

New perspectives with  
**Danfoss Saginomiya Cartridge Controls**



Reliable and consistent



**ACB / LCB Cartridge Controls**

- **Wide range**
  - -0.5 to 45 bar pressure range
  - Normally Closed, Normally Open or SPDT contact system
  - automatic or manual reset
  - various port fittings for soldering or direct mounting
  - spades or cables
  - stripped ends or customer specific electrical plug
- **Open or water-proof IP 65 version**
- **CE, TUV, VDE, UL and C-UL approvals**

ACB / LCB is a small disc type pressure control for use in refrigeration and air conditioning systems. As standard, it is equipped with a 6A contact system having automatic or manual reset.

The control is robust and reliable in operation in many types of units.

The small size, lightness and high degree of protection means that it can be mounted directly on the refrigeration systems where pressure regulation is required.

The control is available with different pressure settings and pressure connections to suit customer requirements.

All these features reduce installation costs and save space.



ACB manual reset type

## APPLICATION

ACB / LCB cartridge controls are used in refrigeration and air conditioning systems with CFC, HCFC, HFC as high and low pressure safety cut in and cut out as well as fan cycling.

## FUNCTION

ACB / LCB contains one or more stainless steel discs. Each disc reverses its curvature when pressurized to a customer specified value.

When the disc „snaps”, electrical contacts open (or close) by means of a push shaft. The pressure control resets automatically when pressure drops below (or rises above) a preset value.

## TYPICAL TECHNICAL DATA

	Water-proof types (W)	Open (spade connector) types (O)
Media	CFC, HCFC, HFC	
Range	-0,5 bar to 45 bar	
Reset	Automatic, Manual	Automatic
Contact function	SPST-NO, SPST-NC, SPDT	
Electrical connections	AWG18 cables	Spades (size 6.35mm x 0.8 mm)
Cable length	150 cm (black)	
Contact load	6A @ 250V AC for SPST 4A @ 250V AC for SPDT	
Pressure connections	1/4" ODM solder 6 mm ODM solder 1/4" SAE female flare with depressor pin	1/4" ODM solder 1/4" SAE female flare with depressor pin
Max. working pressure MWP	45 bar	
Burst pressure	300 bar	
Media temperature	-55 to 135°C	
Ambient temperature	-30 to 85°C	
Enclosure	IP65	IP40
Approvals	CE, TUV, VDE, UL and C-UL	
Packing quantity	20 pcs (industry pack)	50 pcs (industry pack)

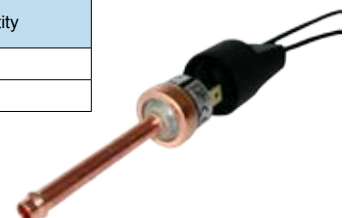
Customer specific features are available in a wide selection. Please refer to Specification Build-up on page 6.

## SPECIAL ACCESSORIES

A selection of open type cartridge controls with IP40 enclosure is available from Danfoss Saginomiya. For these switches a water-proof rubber plug has been specially designed. When the plug is installed on the switch a water-proof seal IP65 is obtained. The water-proof rubber plug is available with many different cable lengths.

Code no.	Standard cable length [m]*	Packing quantity
061F1301	1	100
061F1302	2,5	100

\* other cable lengths available upon request



# CARTRIDGE CONTROLS DIMENSIONS

## STANDARD MODELS

Application	Reset	Cut out bar PSI	Cut in bar PSI	Contact system / enclosure type <i>W-water-proof types with cable (IP65)</i> <i>O-open (spade connector) types / no cable (IP40)</i>	Connection type			
					Solder		7/16-20 UNF for flare with depressure pin	
					6mm	1/4"		
High pressure cut out	automatic	18 ± 0,7 260 ± 10	13 ± 1,2 190 ± 17	SPST-NC / W	061F7504 ACB-2UB504W	061F7505 ACB-2UB505W	061F7506 ACB-2UB506W	
				SPST-NC / O	-	061F8711 ACB-2UB211	061F8709 ACB-2UB209	
				SPDT / W	-	-	061F9057 ACB-2UC59W	
	automatic	20 ± 1 290 ± 14	16 ± 1,5 230 ± 21	SPST-NC / O	-	061F8710 ACB-2UB210	061F8708 ACB-2UB208	
	automatic	23 ± 0,7 335 ± 10	19 ± 1,2 275 ± 17	SPST-NC / W	-	-	061F8494 ACB-2UB465W	
				SPST-NC / O	-	061F8707 ACB-2UB207	061F8703 ACB-2UB203	
				SPDT / W	-	-	061F9056 ACB-2UC58W	
	manual	-	-	-	-	-	061F9243 ACB-2UC63MW	
	automatic	26 ± 1 380 ± 15	20 ± 1,5 290 ± 22	SPST-NC / W	061F7507 ACB-2UB507W	061F7508 ACB-2UB508W	061F7509 ACB-2UB509W	
				SPST-NC / O	-	061F8705 ACB-2UB205	061F8701 ACB-2UB201	
				SPST-NC / W	061F9703 ACB-2UB803MW	061F9714 ACB-2UB814MW	061F9713 ACB-2UB813MW	
				SPDT / O	-	061F9104 ACB-2UC104	061F9100 ACB-2UC100	
	automatic	-	-	SPDT / W	-	-	061F9055 ACB-2UC57W	
				SPST-NC / W	061F7510 ACB-2UB510W	061F7513 ACB-2UB513W	061F7514 ACB-2UB514W	
	manual	-	-	-	-	-	061F9522 ACB-2UB327MW	
	automatic	28 ± 1 405 ± 14	21 ± 1,5 305 ± 22	SPST-NC / O	-	061F8704 ACB-2UB204	061F8700 ACB-2UB200	
				SPDT / W	-	-	061F9054 ACB-2UC56W	
				SPDT / O	-	061F9107 ACB-2UC107	061F9103 ACB-2UC103	
				SPDT / W	-	-	061F9242 ACB-2UC62MW	
	automatic	31 ± 1 405 ± 14	24 ± 1,5 350 ± 22	SPST-NC / W	061F8493 ACB-2UB464W	-	061F8492 ACB-2UB463W	
				SPST-NC / O	-	061F8706 ACB-2UB206	061F8702 ACB-2UB202	
				SPDT / W	-	-	061F9053 ACB-2UC55W	
	automatic	42 ± 1,2 610 ± 17	33 ± 2 480 ± 29	SPST-NC / W	061F7515 ACB-2UB515W	061F7516 ACB-2UB516W	061F7517 ACB-2UB517W	
				SPDT / W	-	-	061F9575 ACB-2UB461MW	
SPDT / W				-	-	061F9052 ACB-2UC54W		
Low pressure control	automatic	0,5 ± 0,4 7 ± 6	1,5 ± 0,5 22 ± 4	SPST-NO / W	061F7518 ACB-2UA518W	061F7519 ACB-2UA519W	061F7520 ACB-2UA520W	
				SPST-NO / O	-	061F7402 ACB-2UA152	061F7400 ACB-2UA150	
				SPDT / O	-	061F9106 ACB-2UC106	061F9102 ACB-2UC102	
	automatic	0,7 ± 0,5 10 ± 7	1,7 ± 0,4 25 ± 6	SPST-NO / W	061F7521 ACB-2UA521W	061F7522 ACB-2UA522W	061F7523 ACB-2UA523W	
				SPST-NO / O	-	061F7403 ACB-2UA153	061F7401 ACB-2UA151	
				SPDT / W	-	-	061F9058 ACB-2UC60W	
				SPDT / O	-	061F9105 ACB-2UC105	061F9101 ACB-2UC101	
	automatic	1,7 ± 0,5 25 ± 7	2,7 ± 0,4 39 ± 6	SPST-NO / W	061F7524 ACB-2UA524W	061F525 ACB-2UA525W	061F7526 ACB-2UA526W	
	automatic	2,2 ± 0,3 32 ± 4,5	3,4 ± 0,3 50 ± 4,5	SPST-NO / W	061F7418 ACB-2UA711W	-	-	
	Fan control	automatic	8,5 ± 1,2 125 ± 17	11 ± 0,8 160 ± 12	SPST-NO / W	061F8491 ACB-2UA393W	-	061F8490 ACB-2UA392W
			13 ± 1,5 190 ± 22	16 ± 1 230 ± 14		061F8334 ACB-2UA306W	-	061F8333 ACB-2UA305W



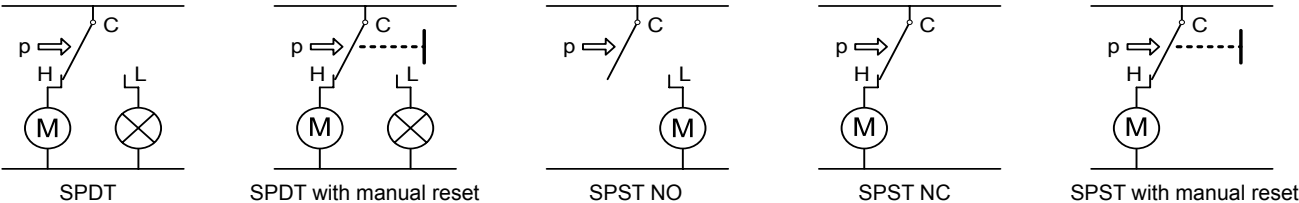
**PRINCIPLES OF OPERATION**

As pressure is applied through the connection on to the diaphragm, the diaphragm is pushed up against the operation shaft.

When the operation shaft rises, it pushes up the contact plate, so that H contact and C contact become disconnected (in Normally Closed switches) or H contact and L contact become connected (in Normally Open switches).

As the pressure in the connection decreases, the diaphragm returns to its original state, and the operation shaft lowers, causing the contact plate to return to its original position.

**ELECTRICAL CONNECTIONS**



SPST - Single Pole Single Throw  
 SPDT - Single Pole Double Throw

(NO) - Normally Open  
 (NC) - Normally Closed

**CONSTRUCTION**

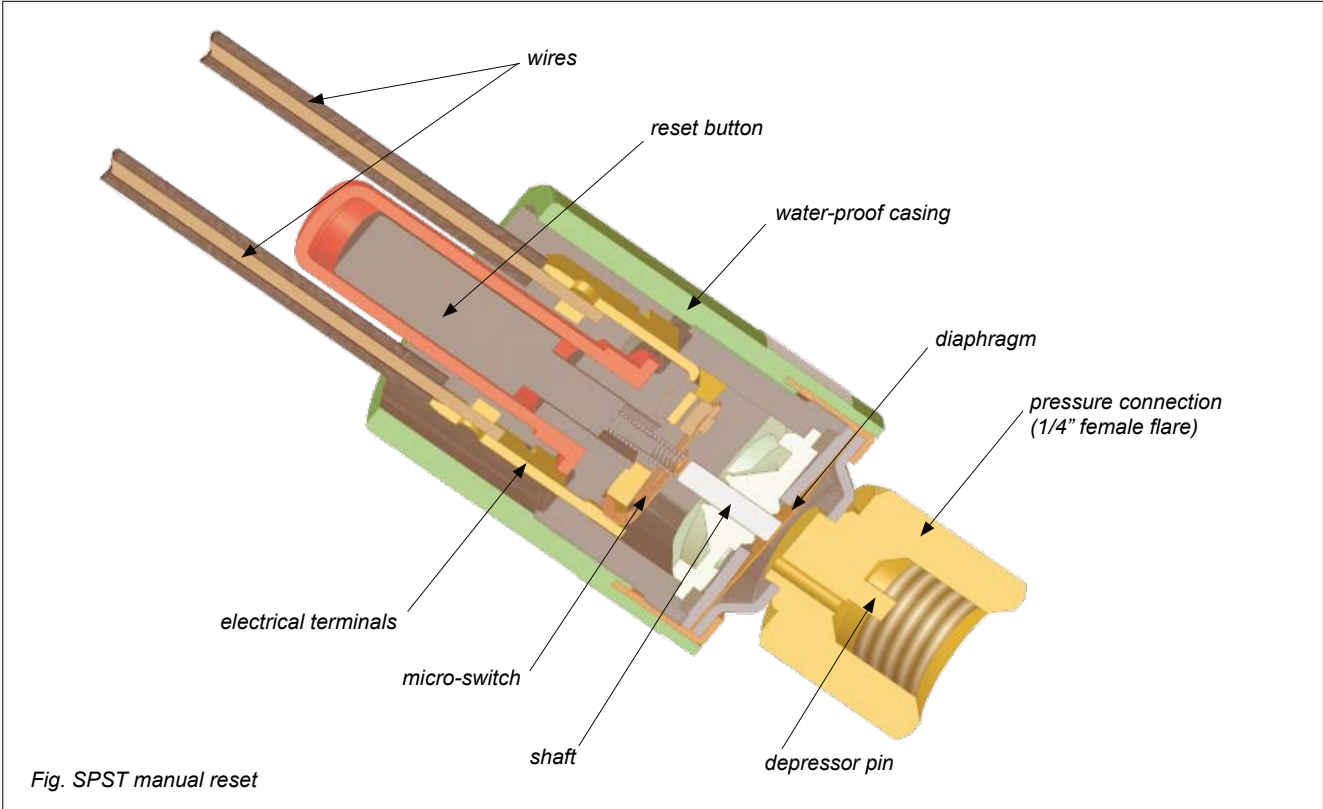
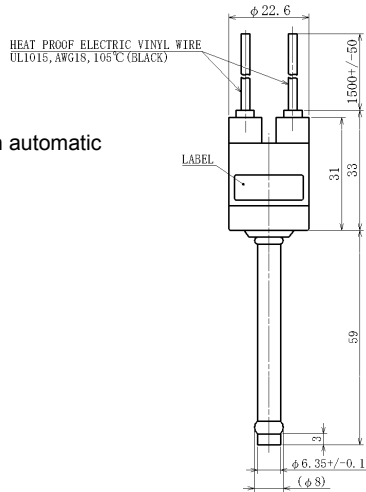


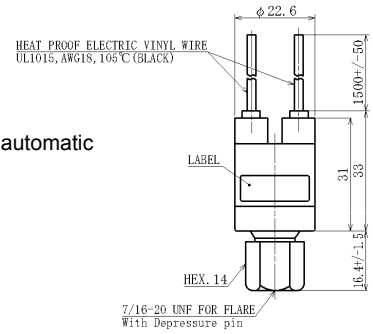
Fig. SPST manual reset

# DIMENSIONS OF STANDARD CARTRIDGE CONTROLS

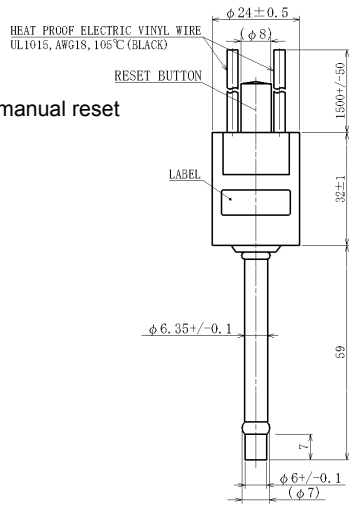
SPST water-proof with automatic reset 1/4" solder type



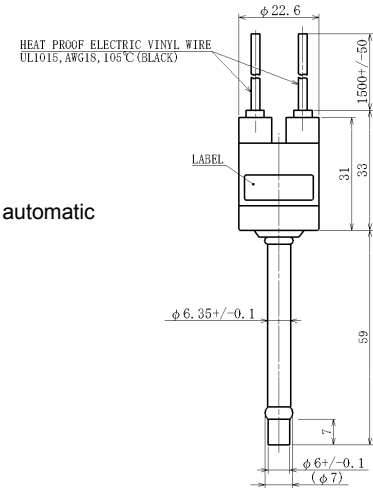
SPST water-proof with automatic reset female flare



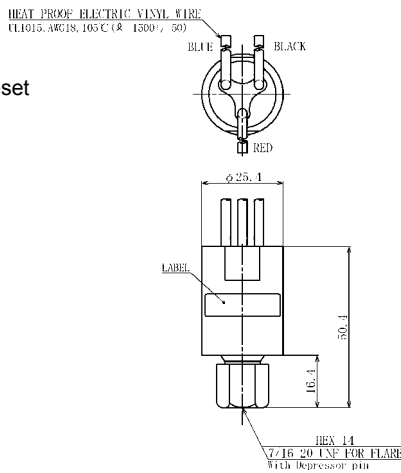
SPST water-proof with manual reset solder type



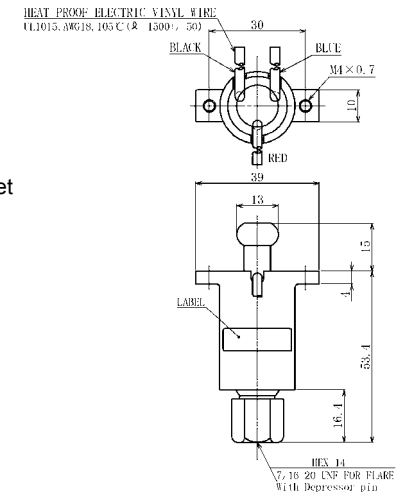
SPST water-proof with automatic reset 6 mm solder type



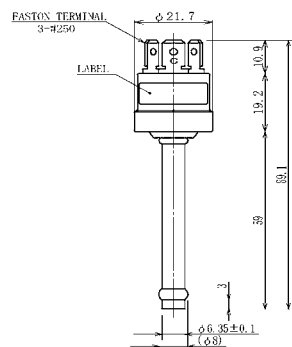
SPDT with automatic reset



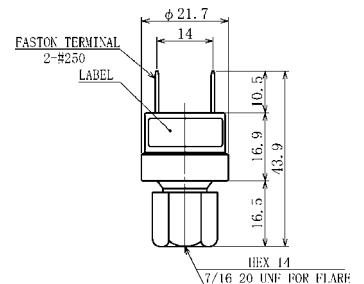
SPDT with manual reset



SPDT open type solder type



SPST open type with female flare



SPECIFICATION BUILD-UP

Field	Code	Explanation	Product	Electrical rating	Contact	Approvals	Enclosure	Reset	Housing	Port fitting	Upper activation setting [bar guage]	Tolerance on upper setting [bar]	Lower activation setting [bar guage]	Tolerance on low setting [bar]	Electrical connection	Cable lenght in cm	Cable plug	Mark if additional specifications	Details of special features (if any)
<b>Requested specs:</b>			Example: ACB - 2U B 1 W A R L 20,0 1,0 15,0 1,5 A 100 0																
<b>Product</b>	LCB	-0,5 bar to 7 bar																	
	ACB	-0,5 bar to 45 bar																	
	HCB	15 bar to 45 bar (max pressure 150 bar, automotive version)																	
<b>Electrical rating</b>	1U	1A @ 250V AC																	
	2U	6A @ 250V AC (SPST), 4A @ 250V AC (SPDT)																	
	3U	4A @ 250V AC (do not specify on new types)																	
	4U	0,05A @ 12/24V DC (gold contacts)																	
<b>Contact</b>	A	SPST-NO																	
	B	SPST-NC																	
	C	SPDT																	
<b>Approvals</b>	0	CE [category II] approval																	
	1	CE [category II + IV], TÜV, VDE, UL & C-UL approvals (only with ACB)																	
	2	UL & C-UL approvals (only with ACB)																	
	3	CE [category II + IV] approval (only with ACB)																	
<b>Enclosure</b>	O	Open IP40																	
	W	Waterproof IP65 (only with cables)																	
<b>Reset</b>	A	Automatic																	
	M	Manual (not SPST-NO; SPDT only in Panel mount housing)																	
<b>Housing</b>	R	Regular hot-melt																	
	E	Epoxy type																	
	V	Vacuum type housing																	
	P	Panel mount (mandatory for SPDT Manual reset versions)																	
<b>Port fitting</b>	M	1/4" SAE female flare w. deflator																	
	V	1/4" SAE female flare w. 1mm deflator																	
	H	1/4" SAE male flare																	
	P	1/4" solder Cu-tube (tip = 3 mm)																	
	X	1/4" solder Cu-tube (tip = 7 mm)																	
	S	1/4" solder Cu-tube (no tip)																	
	L	6 mm solder Cu-tube (tip = 7mm)																	
	E	1/8-27 NPT male																	
	Z	1/4-18 NPT male																	
	Y	R (PT) 1/8"																	
	O	0,9 meter capillary tube w. 1/4" SAE flare nut																	
	C	0,4 meter capillary tube ø2,4mm																	
	U	0,6 meter capillary tube ø2,4mm																	
	F	0,7 meter capillary tube ø2,4mm																	
	G	1,0 meter capillary tube ø2,4mm																	
	W	0,9 meter capillary tube w. 1/4" solder Cu-tube																	
	N	3/8"-24UNF w. O-ring																	
	R	10mm x 1,25 w. O-ring																	
<b>Upper activation setting [bar guage]</b>	---																		
<b>Tolerance on upper setting [bar]</b>	---																		
	---	+/- indicated value																	
<b>Lower activation setting [bar guage]</b>	---																		
<b>Tolerance on low setting [bar]</b>	---																		
	---	+/- indicated value																	
<b>Electrical connection</b>	A	AWG18 cables																	
	B	AWG16 cables																	
	C	AWG18 (UL 3173) cables																	
	S	90 deg. spades																	
	D	Double insulated AWG18 cables																	
	V	Double insulated H05VV5-F 2-in-1 cable (on request only, E housing only, Automatic reset only)																	
	R	Double insulated H05RNF 2-in-1 cable (on request only, E housing only, Automatic reset only)																	
	P	AWG18 with PVC tube																	
	H	AWG18 halogen free (RoHS compliant, currently E housing only)																	
<b>Cable lenght in cm</b>	---	Please use one of standard lengths: 020, 050, 080, 100, 150, 200 & 250 cm																	
<b>Cable plug</b>		(Leave blank if no cable)																	
	0	Cut ends																	
<b>Faston</b>	A	A1: AMP 170213-2, A2: AMP 170213-2, A3: OBR#250, A4: AMP 735222-2+AMP 735222-2, A5: AMP 170183-2, A6: AMP 170213-2																	
<b>AMP</b>	B	B1: AMP 350777-1, B2: AMP 282080-1, B3: AMP 282104-1, B4: AMP 192167-2, B5: AMP 881772-1, B6: AMP 174354-2																	
<b>Molex</b>	M	M1: 5557-02R																	
<b>Pin connector</b>	P	P1: Phoenix 3200250, P2: AMP 350218-1, P3: AMP 170213-2+AMP 926933-1, P4: AMP 926882-1, P5: AMP 165590-1																	
<b>Packard</b>	Q	Q1: 12010973, Q2: 12015792, Q3: 15300002, Q4: 15300027, Q5: 12020829																	
<b>Stripped end</b>	S	S1: stripped ends 15mm, S2: stripped ends 10mm																	
<b>VHR</b>	V	V1: VHR-2N, V2: VHR-3N																	
<b>WAGO</b>	W	W1: 231-302/026-000, W2: 769-102/021-000																	
<b>Additional features</b>		Leave blank if no additional specifications																	
	X	Please specify (clear text attachment)																	
<b>Details of special features (if any)</b>																			



# Instruction ACB Cartridge Controls

060R9765

060R9765

**Media: HFC and HCFC refrigerants**

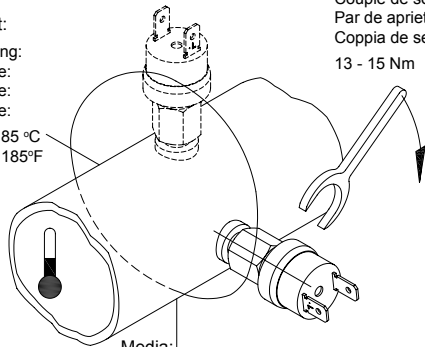
Medium: Kältemittel HFCKW und HFKW  
 Médias: HFC et HCFC  
 Aplicaciones: Refrigerantes fluorinados HFC/HCFC  
 Mezzo: HFC e HCFC refrigeranti

Type	Contact system	Ohmic	Inductive FLA	Starting LRA	Voltage
ACB-1UA	SPST-NO	1 A	1 A	6 A	120/240 AC
					250 AC
ACB-1UB	SPST-NC	1 A	1 A	6 A	120/240 AC
					250 AC
ACB-2UA	SPST-NO	8 A	8 A	48 A	120/240 AC
		6 A	6 A	36 A	250 AC
ACB-2UB	SPST-NC	8 A	8 A	48 A	120/240 AC
		6 A	6 A	36 A	250 AC
ACB-4UA	SPST-NO	0.075 A	0.075 A	0.075 A	120/240 AC and 30 DC
					250 AC and 30 DC
ACB-4UB	SPST-NC	0.075 A	0.075 A	0.075 A	120/240 AC and 30 DC
					250 AC and 30 DC
ACB-2UC	SPDT	8 A	8 A	48 A	120/240 AC
		4 A	4 A	24 A	250 AC

**Min/Max Temperature**

Min/Max Temperatur  
 Min/Max Température  
 Min/Max Temperatura  
 Min/Max Temperatura

Ambient:  
 Umgebung:  
 Ambiente:  
 Ambiente:  
 Ambiente:  
 -30 → + 85 °C  
 -20 → + 185°F

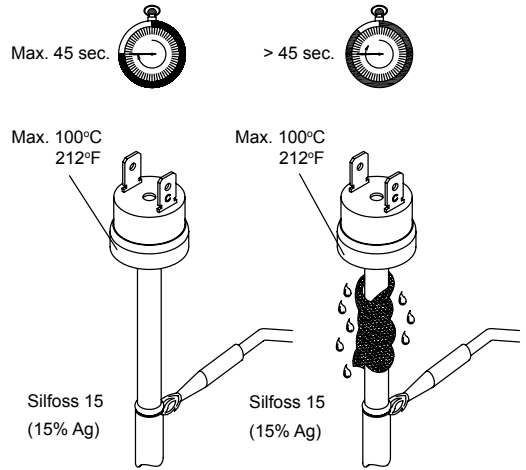


Torque:  
 Moment:  
 Couple de serrage:  
 Par de apriete:  
 Coppia de serraggio:  
 13 - 15 Nm

Media:  
 Medium:  
 Médias:  
 Aplicaciones:  
 Mezzo:  
 -55 → +135°C  
 -70 → + 275°F

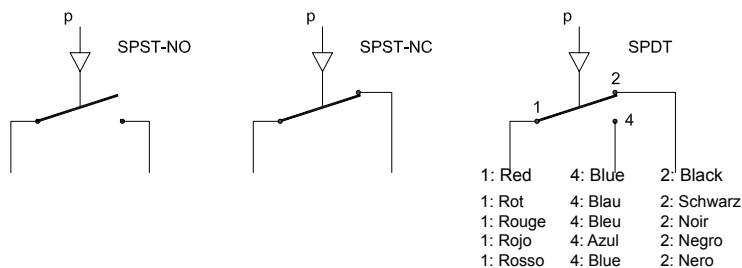
**Soldering**

Löten  
 Soudage  
 Saldatura  
 Soldadura



**Contact system**

Kontaktsystem  
 Système de contacts  
 Contactos eléctricos  
 Tipo di contatti





Danfoss Saginomiya product offer covers a wide range of automatic controls for Refrigeration and Air-Conditioning.

## 4 - WAY REVERSING VALVES (CHV/STF/VHV)

- wide application range
- one valve for all refrigerants
- instantaneous changeover at minimum pressure differential
- high reliability



## FAN SPEED CONTROLLERS (XGE/RGE)

- “all in one” pressure sensor and fan speed control
- single and three phase versions
- reliable sensing mechanism
- simple to install and easy setting



## PRESSURE SENSORS (NSK/XSK)

- compact, light-weight and high accuracy
- versatile application potential
- water-proof (IP66)
- different connection styles available



## SMALL SOLENOID VALVES (NEV/VPV)

- compact and light-weight design
- available for all refrigerants
- different pipe configurations
- space saving



## HIGH PRECISION PRESSURE SWITCHES (TB SERIES)

- high precision pressure control
- adjustable setting point
- high electrical rating
- ambient insensitive settings



## STEPPER MOTOR EXPANSION VALVES (KV SERIES)

- high precision expansion control
- high reliability
- compact and durable design



## FLOW SWITCHES (FQS)

- reliable flow control
- can be used for different pipe diameters



## PRESSURE ACTUATED WATER REGULATING VALVES (AWR/CWR/UWR)

- robust control for water-cooled condensors
- compact
- also for R410A



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