

Data Sheet

Check and Stop valve
Type **OFC**

For Oil Free Refrigerants, Fits Turbocor TTS/TGS/TTH/TGH Compressors



OFC type check and stop valve are designed for delivering a discharge solution that improves performance and reliability of oil-free centrifugal compressors with magnetic bearings by incorporating a damped check valve, while reliably and efficiently incorporating stop and diffuser functions.

Features

- Nozzle check valve closes quickly if backflow
- PTFE protects against reverse refrigerant migration; compatible with oil-free applications
- Gas damper and special opening characteristic prevents from violent movements in surge conditions
- Damped nozzle check valve reduces chattering noises
- Decoupled stop function from check function allows faster access and improves reliability of sealing
- Lock ring design prevents from unintentional closing of the valve
- Built-in sight glass gives direct visibility to proper valve functioning and refrigerant flow
- Built-in pressure port provides connection to high pressure cut out
- Built-in staging port
- Optimized flow path enhances flow capacity with lower pressure drop
- Bolt on to all TTS/TGS/TTH/TGH compressor discharge ports
- Multiple orientations possible

Functions

The OFC is intended for use on Turbocor compressors up to size TTS700 as a combined diffuser elbow, shut off valve and check valve with integrated staging port and pressure port (Schrader valve). The device contains:

Integrated stop function

Damped check valve function

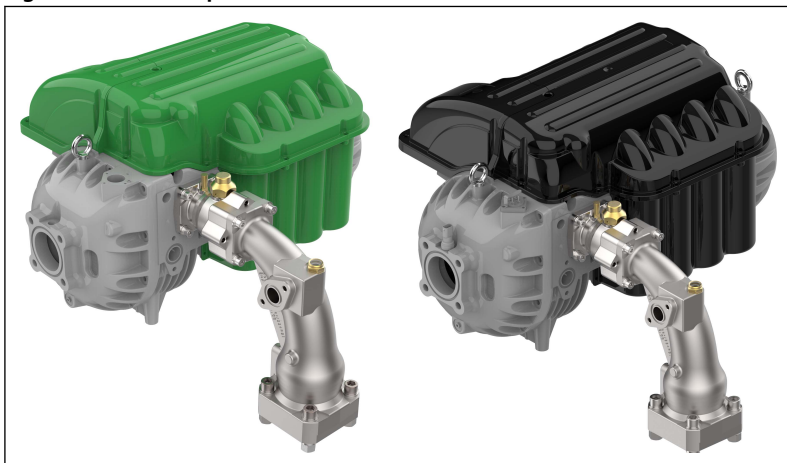
Integrated diffuser elbow

Integrated staging port

Table 1: Used for Danfoss Turbocor® Compressors:

Image	Compressor type	Refrigerant
	TTS300: 60-90 TR	R134a R513A
	TTS350: 70-120TR	
	TTS400: 90-150 TR	
	TTS700: 130-200 TR	
	TTH375: 75-115 TR	
	TGS230: 40-70 TR	R1234ze R515B
	TGS310: 60-90 TR	
	TGS390: 70-120 TR	
	TGS490: 110-140 TR	
	TTGS520: 90-150 R	
	TGH285: 70-90 TR	

Figure 1: Fit on compressor



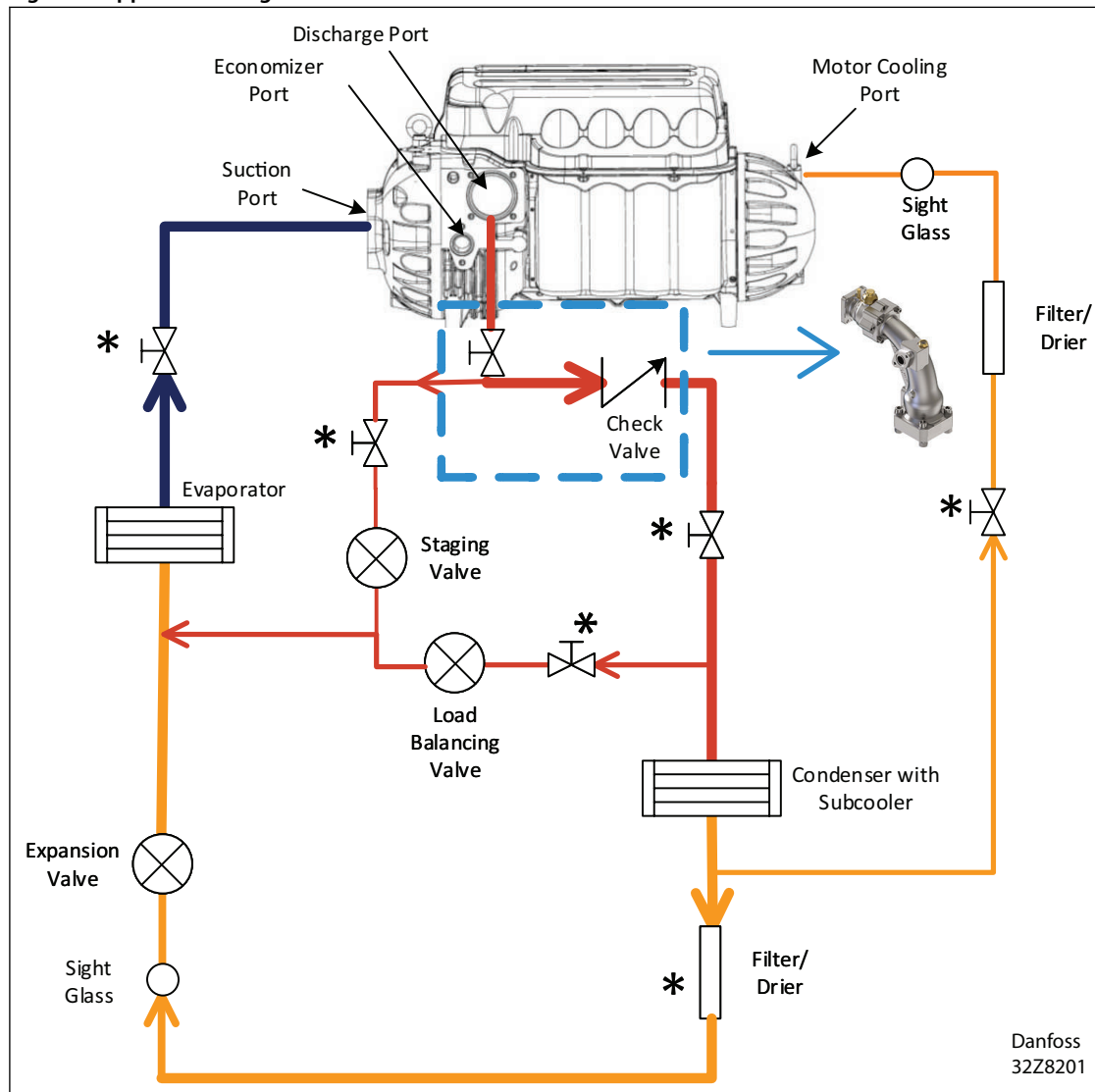
Applications

Typical applications for OFC valves are:

Only for oil free system

- Air-Cooled Chiller
- Water-Cooled Chiller
- Water-to-Water Heat Pump
- Air-to-Water Heat Pump

Figure 2: Application Diagram



Media

UL listed for R134a, R513A and R515B. CE approved for fluid group 2, including R1234ze(E) For other refrigerants, visit <http://store.danfoss.com/> and search for individual code, where refrigerants are listed as part of product details.

Oil: OFC valve is designed for an oil-free environment

Product specification

Technical data

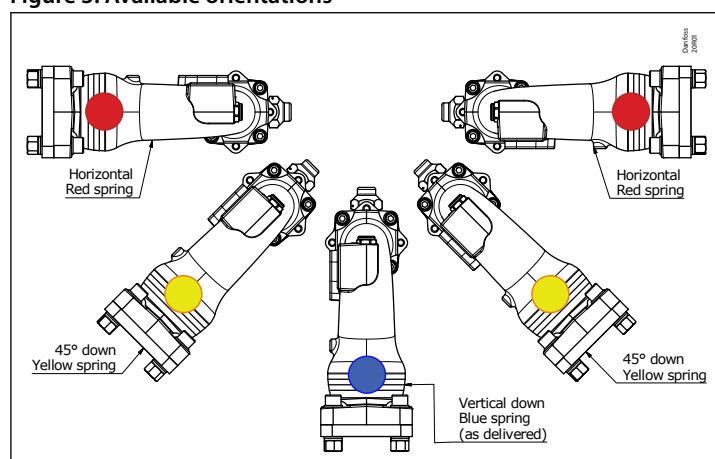
Table 2: Technical data

Technical data	Values
Max. working pressure	23 bar / 334 psig
Media temperature range	Min. 0 °C / 32 °F Max. 90 °C / 194 °F, short term up to 100°C / 212°F
Operating ambient temperature	-15°C to +51°C (5°F to 124°F)
Storage ambient temperature	-30°C to +51°C (5°F to 124°F)
Humidity	5-95% (Non-Condensing)
Flow direction	Single-flow
Valve direction	Angleway
Liquid detection	SGR socket sight glass in elbow
State of Delivery	With spring for vertical installation mounted. Ball valve is open. Included outlet flange and alternative springs packed separately
Orientation ⁽¹⁾	Three different orientations: Horizontal, 45° down and Vertical down
Serviceable	Check valve spare parts
Compressor interface	to fit directly on outlet of the listed Turbocor compressors(see page 2) Connection: Ø54 mm (2 1/8") Flange thickness: 17 mm (Bolt is not included)
Staging port	O-ring groove: OD ø41.1 mm, ID 32,9mm, width 4.1 mm (O-ring is not included) Thread depth: 24mm
Tube Brazing and flange connection	Ø80 mm (3 1/8") Outlet steel flange for brazing of 3-1/8" copper pipe 4 1/8" is available as spare part and shall be purchased separately
Support bracket	Thread: 2 x M10 Thread depth: 18mm

⁽¹⁾ Check valve spring must be exchanged if elbow is mounted horizontal or 45° down

Orientation and Spring Selection

Figure 3: Available orientations



Available orientations

Lifetime and functionality are compromised if used in other orientation than specified and/or not in accordance to the mounted spring.

At delivery, ball valve actuating axle is orientated same way on all versions as shown.

Ball valve clocking may be changed by removing bolts and rotating ball valve housing without retracting the ball valve assembly away from the elbow.

Check and Stop valve, Type OFC

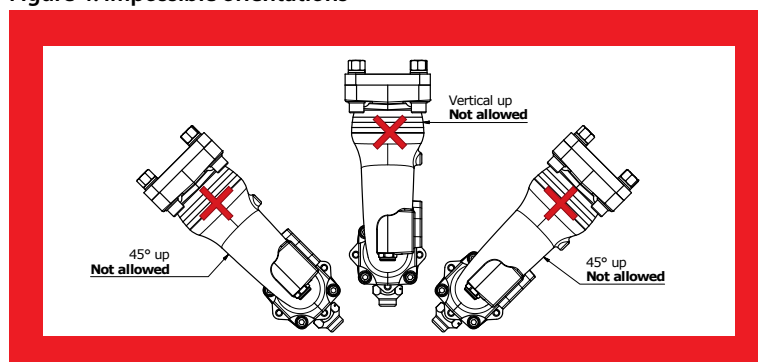
Table 3: Check valve spring

Vertical: Blue spring. Mounted at delivery	
45° down: Yellow spring	
Horizontal: Red spring	

Impossible orientations

45° up as well as vertical up orientations are not allowed. Using these positions will result in improper valve operation and can cause premature valve failure.

Figure 4: Impossible orientations



NOTE:

For more detailed information about OFC mounting, please refer to OFC installation guide.

Identification

Relevant product data is available on the product and box label. An example of a box label and product label are shown, including an explanation of the content.

Table 4: Box label & product label (example)

Box label	Product label
Check and Stop valve OFC 80s 020-5420 Angleway Flange 3 1/8 in - 80,00 mm PS 23 bar/MWP 334 psig 292021 LISTED REFRIGERANT VALVE 53R0 Danfoss A/S, 6430 Nordborg, Denmark	Check and Stop valve 020-5420 OFC 80s TS: 0 - 100°C / 32 - 212°F PS: 23 bar/334psi DN80 Fluid group: 2 020-5420N381D00241 LISTED REFRIGERANT VALVE 53R0 Danfoss A/S 6430 Nordborg, Denmark

Table 5: Product and label text

Position	Inscription	Explanation
Box label; Product label	Check and Stop valve	Product name
Box label; Product label	020-5420	Code number for ordering
Box label; Product label	OFC 80s	Product type

Check and Stop valve, Type OFC

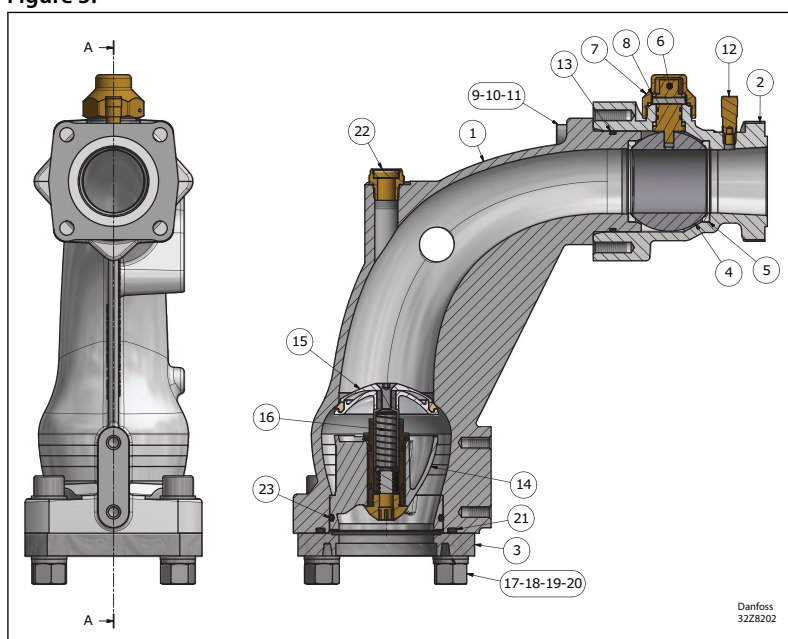
Position	Inscription	Explanation
Box label	Angleway	Direction
Box label	Flange 3 1/8 in-80,00 mm	Connection size and type
Box label; Product label	PS 23 bar/MWP 334 psig	Max. working pressure in bar and psig
Box label	292021	Code for production time: week 29, year 2021
Product label	020-5420N341A00203	Code for production place and time: • 020-5420 = code number • N = Nordborg • 381D = week 38, year 2021, Thursday) (A-B-C-D-E-F-G is used for weekdays) • 00241 = serial number
Box label; Product label	MADE IN DENMARK	Manufacturing site acc. to EN standards
Box label	EAN code	Barcode for individual code no. identification according to EAN standard
Product label	TS: 0 - 100 °C/32-212F	Media temperature range, min and max.
Product label	DN80	Connection size
Product label	Fluid group:2	PED category
Box label; Product label	Additional information: Relevant approval authority logos	

Design and Materials

Straight through, 90 degree diffuser elbow. Integration of all functions into diffuser elbow dimensions:

- Ball valve placed at inlet before staging port
- Sight glass function into 90 degree diffuser elbow
- Check valve function placed at outlet after staging port
- Pressure tap at inlet before ball valve

Figure 5:



Position	Description	Material
1	Elbow housing	Aluminum
2	Ball valve housing	Aluminum
3	Steel flange	Steel
4	Ball	Stainless steel
5	Seat	PTFE
6	Spindle	Brass, rubber, PTFE
7	Cap	Brass, PTFE
8	Stop ring	Stainless Steel
9	Plain washer	Stainless Steel
10	Spring washer	Stainless Steel

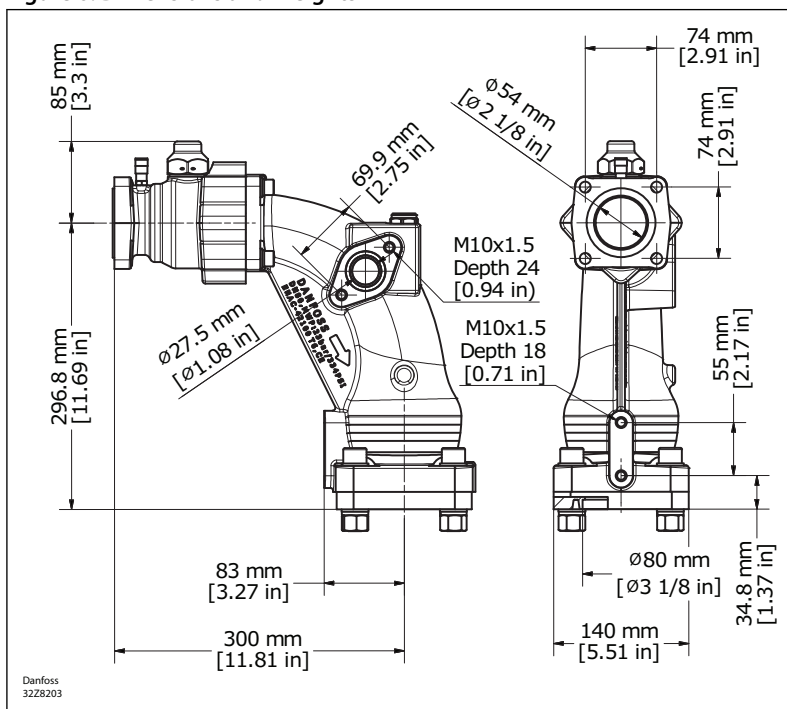
Check and Stop valve, Type OFC

Position	Description	Material
11	Bolt	Stainless Steel
12	Schrader valve	Brass, rubber
13	O-ring	Rubber
14	Check valve stationary part	Aluminum, bronze, brass, steel, rubber
15	Check valve moving part	Aluminum, steel, PTFE
16	Spring	Steel
17	Bolt	Stainless Steel
18	Plain washer	Stainless Steel
19	Nut	Stainless Steel
20	Spring washer	Stainless Steel
21	O-ring	Rubber
22	Sight Glass	Brass, glass
23	O-ring	Rubber

Dimensions

You will find downloadable dimension drawings for individual code numbers on Danfoss store as part of the Visuals tab for individual code numbers.

Figure 6: Dimensions and Weights



NOTE:

Net weight: 9.6 Kg

Ordering

Figure 7: Ordering



Table 6: Ordering

Type	Code no. Single pack	Connection Flange				Kv ⁽¹⁾	Cv ⁽¹⁾	Max. working pressure: PS/MWP	Media temperature range ⁽²⁾	PED category [Fluid Group 1]	PED category [Fluid Group 2]
		Inlet		Outlet							
		[in.]	[mm]	[in.]	[mm]						
OFC 80s	020-5420	2 1/8	54	3 1/8	80	270	312	23 bar / 334 psig	0 °C - 90 °C / 32 °F - 194 °F, short term up to 100°C / 212°F	Art. 4.3	Art. 4.3

⁽¹⁾ Calculated based on fluid dynamic equations. Does not include elbow.

⁽²⁾ For short term use in high temperature application, please consult Danfoss

Spare parts

Figure 8: Check Valve kit



Type	Used for product	Multi pack Quantity per packing [pcs]	Code no.
Check Valve kit	OFC 80s	4	020-5427

Figure 9: Flange kit



Table 7: Flange kit

Type	Valve connection size		Used for product	Multi pack Quantity per packing [pcs]	Code no.
	[inch]	[mm]			
Flange kit 3 1/8 in	3 1/8	80	OFC 80s	4	020-5428
Flange kit 4 1/8 in	4 1/8	105	OFC 80s	4	020-5429

Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.



Table 8: Certificates, declarations and approvals

File name	Document type	Document topic	Approval authority
Д-DK.PA01.B.02567_19	EAC Declaration	Machinery & Equipment	EAC RU
Д-DK.Б/108.B.02139_19	EAC Declaration	PED	EAC RU
033F5420.AB	EU Declaration	PED	Danfoss
033F5420.AB	Manufacturers Declaration	RoHS	Danfoss
UL SA7200	Mechanical - Safety Certificate	UL	UL

NOTE:

Note: EAC is under progress. For further information please contact Danfoss.

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