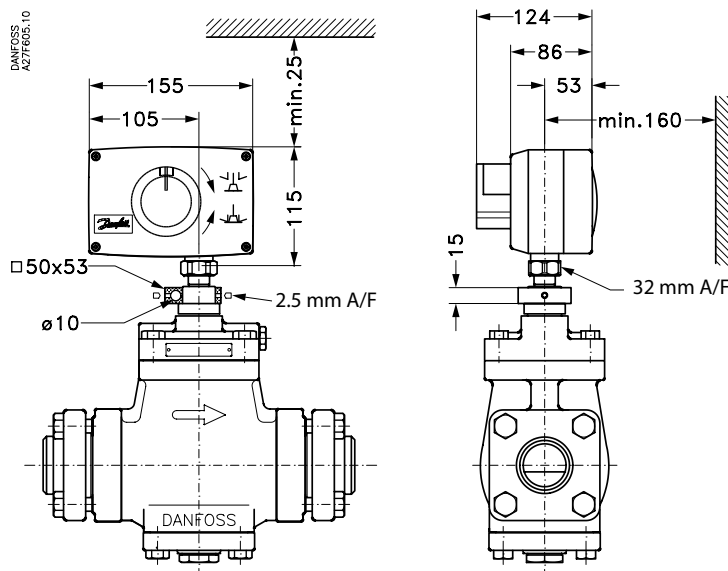


Fig. 9

SMV- og SMVE motorer kan monteres på alle MEV- og MRV-motorventiler.

Type	Beskrivelse	Best. nr.
SMV 24	24 V a.c. tre punkts styret	082H3030
SMV 230	230 V a.c. tre punkts styret	082H3031
SMVE 24	24 V a.c. modulerende input	082H3032

Mekanisk montage

Spindelvarmelegeme

Såfremt medietemperaturen gennem MEV/ MRV er under 0°C skal der monteres et spindelvarmelegeme (fig. 1). Påfør varmeledningspasta mellem spindelvarmelegeme og aluminiumshus, og mellem aluminiumshus og halsen på motorventilen inden delene monteres.

Aluminiumshus med spindelvarmelegeme skrues fast med 2 stk. pinolskruer (sekskantnøgle, NV 2.5).

Type	Beskrivelse	Best. nr.
Spindelvarmelegeme	24 V a.c., 18 VA 2 m ledning	027F3180
Spindelvarmelegeme	230 V a.c., 18 VA 2 m ledning	027F3181

Bemærk!

Spindelvarmelegemet må ikke forsynes med spænding medmindre den er monteret i aluminiumshuset.

Samlet motorventil

Montere ikke med vandret spindel og SMV/ SMVE-motorens eltilslutning pegende opad (fig. 3). SMV/SMVE-motoren spændes fast på MEV/MRV-motorventilens hals med en omløber (NV 32) (max. 25 Nm) ved at bruge trykstiftpakdåsen (NV 22) som modhold (fig. 1).

Det anbefales ikke at montere den samlede motorventil direkte i udbløsningsluften fra en fordamper.

I lukket tilstand vil der være en frigang på 0.6 - 1.0 mm mellem SMV/SMVE-motorens aktuator og MEV/MRV-motorventilens trykstift.

Manuel betjening

SMV/SMVE kan betjenes manuelt på følgende måde (NB! Strømforsyningen skal afbrydes inden ventilen betjenes manuelt):

1. Forsyningsspænding til SMV/SMVE afbrydes
2. De fire skruer i låget løsnes. (Se fig. 3)
3. Med en 5 mm sekskantnøgle og et papstykke (som følger med SMV/SMVE ved leveringen) kan SMV/SMVE betjenes manuelt. (Fig. 4). Placer sekskantnøglen i plastspindlen og drej den med uret for at åbne ventilen. Ventilens position fastlåses samtidig ved at placere papstykket som vist på fig. 4.
4. Når papstykket fjernes vil fjederretursystemet altid automatisk lukke ven-

tilen, forudsat at SMV/SMVE ikke er sluttet til forsyningsspænding.

Konfigurering/kalibrering af SMVE

Før SMVE tilsluttes forsyningsspændingen skal motorens driftssignaler og elektriske signaler konfigureres (fig. 5).

SMVE har 3 jumper-indstillinger:

D/I: Direkte eller invers drift

D: Direkte: Stigende indgangssignal, motorens aktuator bevæger sig nedad (ventilen åbner)

I: Invers: Stigende indgangssignal, motorens aktuator bevæger sig opad (ventilen lukker).

2/0: Inputsignal område

2: 4 - 20 mA / 2 - 10V; afhængig af I/U

0: 0 - 20 mA / 0-10V; afhængig af I/U

I/U: Inputsignal strøm/spænding

I: Strøm

U: Spænding

Fabriksindstilling: D, 2, I

Når jumper-indstillingen er foretaget og SMVE-motoren er tilsluttet forsyningsspændingen (se Elektrisk montage) skal motoren kalibreres til den aktuelle MEV/MRV-motorventil, da forskellige MEV/MRV motorventiler har forskellig løftehøjde.

Kalibreringen, der sker automatisk, startes ved at trykke én gang på RESET knappen.

Bemærk!

Første gang spænding tilkobles vil SMVE foretage en automatisk kalibrering. Vær opmærksom på at den automatiske kalibrering af SMVE-motoren vil åbne og lukke MEV/MRV-motorventilen helt.

Når den automatiske kalibrering er afsluttet „husker“ SMVE-motoren den påmonterede MEV/MRV-motors åbne- og lukkepositioner, og vil herefter kunne indstille motorventilens åbningsgrad i forhold til de styresignaler SMVE-motoren modtager.

Det er ikke nødvendigt at foretage auto-kalibrering efter spændingssvigt. Der kan altid udføres en ny automatisk kalibrering ved at trykke på RESET knappen.

Tekniske data

	SMV, trepunkts motor	SMVE, modulerende motor
Styresignal	3-punkt	Analog
Forsyningsspænding	24 V a.c.; 230/240 V a.c. +10% - -15%	24 V a.c.; +10% - -15%
Effektforbrug, motor	12 W	14 W
Effektforbrug, indvendigt varmelegeme	24 W	24 W
Frekvens	50/60 Hz	
Styresignal input	3-punkt, åbne - neutral - lukke	0 - 10 V / 2 - 10 V, $R_i = 24 \text{ k}\Omega$ 0 - 20 mA / 4 - 20 mA, $R_i = 500 \Omega$
Udgangssignal	Kontakt Danfoss	0 - 10 V / 2 - 10 V
Omgivelsestemperatur	-20°C - + 60°C	
Kapsling	IP 54	
Spindelhastighed ved 50 Hz	3 s/mm	
Spindelhastighed ved 60 Hz	2.4 s/mm	

Rød LED (fig. 6) har følgende indikeringer:

Funktion	Rød LED
Spænding afbrudt	OFF
Normal drift	ON
Autokalibrering	Blinker langsomt (1 blink/s)
Fejl ved autokalibrering. SMVE kan ikke registrere Åbne-/lukkepunkt	Blinker hurtigt (3 blink/s)

Elektrisk montage

Tekniske data (se tabel nederst på siden)

SMV/SMVE leveres monteret med 2 blindpropper. Der skal monteres 1 eller 2 stk. PG 11 forskruninger afhængig af det antal kabler der monteres. Se fig. 3.

Tilslutning, SMV (fig. 6)

N: Nulleder

L: Fase

4: Moment signalindikering; nedre position

1: Input signal for SMV-motorens aktuator ned.

3: Input signal for SMV-motorens aktuator op.

5: Moment signalindikering; øvre position

N,L: Spænding : 24 V a.c eller 230/240 a.c. +10% -15%

4 og 5: Max. belastning:

250 V a.c. : 6 A, 24 V a.c. : 4 A

Bemærk!

Efter et spændingssvigt kan fjederretursystemet **ikke altid** gå i mekanisk indgreb, hvis ikke SMV-motoren har modtaget en impuls på klemme 1 eller 3. Det anbefales derfor at der, efter spændingssvigt, gives en kort impuls på klemme 1 eller 3, så fjederretursystemet kan gå i mekanisk indgreb.

Tilslutning SMVE (fig. 7)

SN: Nulleader
 SP: Fase
 Y: Indgangssignal. Afhængig af jumper D/I (Konfigurering/kalibrering SMVE)
 1: Manuel drift. Input signal for SMV/SMVE aktuator ned.
 3: Manuel drift. Input signal for SMV/SMVE aktuator op.
 X: Udgangs signal. Afhængig af jumper 2/0. (Konfigurering/kalibrering SMVE)
 SN, SP: Spænding: 24 V a.c. +10% –15%

Drift uden aktivt fjederretursystem

Fjederretursystemet kan sættes ud af drift med et beslag, således at SMV/SMVE-motoren ikke lukker MEV/MRV-motorventilen ved spændingssvigt

Beslag til type	Best. nr.
SMV 24	027F1970
SMV 230	027F1970
SMVE 24	027F1970

Fjederreturspærringen monteres som vist på fig. 8.

ENGLISH

SMV/SMVE motors can be fitted on all MEV/MRV motorised valves.

Type	Description	Code no.
SMV 24	24 V a.c. three-point controlled	082H3030
SMV 230	230 V a.c. three-point controlled	082H3031
SMVE 24	24 V a.c. modulating input	082H3032

Mechanical features

Spindle heater

If the temperature of the medium flowing through MEV/MRV is less than 0°C a spindle heater (fig. 1) must be fitted. Apply heat-conductive compound between the spindle heating element and the aluminium housing, and between the aluminium housing and the neck of the motorised valve before the parts are assembled.

The aluminium housing with spindle heating element must be secured with two grub screws (hexagon key, 2.5 mm A/F).

Type	Description	Code no.
Spindle heater	24 V a.c., 18 VA 2 m cable	027F3180
Spindle heater	230 V a.c., 18 VA 2 m cable	027F3181

NOTE!

Spindle heater must not be supplied with voltage unless it is mounted in the aluminium housing.

Assembled motorised valve

The motorised valve must not be installed with the push pin vertically downwards and the SMV/SMVE motor actuator spindle vertically upwards (fig. 2). Secure the SMV/SMVE motor on the neck of the MEV/MRV motorised valve with a union nut (32 mm A/F) (max. 25 Nm) using the adjusting screw (22 mm A/F) to provide counter torque (fig. 1).

Installing the assembled motorised valve directly in the discharge air flow from an evaporator is not recommended.

When the valve is closed, there is 0.6 - 1.0 mm clearance between the SMV/SMVE motor actuator spindle and the MEV/MRV motorised valve push pin.

Manual operation

SMV/SMVE can be operated manually as follows (NB! Power supply must be isolated before opening valve manually!):

1. Isolate the SMV/SMVE power supply.
2. Loosen the four screws in the cover (fig. 3).
3. SMV/SMVE can be operated manually using a 5 mm hex. key and a strip of cardboard (supplied with SMV/SMVE on delivery) (fig. 4). Insert the key in the plastic spindle and turn it clockwise to open the valve. The valve position can then be locked by inserting the cardboard strip as shown in fig. 4.
4. When the cardboard strip is removed the spring return system will always automatically close the valve, provided the SMV/SMVE remains isolated from the power supply.

Configuration/calibration of SMVE

Before SMVE is connected to the power supply the motor operating signals and electrical signals must be configured (fig. 5).

SMVE has three jumper settings:

D/I: Direct or inverse operation

D: Direct:

Rising input signal, the motor actuator spindle extends (valve opens)

I: Inverse:

Rising input signal, the motor actuator spindle retracts (valve closes)

2/0: Input signal range

2: 4 - 20 mA / 2 - 10 V; dependent on U/I

0: 0 - 20 mA / 0-10 V; dependent on U/I

U/I: Input signal current/voltage

I: Current

U: Voltage

Factory setting: D, 2, I

Technical Data

	SMV, three-point motor	SMVE, modulating motor
Control signal	3-point	Analog
Supply voltage	24 V a.c.; 230/240 V a.c. +10% –15%	24 V a.c.; +10% –15%
Consumption, motor	12 W	14 W
Consumption, spindle heating element	24 W	24 W
Frequency	50/60 Hz	
Control signal input	3-point, open - neutral - close	0 - 10 V / 2 - 10 V, $R_i = 24 \text{ kW}$ 0 - 20 mA / 4 - 20 mA, $R_i = 500 \text{ }\Omega$
Output signal	Contact Danfoss	0 - 10 V / 2 - 10 V
Ambient temperature	–20°C - +60°C	
Enclosure rating	IP 54	
Spindle speed at 50 Hz	3 s/mm	
Spindle speed at 60 Hz	2.4 s/mm	

When the jumper setting has been made and the SMVE motor is connected to the power supply (see Electrical installation) the motor must be calibrated to suit the MEV/MRV motorised valve concerned, i.e. different MEV/MRV motorised valves have different strokes.

Calibration is automatic and is started by pressing the RESET button once.

NOTE!

SMVE performs automatic calibration the first time it is connected to the power supply. Note that when automatic calibration is performed, the SMVE motor will completely open and close the MEV/MRV motorised valve.

When automatic calibration has finished, the SMVE motor "remembers" the open and closed positions of the mounted MEV/MRV motor and is thus able to set the degree of opening of the valve, in accordance with the control signals the SMVE motor receives.

Auto-calibration is not necessary after power failure.

A new automatic calibration can always be performed by pressing the RESET button.

Red LED (fig. 6) indicates as follows:

Function	Red LED
Power disconnected	OFF
Normal operation	ON
Auto-calibration	Flashes slowly (1 flash/s)
Auto-calibration error SMVE unable to register open/closing point	Flashes quickly (3 flashes/s)

Electrical installation

Technical data (See table below).

SMV/SMVE motors are supplied fitted with two blanking plugs. Depending on the number of cables involved, one, or two, PG 11 screwed cable entries must be fitted. See fig. 3.

The SMV/SMVE-motors are supplied with a built in motor heater which automatically switches on and off.

Connections, SMV (fig. 6)

- N: Neutral
L: Phase
4: Torque signal indication; lower position.
1: Input signal for SMV motor actuator to extend.
3: Input signal for SMV motor actuator to retract.
5: Torque signal indication, upper position.
N, L: Voltage:
24 V a.c.
or 230/240 a.c. +10% -15%
4 and 5: Max. load:
250 V a.c.: 6 A, 24 V a.c.: 4 A

NOTE!

After a power failure the spring return system might **not always** latch mechanically if the SMV motor has not received a pulse on terminal 1 or 3. It is therefore recommended that after power failure a short pulse be applied to terminal 1 or 3 to enable the spring return mechanism to latch.

Connections, SMVE (fig. 7)

- SN: Neutral
SP: Phase
Y: Input signal. Dependent on jumper D/I (Configuration/calibration SMVE).
1: Manual operation. Input signal for SMV/SMVE actuator to extend.
3: Manual operation. Input signal for SMV/SMVE actuator to retract.
X: Output signal. Dependent on jumper 2/0. (Configuration/calibration SMVE)
SN, SP: Voltage: 24 V a.c. +10% -15%

Operation without activation of spring return system

The spring return system can be made inoperative with a bracket so that the SMV/SMVE motor does not close the MEV/MRV motorised valve in the event of power failure:

Bracket type	Code no.
SMV 24	027F1970
SMV 230	027F1970
SMVE 24	027F1970

The spring return system lock must be mounted as shown in fig. 8.

DEUTSCH

SMV-/ SMVE-Motoren können auf allen MEV-/MRV-Motorventilen montiert werden

Typ	Beschreibung	Bestell-Nr.
SMV 24	24 V a.c. dreipunkt geregelt	082H3030
SMV 230	230 V a.c. dreipunkt geregelt	082H3031
SMVE 24	24 V a.c. modulierender Eingang	082H3032

Mechanische Eigenschaften

Spindelheizung

Falls die Temperatur des Kältemittels niedriger als 0°C ist, muß eine Spindelheizung (Abb.1) montiert werden. Auf die Kontaktflächen zwischen dem Aluminiumblock und Heizelement bzw. Ventilschindel muß Wärmeleitpaste aufgetragen werden, um eine optimale Heizleistung zu gewährleisten.

Das Aluminiumgehäuse mit dem Heizelement ist mit zwei Madenschrauben (Innensechskantschlüssel 2,5 mm A/F) zu sichern.

Typ	Beschreibung	Bestell-Nr.
Spindelheizung	24 V a.c., 18 VA 2 m Kabel	027F3180
Spindelheizung	230 V a.c., 18 VA 2 m Kabel	027F3181

Anmerkung!

Bevor die Spindelheizung im Aluminiumgehäuse montiert ist, darf sie nicht unter Spannung gesetzt werden.

Installation des Motorventils

Das Ventil darf nicht mit dem Motor nach unten montiert werden (Abb. 2).

Es ist nicht empfehlenswert, das zusammengebaute Motorventil direkt im Ausblasbereich eines Verdampfers zu installieren.

Bei geschlossenem Ventil besteht zwischen der SMV-/SMVE-Motorschindel und dem Druckstift des MEV-/MRV-Motorventils ein Spiel von 0,6 - 1,0 mm.

Manueller Betrieb

SMV/SMVE läßt sich wie folgt manuell bedienen (**ACHTUNG! Die Stromzufuhr muß zuverlässig unterbrochen sein, bevor das Ventil manuell geöffnet werden darf!**):

1. Die Stromversorgung zur SMV/SMVE ist zu unterbrechen.
2. Die vier Schrauben im Motordeckel lösen (Abb. 3)
3. SMV/SMVE kann mit einem 5 mm Innensechskantschlüssel durch drehen im Uhrzeigersinn geöffnet werden (Abb. 4). Die Ventilstellung läßt sich, wie in Abb. 4 dargestellt, z.B. durch Einsetzen eines Pappstreifens verriegeln. (Sechskantschlüssel und Pappstreifen liegen bei).

4. Wird der Pappstreifen entfernt, schließt die Federrücklauffunktion das Ventil automatisch, vorausgesetzt, daß die Stromzufuhr zum SMV/SMVE weiter unterbrochen bleibt.

Konfiguration/Kalibrierung von SMVE

Vor dem Anschluß des SMVE an die Stromversorgung müssen die Betriebssignale des Motors konfiguriert werden (Abb. 5)

SMVE hat drei Jumper-Einstellungen:

D/I: Direkter oder inverser Betrieb

D: Direkt: Steigendes Eingangssignal, das Ventil öffnet.

I: Invers: Steigendes Eingangssignal, das Ventil schließt.

2/0: Eingangssignalebereich

2: 4 - 20 mA / 2 - 10 V; abhängig von U/I

0: 0 - 20 mA / 0 - 10 V; abhängig von U/I

U/I: Eingangssignal Strom/ Spannung

I: Strom

U: Spannung

Werkseinstellung: D, 2, I

Nach erfolgter Jumper-Einstellung und Anschluß des SMVE-Motors an die Stromversorgung (siehe Elektrischer Anschluß) muß der Motor zur Anpassung an das betreffende MEV-/MRV-Motorventil kalibriert werden, da die verschiedenen MEV-/MRV-Ventile unterschiedliche Hubhöhen haben.

Die Kalibrierung erfolgt automatisch und wird durch einmaliges Betätigen der RESET-Taste gestartet.

Anmerkung!

Erstmals unter Spannung führt SMVE automatisch eine Kalibrierung durch. Beim automatischen Kalibrieren erfolgt ein vollkommenes Öffnen und Schließen des MEV-/MRV-Motorventils durch den SMVE-Motor.

Nach Abschluß des automatischen Kalibrierungsverfahrens "speichert" der SMVE-Motor die Stellungen Offen und Geschlossen des montierten MEV-/MRV-Motorventils und ist damit in der Lage, den Öffnungsgrad des Ventils entsprechend dem zugeführten Steuersignal einzustellen einzustellen.

Nach einem Stromausfall ist keine neue Kalibrierung erforderlich.

Durch Betätigen der RESET-Taste läßt sich jederzeit eine neue Autokalibrierung vornehmen.

Die rote LED (Abb. 6) zeigt Folgendes an:

Funktion	Rote LED
Power disconnected	OFF
Normal operation	ON
Autokalibrierung	langsames Blinken (1 Leuchtimpuls/s)
Autokalibrierungsfehler SMVE kann die Offen-/ Geschlossenposition nicht registrieren	schnelles Blinken (3 Leuchtimpulse/s)

Elektrischer Anschluß

Technische Daten (siehe Tabelle unten)

In SMV-/SMVE-Motoren sind zwei Blindpfropfen montiert. Abhängig von der benötigten Anzahl Kabel sind eine oder zwei PG 11 Kabelverschraubungen vorzusehen. Siehe Abb. 3.

SMV/SMVE-Motoren werden mit eingebauter Motorheizung geliefert, die automatisch ein- und ausschaltet.

Anschlüsse, SMV (Abb. 6)

N: Neutral

L: Phase

4: Endkontakt; untere Stellung.

1: Eingangssignal zum Ausfahren des SMV-Motor-Stellantriebs.

3: Eingangssignal zum Einfahren des SMV-Motor-Stellantriebs.

5: Endkontakt; obere Stellung.

N, L: Spannung

24 V a.c., oder 230/240 a.c.
+10% -15%.

4 und 5: Max. Belastung:

250 V a.c.: 6 A, 24 V a.c.: 4 A

Anmerkung!

Nach einem Stromausfall schnappt das Federrückzugssystem erst mechanisch ein, wenn an den Klemmen 1 oder 3 des SMV/E-Motors ein Impuls empfangen wird.

Daher empfiehlt es sich, nach einem Stromausfall an die Klemme 1 oder 3 einen kurzen Impuls anzulegen, um das Einschnappen der Federrücklauffunktion zu ermöglichen.

Anschlüsse, SMVE (Abb. 7)

SN: Nulleiter

SP: Phase

Y: Eingangssignal. Abhängig von Jumper D/I. (Konfiguration/Kalibrierung SMVE).

1: Manueller Betrieb. Eingangssignal für SMV-/SMVE-Stellantrieb zum Ausfahren.

3: Manueller Betrieb. Eingangssignal für SMV-/SMVE-Stellantrieb zum Einfahren.

X: Ausgangssignal. Abhängig von Jumper 2/0. (Konfiguration/Kalibrierung SMVE)

SN, SP: Spannung: 24 V a.c. + 10% -15%.

Betrieb mit deaktiviertem Federrücklauf

Die Federrücklauffunktion läßt sich mit einer spez. Sperre deaktivieren, um zu verhindern, daß das MEV-/MRV-Motorventil bei Stromausfall schließt.

Beschlagnahme	Bestell-Nr.
SMV 24	027F1970
SMV 230	027F1970
SMVE 24	027F1970

Die Federrücklaufsperre muß wie in Abb. 8 dargestellt montiert werden.

Technische Daten

	SMV, Dreipunktmotor	SMVE, modulierender Motor
Steuersignal	3-Punkt	Analog
Versorgungsspannung	24 V a.c.; 230/240 V a.c. +10% - -15%	24 V a.c.; +10% - -15%
Leistungsaufnahme	12 W	14 W
Leistungsaufnahme, Spindel-Heizelement	24 W	24 W
Frequenz	50/60 Hz	
Steuersignaleingang	3-Punkt, öffnen - neutral - schließen	0 - 10 V / 2 - 10 V, $R_i = 24 \text{ k}\Omega$ 0 - 20 mA / 4 - 20 mA, $R_i = 500 \Omega$
Ausgangssignal	Wenden Sie sich an Danfoss	0 - 10 V / 2 - 10 V
Umgebungstemperatur	-20°C - +60°C	
Schutzart	IP 54	
Spindelgeschwind. bei 50 Hz	3 s/mm	
Spindelgeschwind. bei 60 Hz	2.4 s/mm	

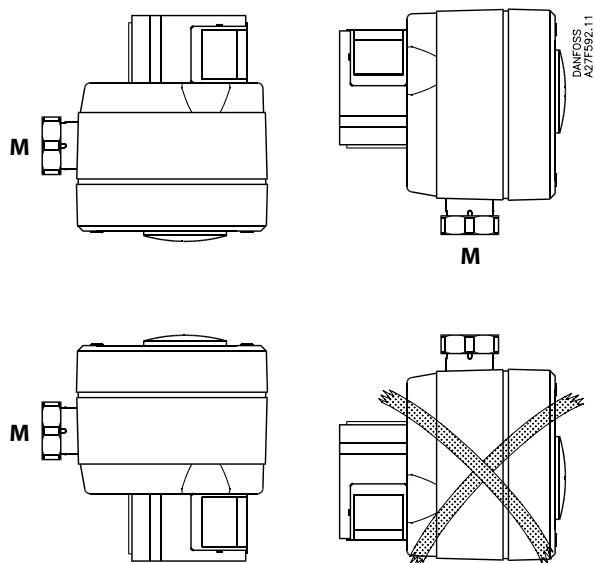


Fig. 1 M = motor spindle

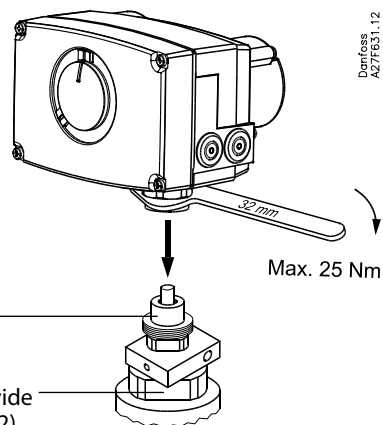
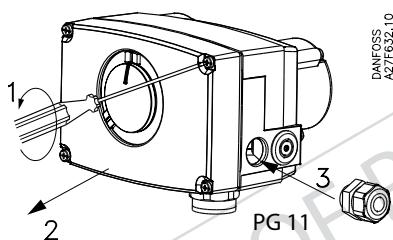
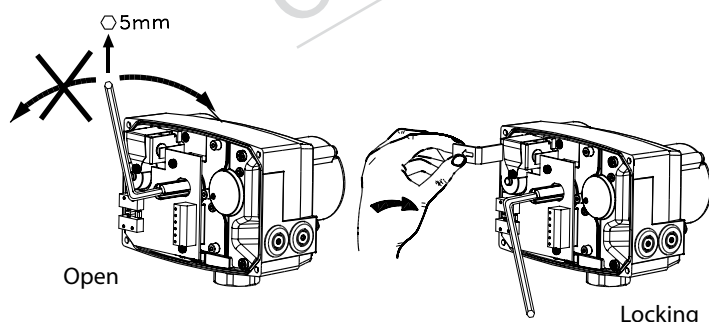


Fig. 2



Isolate power supply before removing cover.

Fig. 3



Power supply **must** be isolated before opening valve manually.

Fig. 4

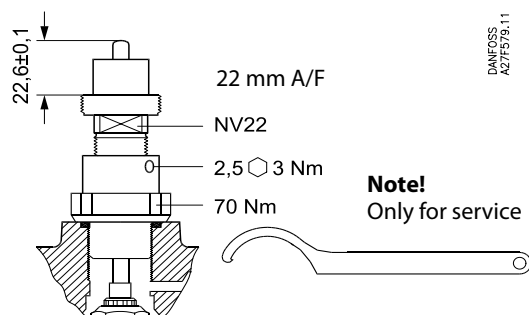
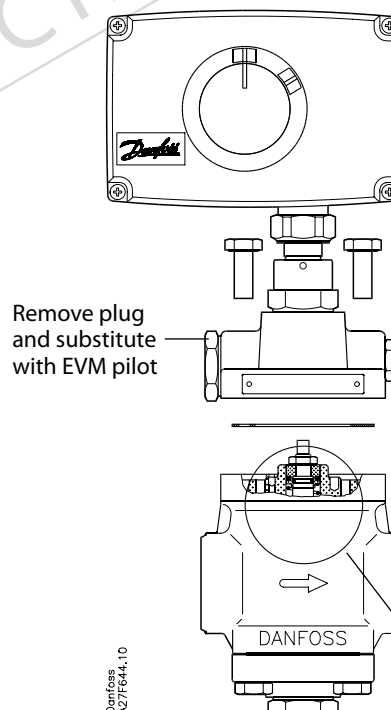


Fig. 5



Remove drain plug

Fig. 6

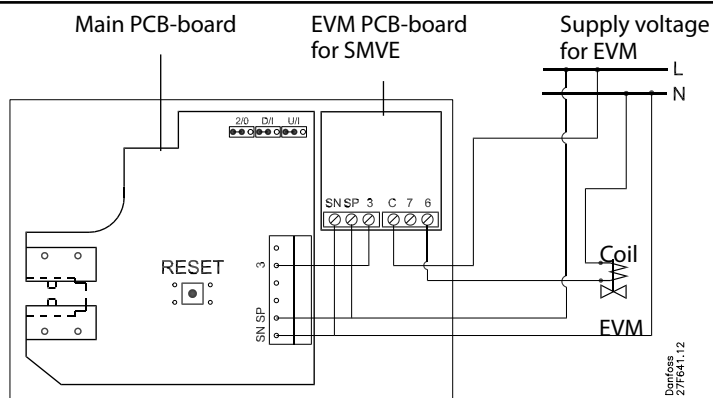


Fig. 7

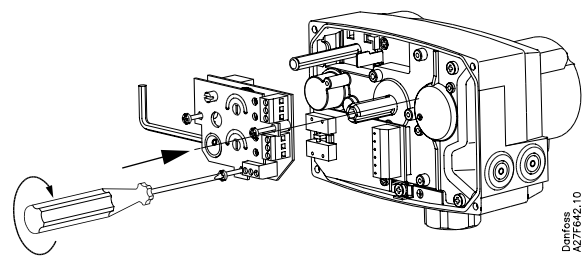


Fig. 8

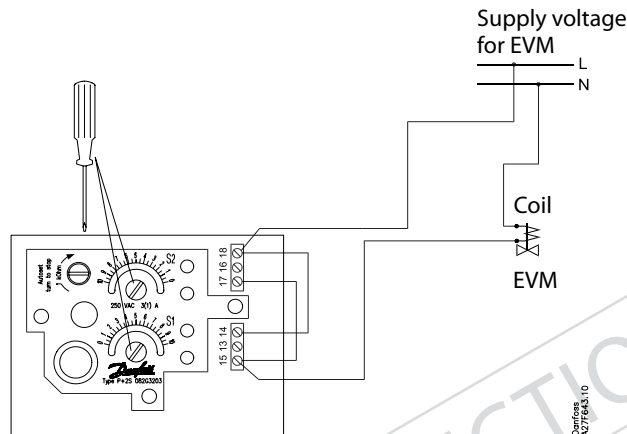


Fig. 9

Push pin seal assembly

Only MEV 500

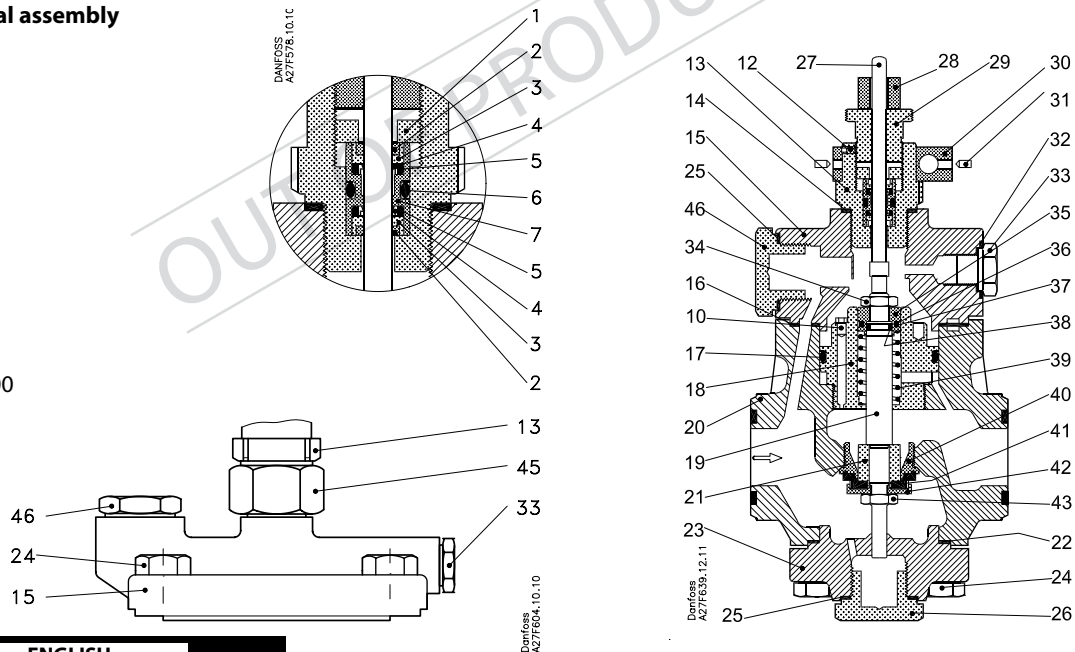
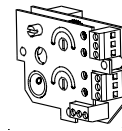
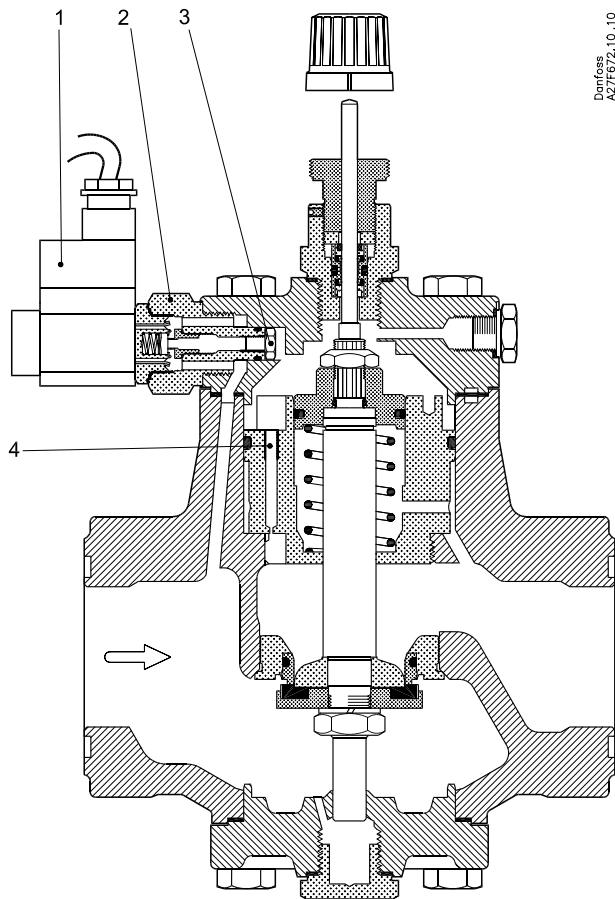


Fig. 10

ENGLISH

- | | | |
|-------------------|---------------------------------|--------------------------|
| 1 Nut | 19 Spindle | 34 Nut |
| 2 Dirt seal | 20 Valve body | 35 Balancing piston |
| 3 Bush | 21 Regulating cone | 36 Piston seal |
| 4 Seal | 22 Gasket | 37 O-ring |
| 5 O-ring | 23 Bottom cover | 38 O-ring |
| 6 O-ring | 24 Bolt | 39 Spring |
| 7 Insert | 25 Gasket | 40 Valve seat |
| 10 Drain plug | 26 Bottom plug | 41 Sealing disc |
| 12 Locking screw | 27 Push pin | 42 Valve plate |
| 13 Nipple | 28 Distance piece (MEV 80 only) | 43 Nut |
| 14 Gasket | 29 Adjusting screw | 45 Nipple (MEV 500 only) |
| 15 Top cover | 30 Heating element housing | 46 Blanking plug |
| 16 Gasket | 31 Locking screw | |
| 17 O-ring | 32 Gasket | |
| 18 Cylinder liner | 33 Blanking plug | |

EVM solenoid kit for MEV motor valve



The EVM kit contains:

- 1 PCB board for SMVE
- 1 EVM valve with accessory for old type coils
- 1 complete set of gaskets covering all MEV's (PM up to 65)
- 1 1.0 mm orifice for the EVM outlet

Fig. 11

ENGLISH

- 1 Coil according to motor power supply
- 2 EVM NC
- 3 1.0 mm orifice inserted
- 4 Blind screw (removed)

All MEV valves can be fitted with an EVM kit. The function of the kit is to either:

1. increase the closing forces of the valve during standstill. Please refer to "MEV with EVM solenoid valve" (page 6) for further explanation of the installation.
2. or to balance orifices in MEV sizes 125-500 to make the MEV close at high differential pressures. The EVM kit must be fitted with a 1.0 mm orifice (pos. 3) if the differential pressure exceeds 10 bar. MEV 80 does not need an EVM kit for this purpose. Please refer to the table in the technical leaflet regarding differential pressure and sizes.

The content of the kit has been extended with the orifice as from now. Previous EVM kits (before 15th October, 2002) do not comprise an orifice.

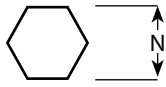
Fig. 11 shows how the orifice is fitted into the outlet of the EVM. It is very important that the blind screw (pos. 4) closing the channel going from the top to the outlet side is removed to form a balance with

the orifice in the EVM. The EVM kit has no function if the blind screw is not removed.

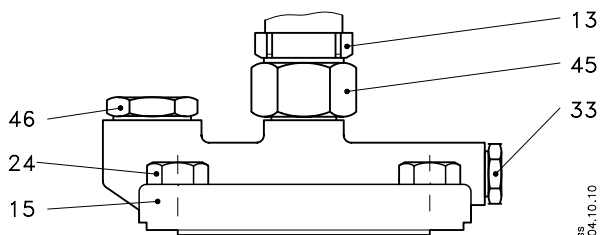
Care should be taken to install the EVM kit correctly, especially the wiring and connection inside the motor. The coil (pos. 1) is adding additional load on the power supply and especially for 24 VAC it should be checked that a surplus in the supply is present.

SMV/SMVE motor spindle speed at:

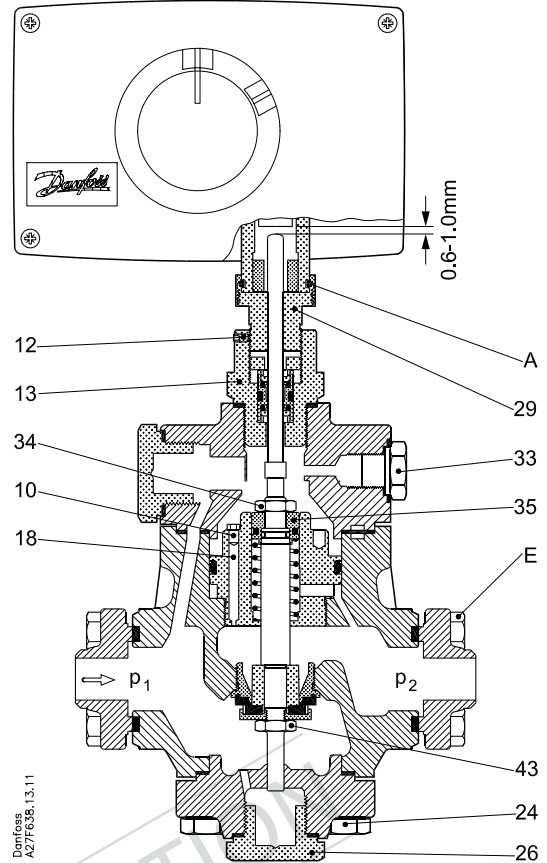
50 Hz	3 s/mm
60 Hz	2.4 s/mm



Only MEV 500



Danfoss
A27F604.10.10



Danfoss
A27F606.13.11

Pos.	MEV 80				MEV 125				MEV 200				MEV 300				MEV 500			
	T	M	N	L	T	M	N	L	T	M	N	L	T	M	N	L	T	M	N	L
A	M 30 × 1.5	25	32	-	M 30 × 1.5	25	32	-	M 30 × 1.5	25	32	-	M 30 × 1.5	25	32	-	M 30 × 1.5	25	32	-
E	M 12 × 1.75	60	18	45	M 12 × 1.75	60	18	45	M 12 × 1.75	60	18	45	M 14 × 2	80	21	65	M 14 × 2	80	21	70
12	M 5	3	X	5	M 5	3	X	5	M 5	3	X	5	M 5	3	X	5	M 5	3	X	5
13	M 24 × 1.5	70	S	12	M 24 × 1.5	70	S	12	M 24 × 1.5	70	S	12	M 24 × 1.5	70	S	12	M 24 × 1.5	70	S	12
18	M 39 × 1.5	60	S	-	M 48 × 1.5	100	S	-	M 52 × 2	100	S	-	M 64 × 2	100	S	-	M 80 × 2	100	S	-
24	M 10 × 1.5	45	16	30	M 10 × 1.5	45	16	30	M 12 × 1.75	60	18	35	M 12 × 1.75	60	18	35	M 14 × 2	80	21	40
26	M 24 × 1.5	50	36	-	M 24 × 1.5	50	36	-	M 24 × 1.5	50	36	-	M 24 × 1.5	50	36	-	M 24 × 1.5	50	36	-
29	M 20 × 1	-	22	-	M 20 × 1	-	22	-	M 20 × 1	-	22	-	M 20 × 1	-	22	-	M 20 × 1	-	22	-
31	-	-	X	-	-	-	X	-	-	-	X	-	-	-	X	-	-	-	X	-
33	R ½	30	19	12	R ½	30	19	12	R ½	30	19	12	R ½	30	19	12	R ½	30	19	12
34	M 10 × 1.5	30	16	-	M 10 × 1.5	30	16	-	M 10 × 1.5	30	16	-	M 10 × 1.5	30	16	-	M 10 × 1.5	30	16	-
35	-	-	18	-	-	-	18	-	-	-	18	-	-	-	18	-	-	-	18	-
43	M 10 × 1.5	30	16	-	M 12 × 1.75	40	18	-	M 12 × 1.75	40	18	-	M 16 × 2	50	24	-	M 16 × 2	60	24	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M 24 × 1.5	70	36	-
46	M 24 × 1.5	50	36	-	M 24 × 1.5	50	36	-	M 24 × 1.5	50	36	-	M 24 × 1.5	50	36	-	M 20 × 1.5	50	36	-

ENGLISH

- T Thread
- M Torque
- N Span of jaws, width across flats (A/F)
- L Length of screw
- S Special key needed
- X Hexagonal key needed

Installation

Refrigerants

Applicable to all common non-flammable refrigerants, including R717 and non-corrosive gases/liquids dependent on sealing material compatibility. Flammable hydrocarbons are not recommended. The valve is only recommended for use in closed circuits. For further information please contact Danfoss.

Temperature range

MEV: -60/+120°C (-76/+248°F)

Pressure range

MEV: The valves are designed for a max. working pressure of 28 bar g (406 psi g).

Design

MEV is a balanced valve which is held closed by a built-in spring.

Depending on the control signal requirement, a SMV or SMVE motor can be fitted to open the valve by acting on the valve push pin.

Valve cone

A V-port cone provides optimum regulation accuracy.

Push pin seal assembly

Replaceable seal assembly in stainless steel with double sealing system.

Valve sizes

MEV is available in sizes from
MEV 80-2 (k_v : 0.6 m³/h) to
MEV 500 (k_v : 23.0 m³/h)

Installation

MEV + SMV/SMVE can be installed in vertical or horizontal pipelines (with motor upwards when mounted horizontally) (fig. 1).

The top cover of the MEV can be turned 90° in any direction without any influence on the valve function.

The MEV valve must be installed with the arrow in the direction of flow. When installing an MEV, refrigerant must not be allowed to escape and dirt must not be allowed to enter the valve. If the temperature of the medium flowing through the valve is less than 0°C a spindle heater must be used.

The valve is designed to withstand a high internal pressure. However, the piping system should be designed to avoid liquid traps and reduce the risk of hydraulic pressure caused by thermal expansion. It must be ensured that the valve is protected from pressure transients like "liquid hammer" in the system.

The valve can be fitted with an AKS 45 electronic position indicator (available as an accessory).

Assembled motorised valve

The motorised valve must not be installed with the push pin (27) vertically downwards and the SMV/SMVE motor actuator spindle vertically upwards (fig. 1). Secure the SMV/SMVE motor on the neck of the MEV motorised valve with a union nut (32 mm A/F) (max. 25 Nm) using the adjusting screw

(22 mm A/F) to provide counter torque (fig. 2).

Technical data

The MEV can be used in suction, liquid, hot-gas and liquid/vapour lines.

The MEV regulates the flow of the medium by modulation or on/off function, depending on the control impulse to the motor.

Function

MEV incorporates a balancing piston (35) that ensures the valve operates with low opening and closing forces. Therefore, the differential pressure across the valve has minimal effect on the valve opening and closing forces.

Inlet pressure P_1 acting on the underside of the regulating cone (21) is led via internal channels in the valve body to the top of the balancing piston. The pressure on the underside of the regulating cone is thus equalised.

In the same way, outlet pressure P_2 , which acts on the top of the regulating cone, is led via an internal channel to the underside of the balancing piston.

The balancing piston operates in a cylinder liner (18) and is fitted with a sealing ring for tight sealing.

MEV is fitted with a spring (39) that closes the valve when the push pin (27) is not activated. The SMV/SMVE motor is fitted with a return spring that forces the motor spindle closed when no voltage is being applied to the motor. This means that the MEV valve closes automatically when, for example, the power fails. (This is a standard function of the SMV/SMVE motor, but can be disconnected, by using the angle bracket accessory, fig. 4). The valve is fitted with a spindle for manual opening.

NOTE!

Distance piece must be used for MEV 80 (fig. 2).

When the valve is closed there is 0.6 - 1.0 mm clearance between the SMV/SMVE motor actuator spindle and the MEV motorised valve push pin.

MEV valves are kept closed by a built-in spring.

Power supply **must** be isolated before opening valve manually!

An AKS 45 position indicator can be fitted instead of the MEV bottom plug (26). An output signal (4-20 mA) of the exact position of the valve cone can be obtained during operation, together with digital on/off signals for fully open and fully closed valve.

A heating element can be fitted on the MEV valve neck to keep the pressure pin free of ice (for use with media temperatures under 0°C).

MEV has a pressure gauge connection (33) for registering valve inlet pressure P_1 .

Delivery

MEV valves are supplied with flange gaskets and flange bolts. Flanges, motor, and spindle heater if required, are supplied separately.

Welding

If using welding flanges, only materials and welding methods, compatible with the flange material must be welded to the flanges. The

flanges should be cleaned internally to remove welding debris on completion of welding and before the valve is inserted. The valve housing and flanges must be free from stresses (external loads) after installation.

MEV valves must not be mounted in systems where the outlet side of the valve is open to atmosphere. The outlet side of the valve must always be connected to the system or properly capped off, for example with a welded-on end plate.

Manual operation

SMV/SMVE can be operated manually as follows (**NB! Power supply must be isolated before opening valve manually!**):

1. Isolate the SMV/SMVE power supply.
2. Loosen the four screws in the cover (Fig. 3).
3. SMV/SMVE can be operated manually using a 5 mm hex. key and a strip of cardboard (supplied with SMV/SMVE on delivery) (fig. 4). Insert the key in the plastic spindle and turn it clockwise to open the valve. The valve position can then be locked by inserting the cardboard strip as shown in fig. 4.
4. When the cardboard strip is removed the spring return system will always automatically close the valve, provided the SMV/SMVE remains isolated from the power supply.

Insulation

If a spindle heater is fitted it must be outside the insulation material.

Colours and identification

The MEV valves are Zinc-Chromated in the factory. If further corrosion protection is required, the valves can be painted. Precise identification of the valve is made via the ID plate on the top cover. The external surface of the valve housing must be prevented against corrosion with a suitable protective coating after installation and assembly.

Protection of the ID plate when repainting the valve is recommended.

Maintenance

Service

A precise service schedule cannot be given for the valve as service intervals will depend on operating conditions, i.e. how often the valve operates and the amount of impurities and dirt the system carries.

The MEV valves are easy to dismantle and most of its parts are replaceable. When the bottom cover is removed, the strainer can be taken out for cleaning.

Do not open the valve while the valve is still under pressure.

- Check that the O-ring has not been damaged.
- Check that the spindle is free of scratches and impact marks.
- If the teflon ring has been damaged, the parts must be replaced.

Push pin seal assembly

The MEV valve seal assembly can only be replaced as a unit; it cannot be dismantled for repair.

The spindle seal of a new MEV valve is adjusted at the factory and locked with two locking screws (pos. 12) to ensure the distance between the MEV push pin and the SMV/SMVE motor thrust pad is correct. This adjustment must be made when the seal is replaced.

Replacement of push pin seal assembly (Fig. 5)

1. Relieve pressure on the MEV valve and evacuate refrigerant in accordance with authority requirements.
2. Remove the SMV/SMVE motor, and spindle heater if fitted.
3. Remove the seal by loosening the complete seal housing (pos. 13) with the special key from the seal spare parts set.
4. Fit a new seal assembly and tighten the complete seal housing (pos. 13) with a torque of 70 Nm. This corresponds to turning it 15 degrees = 1/24 of a turn after finger tightening.

Adjustment of push pin assembly

The push pin must be adjusted so that the height in relation to the seal housing (pos. 13) is correct.

1. Loosen the locking screws (pos. 12) and turn the adjusting screw (pos. 29) until the height of the push pin

(pos. 27) is 22.6 +/-0.1 mm above the adjusting screw.

2. Lock the adjusting screw by tightening the locking screws with a torque of 3 Nm.

Replacement of complete MEV-spindle assembly

When servicing the valve the complete spindle assembly must be replaced, i.e. the spindle (pos. 19), balancing piston (pos. 35), piston seal (pos. 36), O-ring (pos. 37), and valve plate (pos. 42).

1. Relieve pressure on the MEV valve and evacuate refrigerant in accordance with authority requirements.
2. Remove the SMV/SMVE motor, and spindle heater if fitted.
3. Screw off the MEV valve top and bottom covers.
4. Remove the top nut on the spindle (pos. 34) using the balancing piston (pos. 35, 18 mm A/F) to provide counter torque (see "Note").
5. Withdraw the spindle from the bottom of the valve.
6. Take the balancing piston (pos. 35) including piston seal out of the top of the valve.
7. Lubricate the valve internal cylinder with refrigeration machine oil.
8. Insert the new spindle into the housing, from below.
9. Insert the new balancing piston (pos. 35) incl. piston seal in the valve, from above (be careful not to damage the seals during assembly as these must provide a complete seal during operation).

10. Assemble remaining valve parts in the reverse order to dismantling.

Note! Do not use the nut (pos. 43) to provide counter torque. The valve can only be expected to close tightly if all parts that comprise a "complete spindle assembly" are replaced at the same time, and the degree of tightening of the nut (pos. 43) holding the valve plate (pos. 42) against the regulating cone (pos. 21) is not changed.

If it becomes necessary, the cylinder liner with O-ring (pos. 18 and 17) for the balancing piston can be changed, but this is not considered to be a part of normal servicing. Special tools have to be made for cylinder replacement. The old cylinder must be screwed out and the new one tightened using the correct torque (MEV 80: 60 Nm, MEV 125 - 500: 100 Nm).

Use only original Danfoss parts, including packing glands, O-rings and gaskets for replacement. Materials of new parts are certified for the relevant refrigerant.

In cases of doubt, please contact Danfoss. Danfoss accepts no responsibility for errors and omissions. Danfoss Industrial Refrigeration reserves the right to make changes to products and specifications without prior notice.

MEV with EVM solenoid valve

The MEV can be fitted with an optional EVM (NC) solenoid valve. EVM provides ON/OFF control and is screwed in directly to the MEV. The EVM provides security against refrigerant leakage through the valve, when the MEV is in the closed position.

EVM is controlled directly by the relevant motor, either SMV or SMVE.

EVM can also be fitted in an existing MEV installation equipped with either motor type. If an EVM is required it must be ordered separately. The EVM kit used is specific to the motor type used, either SMV or SMVE and must be ordered accordingly.

The EVM kit will always contain the parts mentioned below:

- EVM, NC
- EVM PCB-board (EVM PCB-board for SMVE or EVM PCB-board for SMV).

The EVM will always be of NC type, i.e. the EVM must be delivered as "Normally Closed" execution so there will be no flow through the EVM valve if the power supply to the coil is isolated.

Important:

The coil is not included in the EVM kit. This must be ordered separately according to the voltage used.

Mechanical assembly

To make the EVM solenoid valve operational an orifice inside MEV must be removed before further assembly commences.

Assembly procedure:

1. Isolate and remove motor.
2. Remove top cover.
3. Remove small screw from the cylinder liner (pos. 18).
4. Replace top cover gasket (pos. 16).

5. Reposition and mount top cover (refer to table page 5 for torque).
6. Remove blanking plug (pos. 46).
7. Mount EVM (32 mm wrench, 50 Nm torque).
8. Mount correct coil (check voltage!). Reposition and mount motor (see front page).
9. Open motor and fit electric EVM PCB-board (see "Electrical assembly" below).
10. Install cabling between coil and motor (see "Electrical assembly" below).
11. Reconnect power supply to motor.

Electrical assembly

The EVM valve should always be controlled from the chosen motor type, either SMV or SMVE.

SMVE

1. Disconnect voltage supply to SMVE.
2. Remove SMVE cover.
3. Install the EVM PCB-board for SMVE by the side of the main PCB-board and fasten it with the accompanying screws (fig. 7).
4. Make the connection between main PCB-board and EVM PCB-board (terminals SN, SP and 3).
5. Make the cable connection between EVM PCB-board and SMVE (terminals C and 6), mount EVM coil and connect general voltage supply. Remember to check power supply and coil voltage.
6. Remount SMVE cover.
7. Reconnect voltage supply to SMVE and EVM coil (can be same voltage).

Check

When SMVE is in its extreme top position (MEV is completely closed) EVM must be OFF. That is to say, voltage to EVM must be cut off. When SMVE is in a position other than top, EVM must be ON. That is to say, voltage for EVM must be connected. EVM is controlled by the EVM PCB-board for SMVE.

SMV

1. Disconnect voltage supply to SMV.
2. Remove SMV cover.
3. Install the EVM PCB-board for SMV by the side of the main PCB-board and fasten it with the three accompanying screws. A hexagon key, must be used to secure the EVM PCB-board mechanically to the rotating plastic spindle on SMV (fig. 8).
4. With SMV in its top position, turn S1 (on EVM PCB-board for SMV) counter clockwise until disconnection is just made between terminals 15 and 14. After this, due to tolerance it must be turned a little bit more counter clockwise (fig. 9).
5. Now bring the SMV motor manually (see SMV instructions if necessary) to a position where S1 indicator on EVM PCB-board for SMV is at approx. 12. In this position, turn S2 (on EVM PCB-board for SMV) counter clockwise until connection is just made between terminals 17 and 18.
6. Make the connection between terminals 15 and 17 and between terminals 14 and 18 on EVM PCB-board for SMV.
7. Make the cable connection between EVM PCB-board and SMV (terminals 15 and 18), mount EVM coil and connect general voltage supply. Remember to check power supply and coil voltage.
8. Remount SMV cover.
9. Reconnect voltage supply to SMV and EVM coil (can be same voltage).

Check

When SMV is in its extreme top position (MEV is completely closed) EVM must be OFF. That is to say, voltage to EVM must be cut off. When SMV is in a position other than top, EVM must be ON. That is to say, voltage for EVM must be connected. EVM is controlled by the EVM PCB-board for SMV.