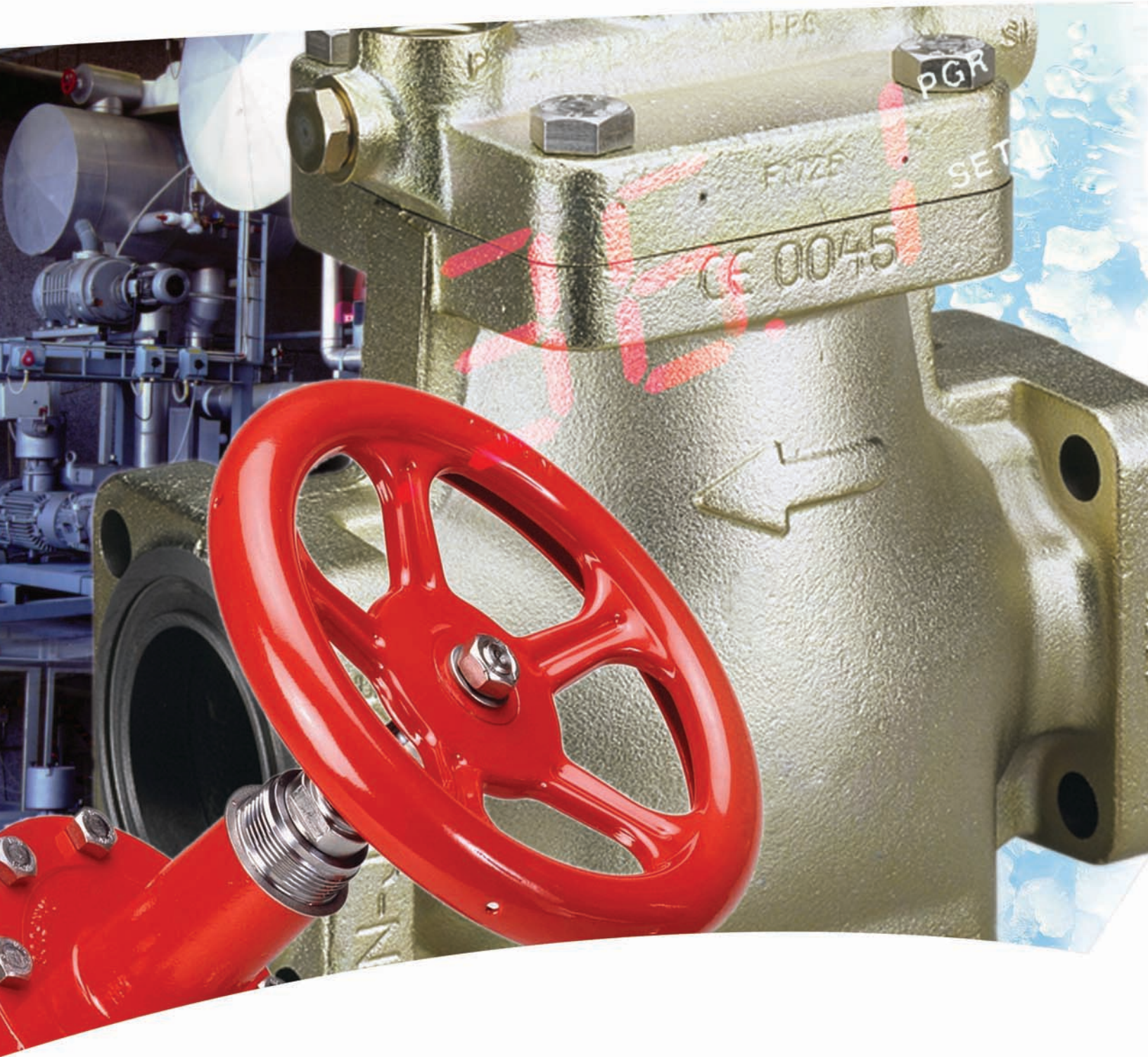


Danfoss



REFRIGERATION AND AIR CONDITIONING

**Industrial Refrigeration
Complete Product Line**

About Danfoss

For more than 60 years Danfoss has developed, manufactured, and marketed high quality products. Today Danfoss is the world's leading manufacturer of refrigeration components operating in more than 100 countries. Danfoss offers the widest, most flexible, and economical range of controls to regulate and monitor ammonia and fluorinated refrigerants in industrial refrigeration systems.



Our comprehensive product line includes valves and controllers for pressure and temperature regulation, check valves, stop valves, motorized valves, and electronic liquid level controls, built for demanding applications in food processing, storage and chemical/petrochemical industries. All components are produced in factories certified under ISO 9001 – the most stringent of the ISO 9000 quality standards.



Supporting our quality products is a team of dedicated Danfoss engineers. Calling upon many capabilities, including Danfoss scientists, research and testing laboratories, application and technical support, and unmatched worldwide logistics expertise, they exceed your requirements and ensure your complete satisfaction.

Mechanical Controls

Traditional mechanical controls are the foundation of Danfoss. These products bring reliability and durability demanded in industrial refrigeration applications.

Product Innovation

As technologies continue to evolve, more sophisticated control strategies have been developed by Danfoss to help our customers achieve efficient operations. Working in concert with our mechanical controls, our advanced electronics allow you to harness additional energy savings, and to achieve a more reliable operation.

Sophisticated Electronic Controls

Danfoss sets the industry standard for refrigeration control. Our sophisticated line of electronic controls enables you to provide your customers with solutions for even the most demanding applications. We provide a range of electronic controls for regulation of compressors, condensers, evaporator refrigerant level, and temperature control of processing plants, cold storage, and other refrigeration systems.

All mechanical and electrical products included in this brochure are compatible with refrigerants including: R717, R22, R134a, R404A/507, R407C, among others. Learn more about our extensive product offering on the following pages.

Danfoss Solutions

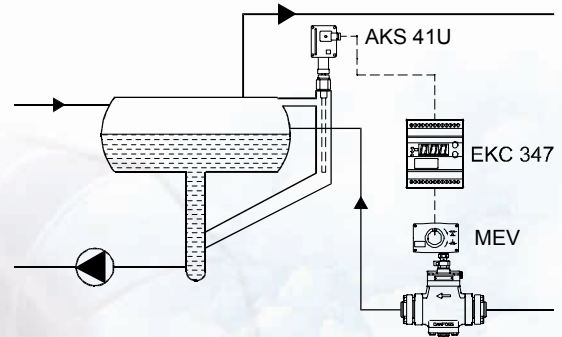
"Liquid Level Control"

Situations:

1. Electronic probes require calibration with the level column (standpipe) and are susceptible to damage or bending and signal drift.
2. Sealed motorized control valves do not close upon power failure and they do not give a visual indication of valve position.

Solutions:

1. Danfoss AKS 41U level probes come standard with a stainless steel reference pipe pre-set for R717, requiring no on-site calibration. Further, the reference pipe protects the integrity of the probe and prevents signal drift.
2. The Danfoss MEV motorized control valves are equipped with an external, fail-safe motor which will close the valve upon power failure. Also, a visual dial indicator confirms valve position and closure.



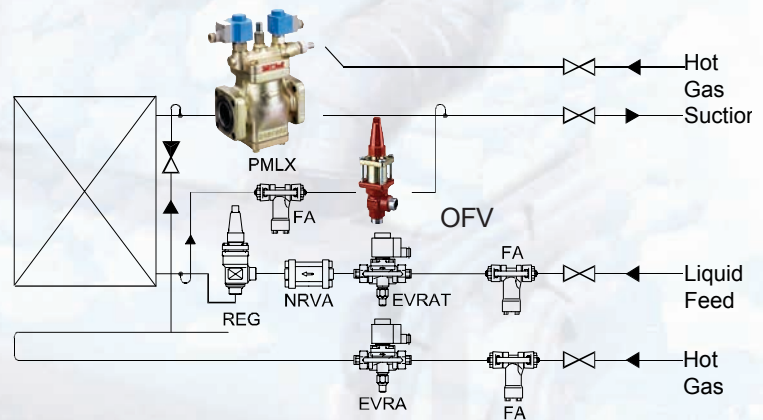
"Simplified Evaporator Piping"

Situations:

1. Traditionally, a costly pressure regulating valve, with pilot, is employed for defrost relief regulation.
2. Gas powered stop valves require external assemblies, fittings, solenoid valves, and piping associated with a bleed line. This increases installation costs, complexity, and creates opportunities for leaks.

Solutions:

1. The Danfoss OFV overflow valve is a simple, adjustable pressure regulator that does not require pilots and is self-reseating. It is suitable for defrost regulation of evaporators up to 100 TR. The OFV is also suitable for oil pump discharge relief applications.
2. The Danfoss two-step opening, gas powered PMLX solenoid valve employs a double spring system that allows internal bleed relief, negating the need for additional external bleed lines and the associated complexity.



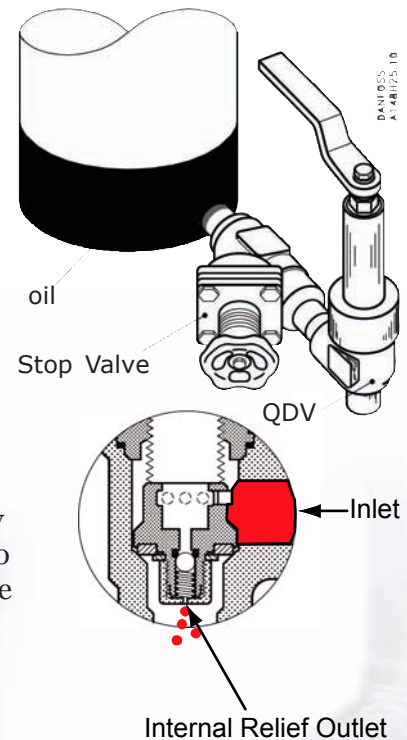
"The Safer Drain Valve"

Situation:

Liquid refrigerant can be trapped between the stop valve and drain valve causing an unsafe, high-pressure situation, or potentially damaging either valve.

Solution:

The internal relief device in the Danfoss QDV allows refrigerant to slowly bleed if internal valve pressure exceeds 260 psig. Further, the valve is easily actuated by hand (without tools), and has an internal spring mechanism to instantly close the valve if the actuator is let go. All QDV valves are in angle orientation with FPT outlet, suitable for safe draining.



"V-Port for Chatter-Free Check Valve Operation"

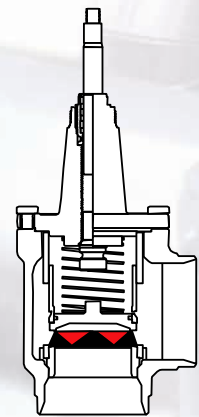
Situation:

Check valve chattering at low load (flow) conditions.

Solution:

Danfoss CHV (check valves) and SCA (stop/check valves) provide an optimum solution to chattering with a V-port design. Active below 25% of opening to maintain adequate velocity at low capacities, the V-port eliminates chatter and noise.

Available in angle and globe versions, the CHV and SCA are ideal for discharge lines in reciprocating and screw compressors including economizer side ports.



SCA Stop/Check Valve

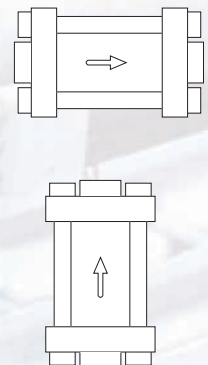
"Check Valve Without Orientation Limitations"

Situation:

Pulsating lines, such as reciprocating compressor discharge lines, require a piston check valve that typically has orientation limitations.

Solution:

The compact, piston in-line NRVA check valve offers the flexibility for multiple orientations, maximizing ease of installation. Available in most common flange sizes up to 2 1/2".



NRVA Check Valves

Mechanical Controls



SVA Series

Stop Valves (SVA)

- ANSI connections
- FPT: $\frac{1}{2}$ " to $1\frac{1}{4}$ ", SW: $\frac{1}{2}$ " to 2", BW $\frac{1}{2}$ " to 12"
- All valves rated 580 psig
- **ST** - standard valves: -58°F to 302°F
- **LT** - low temp valves: -76°F to 302°F
- **HS** - high spec valves (petrochemical)
- Seal cap or handwheel, angle or globe
- Perfect closing valve cone
- Great flow characteristics
- Polished stainless steel spindle
- Scraper designed to prevent penetration of dirt/ice into packing gland
- Cold-resistant steel design - no ductile iron valve bodies



REG

Hand Expansion Valves (REG)

- FPT: $\frac{1}{2}$ " to $1\frac{1}{4}$ ", SW: $\frac{1}{2}$ " to 2", BW: $\frac{1}{4}$ " to $2\frac{1}{2}$ "
- Better flow control characteristics - 580 psig rated
- Wide C_v range
- Dual function - expansion and isolation
- Cold resistant steel design - no ductile iron bodies
- Same housing as SVA stop valve



FIA

Strainer (FIA)

- FPT: $\frac{1}{2}$ " to $1\frac{1}{4}$ ", SW: $\frac{1}{2}$ " to 2", BW: $\frac{1}{4}$ " to 8"
- 580 psig rated
- -76°F to 302°F
- Interchangeable stainless steel strainer element
- 38 to 150 mesh (500 μ to 100 μ)
- Angle or globe
- Same housing as SVA stop valve



SCA

CHV

Check Valve (CHV) Stop Check Valve (SCA)

- $\frac{1}{2}$ " to 5" ANSI BW connections
- 580 psig rated
- -58°F to 302°F
- Laser cut V-ports for excellent opening characteristics
- Non-chattering design with built-in damping chamber
- Opens at low differential pressure of 0.58 psig with adjustable spring

Mechanical Controls



NRVA

Check Valves (In-line)

$1\frac{1}{2}$ " to $1\frac{1}{2}$ "

NRVA - piston-type with damping

- Liquid, suction and hot gas line
- Damping piston for suitability in pulsating lines

NRVS - piston-type without damping

- Liquid lines only
- Direct couple to PM control valves and solenoid valves



PM

Pressure Regulators (PM)

$\frac{3}{16}$ " to 6"

- **PM 1** - single pilot, **PM 3** - three pilots
- Valve bodies available in Ductile Iron GGG 40.3
- Zinc Chromate is standard up to 3" for enhanced corrosion protection
- All valves equipped with built-in strainer
- Leading electronic control technology and C_v values
- Optional AKS 45 electronic position indicator (4-20 mA)
- Electronically operated pressure regulation available (CVQ)
- Flanges available in FPT, SW, BW, and DIN



Pilot Valve Program

Pilot Valves

Complete mechanical and electronic pilot valve program for precise pressure and temperature control.



EVRA

Solenoid Valves

Danfoss solenoid valves are designed and built for industrial applications. They can be installed in suction lines, return lines (liquid/vapor), pressure-equalizing lines, or bypass lines.

- Direct or servo-operated valves (EVRA)
- Assisted lift, servo-operated (EVRAT)
- Direct operated, servo-operated, forced servo-operated with stainless steel bodies (EVRs/EVRST)
- Pilot operated $\frac{3}{4}$ " to 6" (PM)
- Gas powered $1\frac{1}{4}$ " to 6" (PML)
- Gas powered stop valves 3" to 6" (GPLX)
- Gas powered two-stop solenoid valve $1\frac{1}{4}$ " to 6" (PMLX)
- Closed-coupled strainer available up to $1\frac{1}{4}$ "



GPLX

PMLX

Mechanical Controls



QDV



OFV



SNV



AKS 38



AKVA



TEAQ



TEA

Quick Closing Drain Valve (QDV)

- $\frac{1}{2}$ " and $\frac{3}{4}$ " FPT connections
- Spring-loaded handle closes immediately upon release
- Internal relief device prevents hydraulic pressure build-up

Overflow Valve (OFV)

- $\frac{3}{4}$ " and 1" ANSI BW connections
- Combines functions of overflow valve, check valve, and stop valve
- Adjustable differential pressure range of 29 to 116 psi
- Can be closed manually and has backseating for service

Gauge, Purge and Needle Valves (SNV ST)

- $\frac{1}{4}$ " and $\frac{3}{8}$ " FPT/MPT connections
- Cold resistant steel with zinc chromate coating
- Non-removable stainless steel stem

Float Switch (AKS 38)

- Reliable SPDT micro switch
- Protection from high and low levels
- Operates liquid solenoid valve
- Transparent switch box cover for visual indication
- Switch box can be rotated to improve visibility

Electronic Expansion Valve (AKVA)

- $\frac{1}{2}$ " to 2"
- -58°F to 302°F
- 1-900 TR capacity range for ammonia applications
- Pulse width modulating electronic expansion valve
- Full velocity through the valve combined with its damping orifice makes it ideal for flooded systems
- AKVA does not require manual adjustments for changes in capacity (10 to 100%)

Thermostatic & Electronic Expansion Valves

TEA 1-85 TR $\frac{1}{2}$ " to $\frac{3}{4}$ "

- Patented double contact bulb for tighter control

TEAQ 1-85 TR $\frac{1}{2}$ " to $\frac{3}{4}$ "

- Electronically controlled modulating thermal expansion valves

Electronic Controls



EKC

Electronic Controllers

- EKC 315** - Evaporator controller (superheat)
- EKC 331** - Compressor or condenser capacity controller
- EKC 347** - Liquid level controller
- EKC 361** - Media temperature controller
- EKC 366** - Interface module for PC/PLC media temp. control
- One platform – cost effective
- Easy to operate and very compact
- 4-20 mA input/output
- Third-party PC/PLC can modify setpoints



AKS 41U

Liquid Level Transmitter (AKS 41U)

- From 6" to 125" - other lengths upon request
- Detachable electronic top - isolated from refrigerant
- Available with bar graph liquid level indication (optional)
- Precalibrated for R717; easily calibrated for other refrigerants



MEV

Motorized Valves & Valve Motors (MEV)

- Modulating V-port design minimizes pressure fluctuation
- Fail-safe spring return closes valve on power failure
- Motor assembly isolated from valve housing for easy service
- Ideal for wide operating ranges, including low capacity
- Visual indication of valve position



AKS

Pressure Transmitters

- AKS 32** - 1 - 5V DC or 1 - 10V DC
- AKS 33** - 4 - 20 mA
- Temperature compensation
- Built-in voltage stability
- Suitable for harsh environments
- UL recognized for Class I, Group A, B, C, and D, Division 2

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