ENGINEERING TOMORROW

Data sheet

Electric regulating valves

Type CCMT Light 3 - 5 - 8

The CCMT Light is an electrically operated valve designed specifically for operation in CO_2 systems.

The CCMT Light valve concept is designed to fulfill global refrigeration requirements.

The valve is capable of functioning either as a pressure regulator for the gascooler or as a gas bypass valve with back-pressure regulation in transcritical applications.

Features

- Designed for CO2 systems with maximum working pressure of 140 bar / 2030 psig with steel connections and 130 bar / 1885 psig with Bi-metal connections
- The CCMT Light is compatible with oil types PAG and POE
- All-in-one function module ensures optimum regulating accuracy, particularly at part load
- Patented cone and balance design
- The PTFE (TFM) seat provides excellent valve tightness
- Combined butt weld and unique bi-metal solder connections
- MOPD up to 90 bar / 1305 psi
- Integrated M12 male connector for simple and flexible connection to the motor driver
- Low weight and compact design
- Easy to service from the top by removing a single function module insert
- For manual operation and service of the CCMT an AST-g service driver is available

For more information on the product, please scan the QR code.

Technical data

Parameter	CCMT Light 3 - 5 - 8
Compatibility refrigerants	R744
Refrigerant oils	PAG and POE
MOPD	90 bar / 1305 psi
Max. working pressure (PS/MWP)	140 bar / 2030 psig with steel connections 130 bar / 1885 psig with Bi-metal connections
Refrigerant temperature range*	–5 – 55 °C / 23 – 131 °F
Ambient temperature	–5 – 50 °C / 23 – 122 °F
* Measured at inlet of the valve	
Valve body material specification	Stainless steel
Built-in strainer / filter	No
Comply with P.E.D.	Fluid group I / Article 3, paragraph 3
Approval	CE

Electrical data

Parameter	CCMT Light 3 - 5 - 8
Stepper motor type	Bi-polar - permanent magnet
Motor enclosure	IP 67
Step mode	2 phase full step, microstepping (recommended)
Phase resistance	15 Ω ±10%
Phase inductance	16 mH
Phase current	Using chopper drive: 350 mA RMS +/- 10 %
Holding current	No voltage driver. Current controller: 20% of max. current
Duty cycle	20% duty cycle of period time 50 sec
Max. total power	Current drive: 1.8 W
Step rate	Chopper current drive: 100 steps/sec
Total full steps	210 steps
Full travel time	2.1 sec. (at 100 steps sec.)
Reference position	Overdriving against full close position
Overdrive in close position	Max. 10% of total full steps
Overdrive in open position	Not Allowed
Electrical connection	Integrated M12 male connector

Compatible controllers	EKE 1X, AK-PC 572, AK-PC 7xx, AK-XM 208C (*)

(*): NOTE!
Please refer to CCMT Light installation guide for correct valve insulation recommendation related to usage of electronic driver type AK-XM 208C.

Ordering

Valve including actuator

Type	Connections [in]		Flow rate		Packing format	Code no.
	Bi-metal	Steel	k_v [m³/h]	C_v [gpm]	Single pack	
CCMT 3L	3/8 × 3/8		0.26	0.30	1	027H7239
CCMT 3L	1/2 × 1/2		0.26	0.30	1	027H7240
CCMT 3L		5/8 × 5/8	0.26	0.30	1	027H7241
CCMT 3L		7/8 x 7/8	0.26	0.30	1	027H7273
CCMT 5L	3/8 × 3/8		0.50	0.57	1	027H7242
CCMT 5L	1/2 × 1/2		0.50	0.57	1	027H7243
CCMT 5L		5/8 × 5/8	0.50	0.57	1	027H7245
CCMT 5L		7/8 x 7/8	0.50	0.57	1	027H7274
CCMT 8L	3/8 × 3/8		0.80	0.92	1	027H7275
CCMT 8L	1/2 × 1/2		0.80	0.92	1	027H7247
CCMT 8L		5/8 × 5/8	0.80	0.92	1	027H7250
CCMT 8L		7/8 x 7/8	0.80	0.92	1	027H7272

Spareparts

Type	Description	Single pack	Code no.
Gasket	O-ring spare part kit for CCMT Light 3 - 5 - 8	1	027H7276

Related products

Superheat controller / driver, type EKE 1X

Electronic driver type AK-PC 572

Electronic driver type AK-PC 7XX

Electronic driver type AK-XM 208C (*)

(*): NOTE!
Please refer to CCMT Light installation guide for correct valve insulation recommendation related to usage of electronic driver type AK-XM-208C.

Accessories:

M12 angle cable

M12 angle female connector is intended for use with the standard M12 male connector on CCMT Light valves.

The Danfoss cable is designed to offer high flexibility and proper tensile strength.
The Danfoss M12 cable also consists of paired, twisted wires, which decreases mutual influence between signals transmitted along the cable and reduces influence of external sources of interference.
The cable thus provides a higher degree of protection against lost steps compared to other cables.

Approvals

CE RoHS cULus 089 EAC

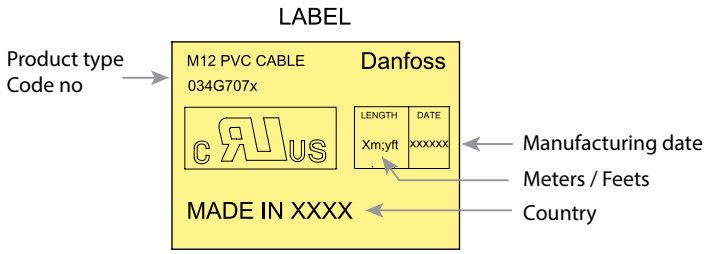
Specification

Jacket	PVC - black
Cable outer sheath	Oil - resistant
Water proof rating	IP 67
Operating temperature range	-40 – +80 °C
Wire type	Twisted pair, cross section 20 AWG / 0.5 mm2
Cable outer diameter	7.0 mm
Minimum bending radius	10 x cable diameter
Cable combustibility / test	Flame retardant / VW-1 / CSA FT - 1
M12 standard	EN 61076-2-101
Reference standard	UL style 2464 and DIN VDE 0812
LVD directive	73/23/EEC and 93/68/EEC

Ordering

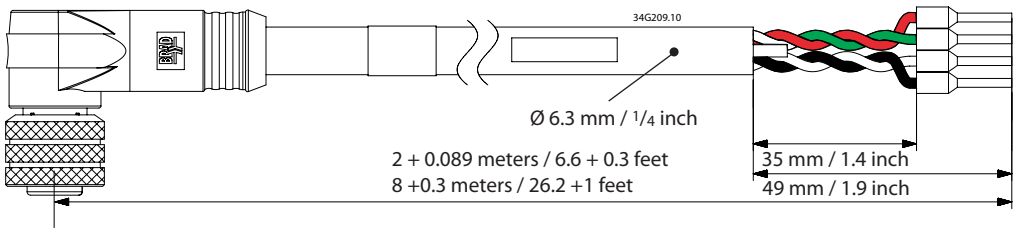
Cable	Cable length (L)	Insulation	Packing format	Code no.
PVC - black	2 + 0.089 m / 6.6 + 0.3 ft	SR-PVC	Single pack	034G7073
	8 + 0.3 m / 26.2 +1 ft	SR-PVC	Single pack	034G7074

Identification

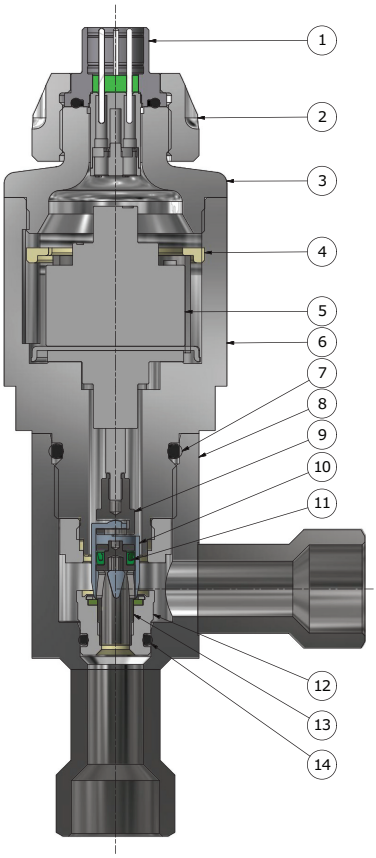


Connections

Dimensions



Design



CCMT Light 3 - 5 - 8,
Steel and Bi-metal connections

1. Connector socket
2. Top nut
3. Actuator cover
4. Lock ring for motor
5. Motor
6. Motor housing
7. O-ring
8. Valve housing with connectors
9. Actuator joint
10. Slider
11. Seal
12. Nozzle holder assembly
13. Nozzle
14. O-ring

Stepper motor switch sequence

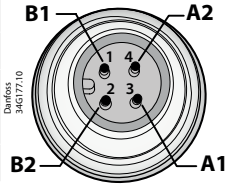
Stepper motor switch sequence

	STEP	Coil I (B)		Coil II (A)		
		Red	Green	White	Black	
CLOSING ↑	1	+	-	+	-	
	2	+	-	-	+	
	3	-	+	-	+	
	4	-	+	+	-	
	1	+	-	+	-	↓ OPENING

Danfoss cable connections

Pin	Wire color
A1	White
A2	Black
B1	Red
B2	Green

CCMT Light valve



If the controller driving the CCMT Light valve is from another manufacturer than Danfoss or a custom design, the following points must be considered in order to overcome potential step loss.

To ensure total closing of the valve, and to compensate the lost steps after a defined number of changes in opening degree. the controller should have a function to overdrive the valve in the closing direction. It is recommended to overdrive ten percent of the full steps range at appropriate intervals.

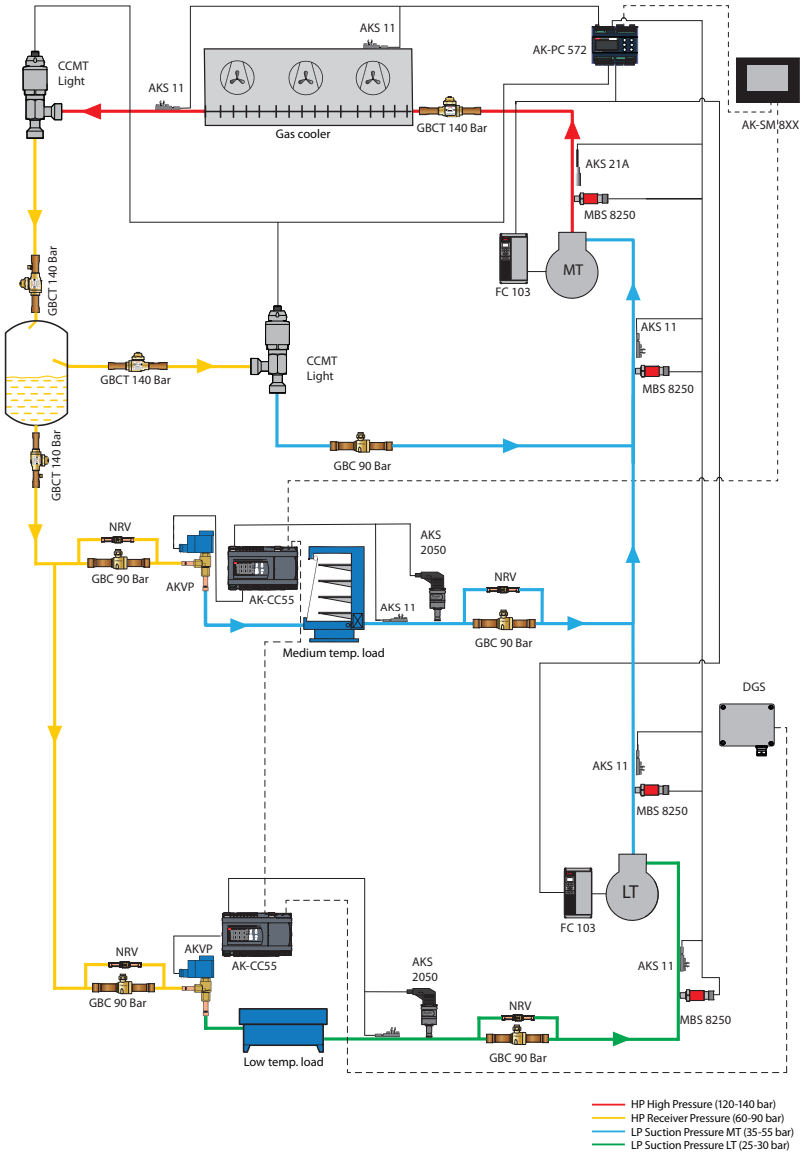
Warning:
At power failure the CCMT Light valve will remain in the actual opening position it has at the moment of power failure, unless a safety device in the form of a battery backup is installed.

Application

The CCMT Light valve is developed for transcritical CO_2 applications. The CCMT valve can be used in systems with flash gas bypass, parallel compression as well as in stand-alone applications.

The CCMT Light valve can be used in transcritical and subcritical conditions.

CCMT Light valves are typically used as flash gas bypass and high pressure regulation.



Application 1 - High Pressure Valve

The function of the high pressure valve is to control the high pressure in the system according to the reference from the controller. The reference can be set to obtain the optimum COP, optimum capacity or any other factors.

Pressure optimization is performed by the CCMT valve, which is installed at the outlet of the gas cooler (see the figure above) and a matching Danfoss controller. This design provides the possibility to optimize gas cooler pressure in all situations and intermediate receiver pressure independently.

Please refer to the www.danfoss.com/CO_2 for more information on CO_2 systems.

Application 2 - Gas bypass Valve

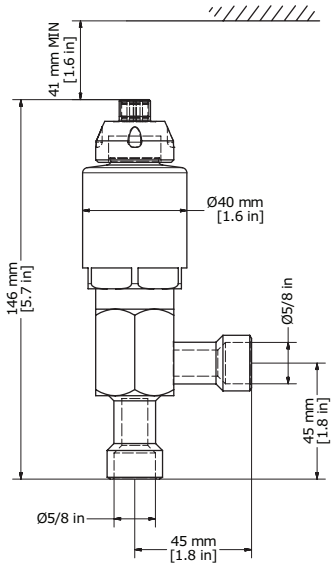
A gas bypass valve is typically used to regulate the intermediate pressure in a transcritical CO_2 refrigeration system, in order to keep the intermediate pressure low. By venting flash gas generated through a gas bypass valve to the suction side of the compressor after the transcritcal expansion, the pressure can be kept at a safe level for all components situated in the liquid lines of a transcritical CO_2 system . The two phase mixture from the CCMT valve has to be separated before gas enters the gas bypass. For use in the gas bypass applicaton the Danfoss AK controllers are recommended.

Coolselector®2

is a Danfoss calculation and selection software, designed to make selection processes for all refrigeration projects easier and less time consuming. It is strongly recommended to use **Coolselector®2** to find the correct valve for the application.

For fast and precise selection of valve, use Danfoss' CoolSelector2® software.
You can download it from http://coolselector.danfoss.com

Steel connections



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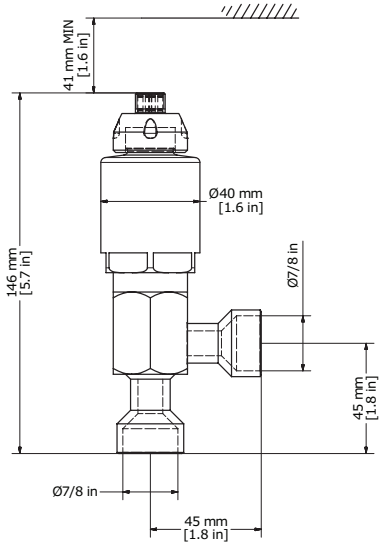

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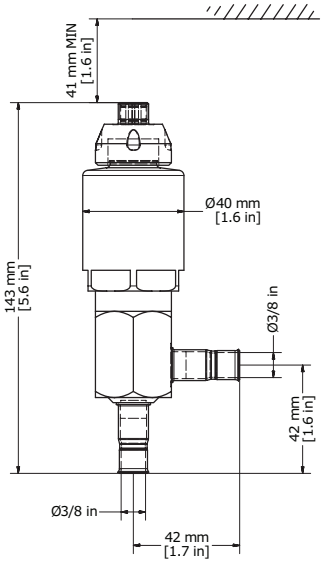
Bi-metal connections



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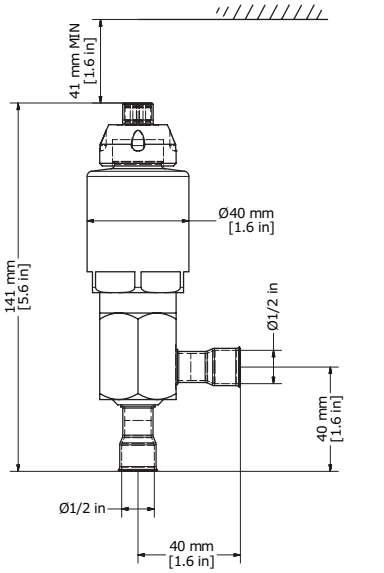

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For further information please contact your local Danfoss sales office.