Product Guide 2015

For Propane Applications

EMERSON
Climate Technologies

Preface

This catalogue contains two sections. The first section is related to products which are intended to be applied in systems located in an environment according to ATEX definition (Zone 2). These products are manufactured under consideration of appropriate standards and directives.

The second section is only related to products intended to be used in systems with R290 refrigerant but having appropriate solution in order to prevent explosion risk at any time (non-risk zone).

The definition of “non-risk zone” is related to the environment of the installed device and no special product requirement is needed except material compatibility of part in contact with refrigerant.

These products are not ATEX certified may under no circumstance be used within areas with explosive or flammable atmosphere and that the owner, designer and installer are responsible to ensure strict compliance with related regulation and avoid any such risk.

Products in section 1: **Page 03 – 44**
Products are intended for use in systems located in an environment according definition of ATEX (Zone 2)

Products in section 2: **Page 45 – 52**
Products are intended for use in non explosive environment (Products do not comply with ATEX requirements)

General Information

Technical data provided herein is collected with scrutiny. However, errors and misprinting remain reserved. The technical data is presented for informational purposes only and they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described or their use or applicability.

Technical data may be updated; should you require confirmation with respect to a specific value, please contact Emerson Climate Technologies GmbH and clearly state the information you require.

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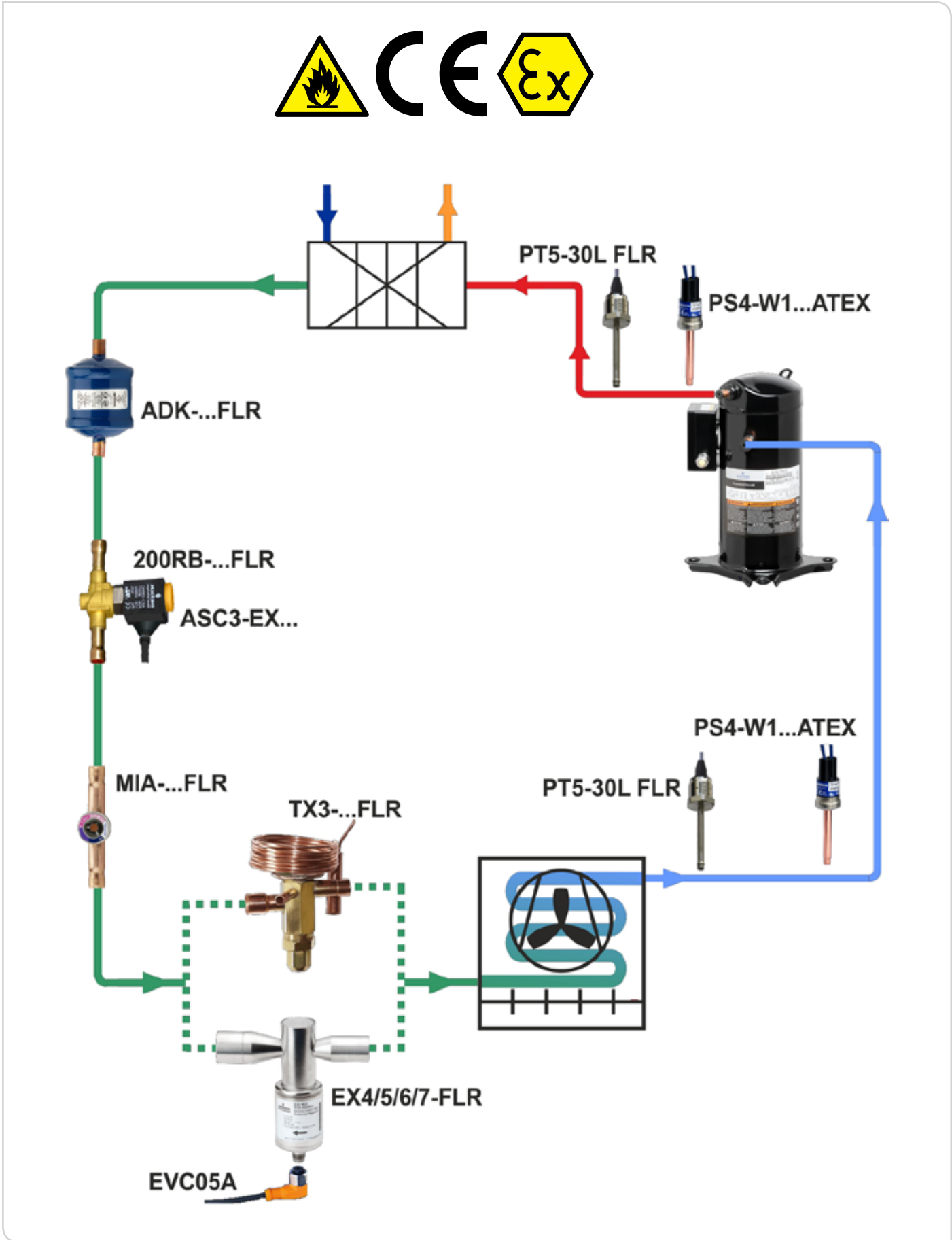
Emerson does not assume responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use and maintenance of any product remains solely with the purchaser and end-user.

The information given herein is based on data and tests which Emerson Climate Technologies GmbH believes to be reliable. Such information is intended for use by individuals having the appropriate technical knowledge and skills, at their own discretion and risk. Our products are designed and adapted for stationary application. When using our products in mobile applications, our products might fail. The suitability for such mobile applications has to be assured by the plant manufacturer; for this purpose appropriate tests might be necessary.

Products for use in Zone 2 according to ATEX definition



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1 Products for use in Zone 2 according to ATEX definition

Introduction

Many end-users, equipment and compressor manufacturers are investigating ways to minimize their impact on the environment. Improving system architectures, using a refrigerant with lower global warming potential (GWP) can significantly improve the carbon footprint of an installation. R290 is one of the most-discussed refrigerants which has long been known for its good performance as refrigerant but is flammable and consequently brings about strict considerations for system manufacturers in terms of system design and operation. The specified listed products in this section have been released for use in systems using R290 as a refrigerant by considering information related to each product as follows:

Product family	Product type	Pages
Scroll Compressor	ZH	8 - 9
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Electronic Expansion Valves	EX4-7…-FLR	12 - 14 & 15 - 17
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Coils	ASC3-EX24VAC	29
	ASC3-EX230VAC	
Pressure Transmitters	PT5-30L-FLR	30 - 32
Pressure Switches	PS4-W1 808301 0.6/1.8 bar	33 - 35
	PS4-W1 808300 20/26 bar	
Filter Driers	ADK-03.../-05.../-08…/-16.../-30.../-41.../-75…-FLR	36 - 39
Moisture Indicator / Sight Glass	MIA...-FLR	40 - 43

a. Important Considerations

- The products are intended to be sold in EU and EFTA countries where European directives and standards are in place and considered. Other countries may require additional approval of local authorities/ regulations.
- Documentation is in English language. System manufacturers shall consider this fact. If the transmission of information in local language as per requirement of ATEX directive is needed, system manufacturer is to take care of proper translation.
- The operating instructions results from risk assessment and it must be taken into account during design and manufacturing of system.
- Using inaccurate design operating conditions for selection of products might lead to wrong selection/ results. In this case, the selected products might be oversized or undersized and consequently lead to improper operation of the device in the system.
- Only specified products in this document have been intended for use with R290.
- It is advisable to share the related information with own consultant or notify body in order to make sure the applicability of products for any specific system under consideration of hazardous zone where system supposed to be operated.

b. ATEX Zone 2 Definition

Location of equipment	Category	Explosive atmospheres	Explosive gas	Zone
Group II: Intended for use in other places	3	Unlikely	Gas	2

c. Device Classification

- Non-electrical operating device without potential of electrostatic charge:
  - Thermo expansion valves, sight glasses, solenoid valves body (without coil), filter driers
- Electrical operating device contains a housing with sufficient protection design/construction:
  - Compressor, pressure transmitters, coils of solenoid valves and electronic expansion valves
- Electrical operating device with maximum permitted electrical operating supply voltage/current:
  - Pressure switches and electronic expansion valves

d. European Directives and Standard

The following directives and standards have been considered for compliance of products in this document:

- PED (Pressure Equipment Directive)
- ATEX 94/9/EC (Equipment and protective systems intended for use in potentially explosive atmospheres Directive)
- LVD cannot be used when ATEX is used
- EMC (Electromagnetic Compatibility Directive)
- Guidelines on the application of Directive ATEX 94/9/EC
- EN60335 (Safety of Household and similar electrical appliance, Part 1 & 40)
- EN60079 (Explosive atmospheres, Part 1, 10-1, 11, 14, 15 and 18)
- EN378 (Refrigerating systems and heat pumps - Safety and environmental requirements)
- EN12284 (Refrigeration systems and heat pumps. Valves: Requirements, testing and marking)
- EN12178 (Refrigeration systems and heat pumps. Liquid level indicating devices: Requirements, testing and marking)
- EN14276-1 (Refrigeration systems and heat pumps. Vessels: Requirements, testing and marking)
- EN12263 (Refrigeration systems and heat pumps. Safety switching devices for limiting pressure: Requirements, testing and marking)
- EN16084 (Refrigeration systems and heat pumps.
- Qualification of tightness of components and joints)

e. Compliance and Marking

<table>
<tr><th rowspan="2">Product type</th><th colspan="3">Directive</th><th rowspan="2">Marking</th></tr>
<tr><th>PED</th><th>EMC</th><th>ATEX</th></tr>
<tr><td>Thermo™ Expansion Valve : TX3-…-FLR</td><td rowspan="10">Out of scope</td><td rowspan="4">Out of scope</td><td rowspan="4">Out of scope</td><td></td></tr>
<tr><td>Filter Drier : ADK-…-FLR</td><td></td></tr>
<tr><td>Sight Glass : MIA-…-FLR</td><td></td></tr>
<tr><td>Solenoid Valve : 200RB-…-FLR</td><td></td></tr>
<tr><td>Solenoid Valve Coil : ASC3-EX-24VAC</td><td rowspan="2">Out of scope</td><td rowspan="9">Applicable</td><td></td></tr>
<tr><td>Solenoid Valve Coil : ASC3-EX-230VAV</td><td></td></tr>
<tr><td>Pressure Transmitter : PT5-…-FLR</td><td>Applicable</td><td></td></tr>
<tr><td>Electronic Expansion valve : EX4-7...FLR</td><td>Out of scope</td><td></td></tr>
<tr><td>Electrical plug and cable assembly : EVC05A</td><td rowspan="2">Out of scope</td><td></td></tr>
<tr><td>Safety Pressure Switch : PS4-…ATEX</td><td>Applicable</td><td>Applicable</td><td></td></tr>
</table>

ZH Copeland Scroll™ for R290 (Propane)

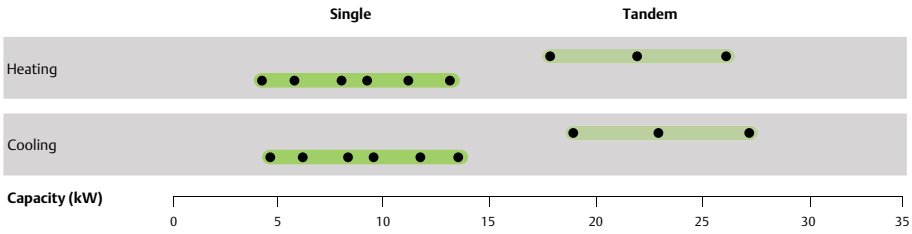
Propane (R290) is a flammable natural refrigerant which has long been known for its good performances. It has zero ozone depletion potential, negligible global warming potential, as well as excellent thermodynamic properties. R290 systems require in average half the charge of hydrofluorocarbons (HFCs). These features make R290 suitable for upcoming F-gas regulations. Emerson is launching a full line-up of propane Copeland Scroll compressors designed for chillers and heat pump applications. This line-up meets Emerson reliability standards and is classified ATEX Group II.

ZH Copeland Scroll™ for R290

Features and Benefits

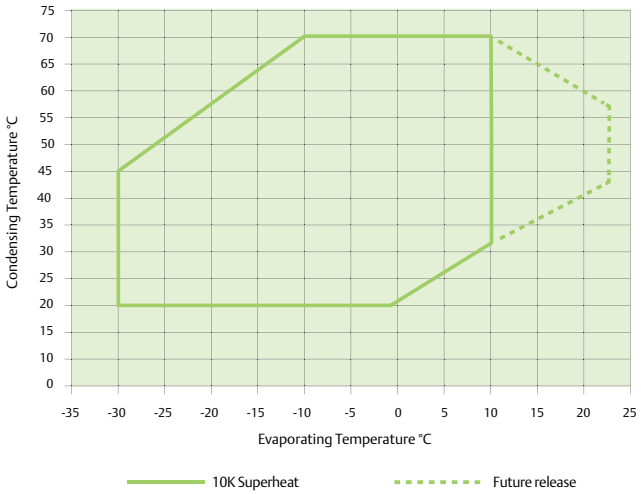
- Axial and radial compliance
- Dedicated oil for propane
- ATEX compliance
- IP65 (IEC 60529)
- No sight-glass, no Schrader valve
- Hermetic compressor
- Wide operating envelope

R290 Scroll Compressor Line-Up *



* Propane Variable Speed compressors in development
Conditions Heating : Evaporating -7°C, Condensing 50°C, Superheat 10K, Subcooling 4K
Conditions Cooling : Evaporating 5°C, Condensing 50°C, Superheat 10K, Subcooling 0K

Operating Envelope R290



ATEX Compressor Classification

Ex	ATEX Protection against explosion
II	Group II gas atmosphere other than mines susceptible to fire damp
3	Category 3 - Equipment that is intended for use in areas where explosive atmospheres are unlikely to occur in normal operation and if they do occur, are likely to do so infrequently and for a short period only. It must ensure a normal/suitable level of protection for normal operation
G	G - Gas: Explosive atmospheres caused by mixtures of air and gases, vapors, mists
Ex nA	Ex nA - Non Sparking. Protection for Category 3G devices according to EN 60079-15. Suitable for use in Zone 2
IIA	Electrical equipment of Group II is subdivided according to the nature of explosive gas atmosphere for which it is intented. A typical Group IIA gas is propane
T2	T2 - Temperature Classification by maximum permissible surface temperature: 300°C

Technical Overview

Model		Displacement (m^3/h)	Heating capacity (kW)*	COP	Sound pressure @1 m (dBA)**	Length / Width / Height (mm)	Net weight (kg)	Availability
1 Ph	3 Ph							
ZH04KCU-PFZN	ZH04KCU-TFMN	5.8	4.4	3.2	60	243 / 242 / 364	23	End of 2014
ZH06KCU-PFZN	ZH06KCU-TFMN	8.0	6.2	3.2	61	243 / 242 / 406	27	
ZH08KCU-PFZN	ZH08KCU-TFMN	10.0	7.7	3.3	64	243 / 242 / 419	28	
ZH09KCU-PFZN	ZH09KCU-TFMN	11.7	9.0	3.2	62	247 / 241 / 438	38	Available
ZH11KCU-PFZN	ZH11KCU-TFMN	14.4	10.9	3.3	63	247 / 241 / 438	38	
-	ZH13KCU-TFMN	17.1	13.0	3.3	64	250 / 246 / 450	40	

* Conditions Evaporating -7°C, Condensing 50°C, Superheat 10K, Subcooling 4K
** @ 1m: sound pressure level at 1m distance from the compressor, free field condition

Capacity Data

Condensing temperature °C	R290 Heating Capacity in kW Evaporating temperature °C								R290	Compressor model
	10	5	0	-5	-10	-15	-20	-25	-30	
70	6.1	5.4	4.7	4.2	3.7	0.0	0.0	0.0	0.0	ZH04KCU-TFMN
	8.4	7.4	6.5	5.7	5.1	0.0	0.0	0.0	0.0	ZH06KCU-TFMN
	10.5	9.2	8.1	7.2	6.4	0.0	0.0	0.0	0.0	ZH08KCU-TFMN
	12.2	10.7	9.4	8.3	7.3	0.0	0.0	0.0	0.0	ZH09KCU-TFMN
	15.1	13.3	11.7	10.3	9.1	0.0	0.0	0.0	0.0	ZH11KCU-TFMN
	17.6	15.5	13.7	12.1	10.8	0.0	0.0	0.0	0.0	ZH13KCU-TFMN
65	6.4	5.6	4.9	4.3	3.8	0.0	0.0	0.0	0.0	ZH04KCU-TFMN
	8.7	7.6	6.7	5.9	5.2	0.0	0.0	0.0	0.0	ZH06KCU-TFMN
	10.9	9.5	8.3	7.3	6.4	0.0	0.0	0.0	0.0	ZH08KCU-TFMN
	12.7	11.1	9.7	8.5	7.5	0.0	0.0	0.0	0.0	ZH09KCU-TFMN
	15.7	13.7	12.0	10.6	9.3	0.0	0.0	0.0	0.0	ZH11KCU-TFMN
	18.2	16.0	14.1	12.4	10.9	0.0	0.0	0.0	0.0	ZH13KCU-TFMN
60	6.6	5.8	5.1	4.4	3.8	3.3	0.0	0.0	0.0	ZH04KCU-TFMN
	9.0	7.9	6.9	6.0	5.2	4.6	0.0	0.0	0.0	ZH06KCU-TFMN
	11.3	9.8	8.6	7.5	6.6	5.8	0.0	0.0	0.0	ZH08KCU-TFMN
	13.2	11.5	10.0	8.7	7.6	6.7	0.0	0.0	0.0	ZH09KCU-TFMN
	16.2	14.2	12.4	10.8	9.5	8.3	0.0	0.0	0.0	ZH11KCU-TFMN
	18.9	16.5	14.5	12.7	11.1	9.7	0.0	0.0	0.0	ZH13KCU-TFMN
55	6.9	6.0	5.2	4.5	3.9	3.4	2.9	0.0	0.0	ZH04KCU-TFMN
	9.4	8.2	7.1	6.2	5.4	4.7	4.0	0.0	0.0	ZH06KCU-TFMN
	11.7	10.2	8.9	7.7	6.7	5.8	5.1	0.0	0.0	ZH08KCU-TFMN
	13.7	11.9	10.3	9.0	7.8	6.8	5.9	0.0	0.0	ZH09KCU-TFMN
	16.8	14.7	12.8	11.1	9.7	8.4	7.3	0.0	0.0	ZH11KCU-TFMN
	19.5	17.1	14.9	13.0	11.3	9.9	8.6	0.0	0.0	ZH13KCU-TFMN
50	7.1	6.2	5.4	4.6	4.0	3.5	3.0	2.5	0.0	ZH04KCU-TFMN
	9.7	8.5	7.3	6.3	5.5	4.7	4.1	3.5	0.0	ZH06KCU-TFMN
	12.1	10.5	9.1	7.9	6.9	5.9	5.1	4.4	0.0	ZH08KCU-TFMN
	14.2	12.3	10.7	9.2	8.0	6.9	5.9	5.1	0.0	ZH09KCU-TFMN
	17.4	15.2	13.2	11.4	9.9	8.6	7.4	6.4	0.0	ZH11KCU-TFMN
	20.2	17.6	15.3	13.3	11.6	10.0	8.7	7.5	0.0	ZH13KCU-TFMN
45	7.4	6.4	5.5	4.8	4.1	3.5	3.0	2.6	2.1	ZH04KCU-TFMN
	10.1	8.7	7.6	6.5	5.6	4.8	4.1	3.5	3.0	ZH06KCU-TFMN
	12.5	10.9	9.4	8.1	7.0	6.0	5.2	4.5	3.8	ZH08KCU-TFMN
	14.7	12.7	11.0	9.5	8.2	7.0	6.0	5.2	4.4	ZH09KCU-TFMN
	18.0	15.7	13.6	11.7	10.1	8.7	7.5	6.4	5.5	ZH11KCU-TFMN
	20.8	18.1	15.7	13.6	11.8	10.2	8.8	7.6	6.5	ZH13KCU-TFMN
40	7.6	6.6	5.7	4.9	4.2	3.6	3.0	2.6	2.2	ZH04KCU-TFMN
	10.4	9.0	7.8	6.7	5.7	4.9	4.2	3.6	3.0	ZH06KCU-TFMN
	12.9	11.2	9.7	8.3	7.2	6.2	5.3	4.5	3.9	ZH08KCU-TFMN
	15.2	13.1	11.3	9.7	8.4	7.2	6.1	5.2	4.5	ZH09KCU-TFMN
	18.6	16.1	13.9	12.0	10.3	8.9	7.6	6.5	5.5	ZH11KCU-TFMN
	21.5	18.6	16.2	14.0	12.1	10.4	8.9	7.6	6.5	ZH13KCU-TFMN
35	7.9	6.8	5.8	5.0	4.3	3.6	3.1	2.6	2.2	ZH04KCU-TFMN
	10.8	9.3	8.0	6.9	5.9	5.0	4.3	3.6	3.1	ZH06KCU-TFMN
	13.3	11.5	9.9	8.6	7.3	6.3	5.4	4.6	3.9	ZH08KCU-TFMN
	15.7	13.6	11.7	10.0	8.6	7.3	6.2	5.3	4.5	ZH09KCU-TFMN
	19.2	16.6	14.3	12.3	10.6	9.0	7.7	6.6	5.6	ZH11KCU-TFMN
	22.1	19.2	16.6	14.3	12.3	10.6	9.0	7.7	6.6	ZH13KCU-TFMN
30	0.0	7.0	6.0	5.1	4.4	3.7	3.1	2.7	2.2	ZH04KCU-TFMN
	0.0	9.6	8.2	7.1	6.0	5.1	4.3	3.7	3.1	ZH06KCU-TFMN
	0.0	11.8	10.2	8.8	7.5	6.4	5.5	4.6	3.9	ZH08KCU-TFMN
	0.0	14.0	12.0	10.3	8.8	7.5	6.3	5.4	4.5	ZH09KCU-TFMN
	0.0	17.1	14.7	12.6	10.8	9.2	7.8	6.7	5.6	ZH11KCU-TFMN
	0.0	19.6	17.0	14.6	12.5	10.7	9.2	7.8	6.6	ZH13KCU-TFMN
25	0.0	0.0	6.2	5.3	4.5	3.8	3.2	2.7	2.3	ZH04KCU-TFMN
	0.0	0.0	8.5	7.2	6.2	5.2	4.4	3.7	3.2	ZH06KCU-TFMN
	0.0	0.0	10.4	9.0	7.7	6.5	5.5	4.7	4.0	ZH08KCU-TFMN
	0.0	0.0	12.3	10.5	9.0	7.6	6.4	5.4	4.6	ZH09KCU-TFMN
	0.0	0.0	15.1	12.9	11.0	9.4	8.0	6.8	5.7	ZH11KCU-TFMN
	0.0	0.0	17.3	14.9	12.8	10.9	9.3	7.9	6.7	ZH13KCU-TFMN
20	0.0	0.0	0.0	5.4	4.6	3.9	3.3	2.8	2.3	ZH04KCU-TFMN
	0.0	0.0	0.0	7.4	6.3	5.3	4.5	3.8	3.2	ZH06KCU-TFMN
	0.0	0.0	0.0	9.1	7.8	6.6	5.6	4.8	4.0	ZH08KCU-TFMN
	0.0	0.0	0.0	10.8	9.2	7.8	6.5	5.5	4.7	ZH09KCU-TFMN
	0.0	0.0	0.0	13.2	11.3	9.6	8.1	6.9	5.8	ZH11KCU-TFMN
	0.0	0.0	0.0	15.2	13.0	11.1	9.4	8.0	6.8	ZH13KCU-TFMN

ZB Copeland Scroll™ for R290 (Propane)

Emerson Climate Technologies is offering a full range of propane Copeland Scroll compressors. The new ZB*KCU Copeland Scroll compressor range with R290 is the ideal choice for self-contained medium-temperature applications. These compressors are also suitable for refrigeration chiller and small cascade systems. The complete compressor range of propane scrolls meets Emerson´s reliability standards and is **ATEX Group** II classified.

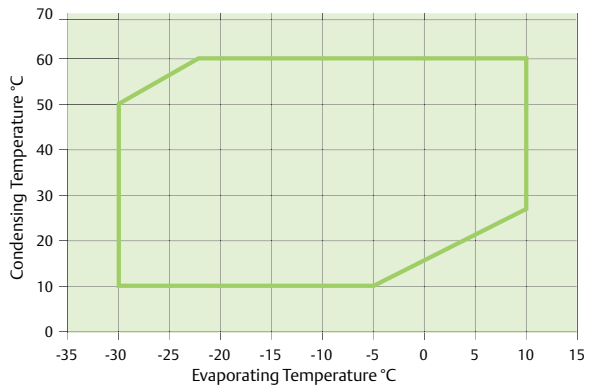
Propane (R290) is a flammable natural refrigerant which has long been known for its good performance. It has zero ozone depletion potential, negligible global warming potential (GWP), as well as excellent thermodynamic properties. R290 systems require in average half the charge of hydro-fluorocarbons (HFCs). These features make R290 suitable for the upcoming F-gas regulations.

ZB Copeland Scroll™ for R290

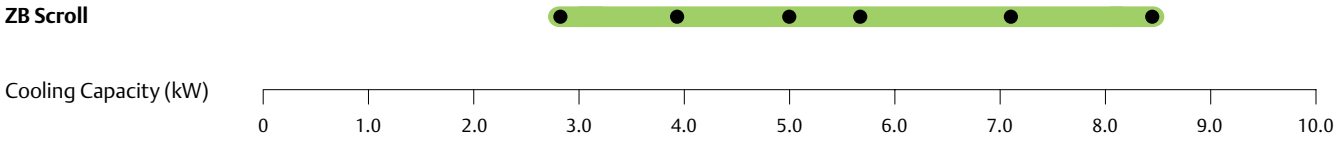
Features and Benefits

- ATEX compliance
- IP65 (IEC 60529) Terminal Box
- Fully hermetic design, no sight-glass, no Schrader valve
- Wide operating envelope
- Dedicated oil for propane
- Ideal for self-contained medium-temperature display cases
- Suitable for refrigeration chiller and small cascade systems
- Light weight, compactness and high efficiency
- Axial and radial compliance
- II 3G Ex nA IIA T2

Operating Envelope R290



ZB*KCU Compressor Range



EN12900 Evaporating -10C, Condensing 45C, Superheat 10K, Subcooling 0K

Technical Overview

MODEL	Nominal (hp)	Displacement (m3/h)	Cooling Capacity (kW)	Stub suction (inch)	Stub discharge (inch)	Oil quantity (l)	Length / Width / Height (mm)	Net weight (kg)	Motor version / code	Maximum operating current (A)	Locked rotor current (A)	Sound pressure @1 m (dBA) ***
									3 Ph**	3 Ph**	3 Ph**	
ZB12KCU	2.0	5.8	2.8	3/4	1/2	1.3	243/243/364	25.9	TFM	4.1	26	60
ZB17KCU	2.5	8.0	3.9	3/4	1/2	1.5	243/242/387	27.2	TFM	5.2	32	61
ZB20KCU	3.5	10.0	5.0	3/4	1/2	1.5	243/242/400	28.1	TFM	6.8	46	62
ZB25KCU	4.0	11.7	5.7	3/4	1/2	1.9	247/241/451	39.5	TFM	8.2	64	63
ZB31KCU	5.0	14.4	7.1	3/4	1/2	1.9	247/241/451	37.3	TFM	10.1	64	64
ZB37KCU	6.0	17.1	8.4	3/4	1/2	1.9	250/246/438	39.5	TFM	11.8	74	64
ZB49KCU	8.0	21.4	10.4	1 1/4	1 1/4	1.9	246/256/442	39.5	TFM	15.9	102	68

Capacity Data

Condensing temperature °C	R290	Heating capacity in kW Evaporating temperature °C							R290	Compressor model
	10	5	0	-5	-10	-15	-20	-25	-30	
70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB12KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB17KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB20KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB25KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB31KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB37KCU-TFMN
65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB12KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB17KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB20KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB25KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB31KCU-TFMN
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	ZB37KCU-TFMN
60	4.8	4.0	3.3	2.8	2.3	1.8	1.5	0.0	0.0	ZB12KCU-TFMN
	6.5	5.5	4.5	3.7	3.1	2.5	2.0	0.0	0.0	ZB17KCU-TFMN
	8.2	6.8	5.7	4.7	3.8	3.0	2.4	0.0	0.0	ZB20KCU-TFMN
	9.6	8.1	6.7	5.5	4.5	3.7	0.0	0.0	0.0	ZB25KCU-TFMN
	11.8	9.9	8.2	6.8	5.6	4.5	0.0	0.0	0.0	ZB31KCU-TFMN
	13.8	11.6	9.7	8.0	6.6	5.3	0.0	0.0	0.0	ZB37KCU-TFMN
55	5.1	4.3	3.6	3.0	2.5	2.0	1.6	1.2	0.0	ZB12KCU-TFMN
	7.0	5.9	4.9	4.1	3.3	2.7	2.2	1.7	0.0	ZB17KCU-TFMN
	8.8	7.4	6.2	5.1	4.1	3.3	2.6	2.0	0.0	ZB20KCU-TFMN
	10.4	8.7	7.3	6.0	4.9	4.0	3.2	0.0	0.0	ZB25KCU-TFMN
	12.7	10.7	8.9	7.4	6.0	4.9	3.9	0.0	0.0	ZB31KCU-TFMN
	14.8	12.5	10.5	8.7	7.1	5.8	4.7	0.0	0.0	ZB37KCU-TFMN
50	5.5	4.6	3.9	3.2	2.6	2.1	1.7	1.3	1.0	ZB12KCU-TFMN
	7.5	6.3	5.3	4.4	3.6	2.9	2.4	1.9	1.5	ZB17KCU-TFMN
	9.4	8.0	6.6	5.5	4.5	3.6	2.9	2.2	1.7	ZB20KCU-TFMN
	11.1	9.3	7.8	6.4	5.3	4.3	3.4	2.7	0.0	ZB25KCU-TFMN
	13.6	11.4	9.6	7.9	6.5	5.3	4.2	3.3	0.0	ZB31KCU-TFMN
	15.8	13.4	11.2	9.3	7.7	6.3	5.1	4.0	0.0	ZB37KCU-TFMN
45	5.8	4.9	4.1	3.4	2.8	2.3	1.8	1.5	1.1	ZB12KCU-TFMN
	8.0	6.7	5.6	4.7	3.9	3.1	2.5	2.0	1.6	ZB17KCU-TFMN
	10.1	8.5	7.1	5.9	4.8	3.9	3.1	2.5	1.9	ZB20KCU-TFMN
	11.8	9.9	8.3	6.9	5.7	4.6	3.7	2.9	2.3	ZB25KCU-TFMN
	14.4	12.2	10.2	8.5	7.0	5.7	4.6	3.6	2.8	ZB31KCU-TFMN
	16.7	14.2	12.0	10.0	8.3	6.8	5.5	4.3	3.4	ZB37KCU-TFMN
40	6.2	5.2	4.4	3.6	3.0	2.4	2.0	1.6	1.2	ZB12KCU-TFMN
	8.5	7.2	6.0	5.0	4.1	3.4	2.7	2.2	1.7	ZB17KCU-TFMN
	10.6	9.0	7.5	6.3	5.2	4.2	3.4	2.7	2.0	ZB20KCU-TFMN
	12.5	10.5	8.8	7.3	6.0	4.9	3.9	3.1	2.4	ZB25KCU-TFMN
	15.2	12.9	10.8	9.0	7.4	6.1	4.9	3.9	3.0	ZB31KCU-TFMN
	17.7	15.0	12.7	10.6	8.8	7.2	5.9	4.7	3.7	ZB37KCU-TFMN
35	6.5	5.5	4.6	3.9	3.2	2.6	2.1	1.7	1.3	ZB12KCU-TFMN
	8.9	7.6	6.3	5.3	4.4	3.6	2.9	2.3	1.8	ZB17KCU-TFMN
	11.2	9.5	8.0	6.6	5.5	4.5	3.6	2.9	2.2	ZB20KCU-TFMN
	13.2	11.1	9.3	7.8	6.4	5.2	4.2	3.3	2.6	ZB25KCU-TFMN
	16.0	13.6	11.4	9.5	7.9	6.4	5.2	4.2	3.2	ZB31KCU-TFMN
	18.5	15.8	13.3	11.2	9.3	7.6	6.2	5.0	3.9	ZB37KCU-TFMN
30	6.9	5.8	4.9	4.1	3.4	2.8	2.2	1.8	1.4	ZB12KCU-TFMN
	9.4	7.9	6.7	5.6	4.6	3.8	3.0	2.4	1.9	ZB17KCU-TFMN
	11.7	9.9	8.4	7.0	5.8	4.7	3.8	3.1	2.4	ZB20KCU-TFMN
	0.0	11.7	9.8	8.2	6.7	5.5	4.4	3.5	2.8	ZB25KCU-TFMN
	0.0	14.3	12.0	10.0	8.3	6.8	5.5	4.4	3.5	ZB31KCU-TFMN
	0.0	16.5	14.0	11.7	9.8	8.1	6.6	5.3	4.2	ZB37KCU-TFMN
25	0.0	6.1	5.1	4.3	3.6	2.9	2.4	1.9	1.5	ZB12KCU-TFMN
	0.0	8.3	7.0	5.8	4.8	3.9	3.2	2.6	2.0	ZB17KCU-TFMN
	0.0	10.4	8.7	7.3	6.1	5.0	4.0	3.2	2.6	ZB20KCU-TFMN
	0.0	0.0	10.3	8.6	7.1	5.8	4.7	3.7	2.9	ZB25KCU-TFMN
	0.0	0.0	12.6	10.5	8.7	7.2	5.8	4.7	3.7	ZB31KCU-TFMN
	0.0	0.0	14.6	12.2	10.2	8.4	6.9	5.6	4.5	ZB37KCU-TFMN
20	0.0	0.0	5.4	4.5	3.7	3.1	2.5	2.0	1.6	ZB12KCU-TFMN
	0.0	0.0	7.3	6.1	5.0	4.1	3.4	2.7	2.2	ZB17KCU-TFMN
	0.0	0.0	9.1	7.6	6.3	5.2	4.2	3.4	2.7	ZB20KCU-TFMN
	0.0	0.0	0.0	9.0	7.4	6.1	4.9	3.9	3.1	ZB25KCU-TFMN
	0.0	0.0	0.0	11.0	9.1	7.5	6.1	4.9	3.9	ZB31KCU-TFMN
	0.0	0.0	0.0	12.7	10.6	8.8	7.2	5.9	4.7	ZB37KCU-TFMN

Electronic Expansion Valves EX4-7-...FLR Versions and M12 Connector EVC05A

Emerson Climate Technologies' EX4-7-...FLR are stepper motor driven valves for precise control of refrigerant mass flow in air conditioning, refrigeration, heat pumps, close control, and industrial process cooling applications.

EX4-...FLR EX7-...FLR

EVC05A

Features

- Fully hermetic design
- Stepper motor driven
- Very fast full stroke time
- High resolution and excellent repeatability
- Bi-flow versions with positive shut-off in both flow directions
- Positive shut-off function to eliminate the use of an additional solenoid valve
- Linear flow capacity
- Extremely wide capacity range (10 ... 100%)
- Continuous modulation of mass flow
- Direct coupling of motor and valve for high reliability (no gear mechanism)
- Ceramic slide and port for accurate flow and minimal wear
- Corrosion resistant stainless steel body and connections
- Ex II 3G Ex nA IIA T3 Gc X
- The qualification /certification of EX4-7-...FLR is valid only in conjunction with EVC05A (M12 Connector)

Features EVC05A (ifm electronic GmbH)

- Vibration and shock resistance
- Protection: BVS 08 ATEX E 109 U
  IECEx BVS 08.0041 U
- Marking: Ex II 3G Ex nA IIC Gc
  Ex II 2D Ex tD IIIC Db IP65/ IP67

Cable and Connector Assembly

Type	Part no.	Length	Connector type to valve	Connector type to driver board or controller
EVC05A	800439	5 m	M12	Loose wires

Selection Table

Type	Part no.	Flow pattern	Nominal capacity range [kW]	Inlet connection	Outlet connection	Electrical connector
EX4-I21FLR	800430	Uni-flow	2...17	3/8" ODF	5/8" ODF	Special M12 plug
EX4-M21FLR	800431			10 mm ODF	16 mm ODF	
EX5-U21FLR	800432		5…51.6	5/8" (16 mm) ODF	7/8" (22 mm) ODF	
EX6-I21FLR	800433		12…124	7/8" ODF	1-1/8" ODF	
EX6-M21FLR	800434			22 mm ODF	28 mm ODF	
EX7-I21FLR	800440		30…340	1-1/8" ODF	1-1/8" ODF	
EX7-M21FLR	800441			28 mm ODF	28 mm ODF	
EX4-U31FLR	800435	Bi-flow (Heat pump)	2...17	5/8" (16 mm) ODF	5/8" (16 mm) ODF	
EX5-U31FLR	800436		5…51.6	7/8" (22 mm) ODF	7/8" (22 mm) ODF	
EX6-I31FLR	800437		1 …124	1-1/8" ODF	1-1/8" ODF	
EX6-M31FLR	800438			28 mm ODF	28 mm ODF	
EX7-I31FLR	800442		30…340	1-1/8" ODF	1-1/8" ODF	
EX7-M31FLR	800443			28 mm ODF	28 mm ODF	

Note: The valves are delivered without cable/connector assembly (order separately). Nominal capacity at +38°C liquid temperature, +4°C evaporating temperature and 1K subcooling. For other operating condition, see the next page.

Quick Selection (included1.5 bar pressure drop for liquid line components and distributor)

Condensing temperature °C	R290 Capacity in kW Evaporating temperature °C										R290	Valve type
	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	
75	17	17	16,9	16,6	16,4	16	15,6	15,2	14,8	14,3	13,8	EX4...FLR
	52	52	51	51	50	49	47	46	45	43	42	EX5...FLR
	124	124	123	121	119	117	114	111	108	104	100	EX6...FLR
	342	341	338	333	328	321	313	305	296	286	276	EX7...FLR
70	17,6	17,7	17,6	17,5	17,2	17	16,7	16,3	15,9	15,4	15	EX4...FLR
	54	54	53	53	52	52	51	49	48	47	45	EX5...FLR
	128	129	128	127	126	124	121	119	116	112	109	EX6...FLR
	353	354	352	350	345	340	334	326	318	309	300	EX7...FLR
65	17,9	18	18,1	18	17,9	17,7	17,4	17,1	16,7	16,4	15,9	EX4...FLR
	54	55	55	55	54	54	53	52	51	50	48	EX5...FLR
	130	131	132	131	130	129	127	125	122	119	116	EX6...FLR
	358	361	362	361	358	354	349	342	335	327	319	EX7...FLR
60	17,8	18,1	18,3	18,3	18,2	18,1	17,9	17,7	17,4	17	16,7	EX4...FLR
	54	55	55	56	55	55	54	54	53	52	51	EX5...FLR
	130	132	133	133	133	132	131	129	127	124	121	EX6...FLR
	357	363	366	366	365	363	359	354	348	341	334	EX7...FLR
55	17,5	17,9	18,2	18,3	18,4	18,3	18,2	18	17,8	17,5	17,2	EX4...FLR
	53	54	55	56	56	56	55	55	54	53	52	EX5...FLR
	127	130	132	134	134	134	133	131	130	128	125	EX6...FLR
	350	359	364	367	368	367	365	361	357	351	344	EX7...FLR
50	16,9	17,5	17,9	18,1	18,3	18,4	18,3	18,2	18	17,8	17,5	EX4...FLR
	51	53	54	55	56	56	56	55	55	54	53	EX5...FLR
	123	127	130	132	133	134	133	133	131	130	128	EX6...FLR
	338	350	358	363	367	368	367	365	361	356	351	EX7...FLR
45	15,9	16,7	17,3	17,7	18	18,2	18,2	18,2	18,1	17,9	17,7	EX4...FLR
	48	51	53	54	55	55	55	55	55	54	54	EX5...FLR
	116	122	126	129	131	132	133	132	132	130	129	EX6...FLR
	318	335	346	355	360	364	365	364	362	358	354	EX7...FLR
40	14,6	15,6	16,4	17	17,5	17,7	17,9	17,9	17,9	17,8	17,7	EX4...FLR
	44	47	50	52	53	54	54	54	54	54	54	EX5...FLR
	106	114	120	124	127	129	130	131	130	130	129	EX6...FLR
	292	313	329	341	350	355	358	359	359	357	353	EX7...FLR
35	12,8	14,2	15,3	16,1	16,7	17,1	17,4	17,5	17,6	17,6	17,5	EX4...FLR
	39	43	46	49	51	52	53	53	53	53	53	EX5...FLR
	93	104	111	117	122	125	127	128	128	128	127	EX6...FLR
	256	285	306	322	334	343	348	351	352	352	350	EX7...FLR
30	10,3	12,3	13,8	14,9	15,7	16,2	16,7	16,9	17,1	17,1	17,1	EX4...FLR
	31	37	42	45	48	49	51	51	52	52	52	EX5...FLR
	75	90	100	108	114	118	121	123	124	125	125	EX6...FLR
	206	247	276	298	314	325	333	339	342	343	343	EX7...FLR
20		5,3	8,7	10,7	12,1	13,1	13,8	14,3	14,7	14,9	15,1	EX4...FLR
		16	26	32	37	40	42	44	45	45	46	EX5...FLR
		39	63	78	88	95	101	104	107	109	110	EX6...FLR
		107	174	214	242	262	277	287	295	299	302	EX7...FLR

Select the valve type from tables for capacity value corresponding to system (evaporator) cooling capacity.

Electronic Expansion Valves EX4-7-...FLR Versions and M12 Connector EVC05A

Technical Data EX4-7-...FLR Valves

MOPD (maximum operating pressure differential)	30 bar
Max. working pressure, PS	35 bar
Max. system test pressure	38.5 bar
Ambient temperature Storage temperature	-20…+60°C -40…+70°C
Medium inlet temperature Bi-flow version: Uni-flow version:	 TS: -40…+80°C TS: -50…+100°C
Vibration for non-connected and fastened valve	4 g (0 to 1000 Hz, 1 octave /min.)
Material	stainless steel body and fittings
Marking	CE acc. to directive 94/9/EC Ex II 3G Ex nA IIA T3 Gc X

Protection accordance to IEC 529, DIN 40050	IP67 with M12 Connector EVC05A
Humidity	5 to 95% r.H.
Connections	ODF stainless steel fittings
Shock	20 g at 11 ms 80 g at 1 ms
Net weight (kg)	0.5 kg (EX4), 0.52 kg (EX5), 0.60 kg (EX6), 1.1 kg (EX7)
Package and delivery (individual)	without electrical connector
Accessories	M12 Connector EVC05A

Electrical Data EX4-7...-FLR Valves

Stepper motor type	Bi-polar, phase current by chopper control (constant current)
Electrical connection	4 pin terminal via plug
Nominal supply voltage to the valve U	24 VDC
Driver supply voltage range	18 … 36 VDC
Phase current, operating	EX4-6-…FLR: 500 mA EX7-…FLR: 750 mA
Holding current	EX4-6-…FLR: 100 mA EX7-…FLR: 250 mA

Step mode	2 phase full step, half step or microstep
Step angle	1.8° per step ±8%
Stepping rate	500 Hz
Total number of steps	EX4-6-...FLR: 750 full steps EX7-…FLR: 1600 full steps
Winding resistance per phase	EX4-6-…FLR: 13 Ohm ±10% EX7-…FLR: 8 Ohm ±10%
Full travel time	EX4-6-…FLR: 1.5 seconds EX7-…FLR: 3.2 seconds
Reference position	Mechanical stop at fully closed position

Technical Data EVC05A (ifm electronic GmbH)

Operating voltage	36 VDC in conjunction with EX4-7-…FLR
Current rating	800 mA in conjunction with EX4-7-…FLR
Design	angled
Ambient temperature	-20…+60°C
Protection	IP 67
Approval	BVS 08 ATEX E 109 U IECEx BVS 08.0041 U

Material body	housing: TPU orange; sealing: Viton
Material nut	Stainless steel 316L / 1.4404
Tightening torque for knurled nut	1.2...1.5 Nm
Weight	0.18 Kg
Connection	PUR cable / 5 m; 4 x 0.34 mm² (42 x Ø 0.1 mm); Ø 4.9 mm; halogen-free
Marking	Ex II 3G Ex nA IIC Gc Ex II 2D Ex tD IIIC Db IP65/IP67

General Information

EX4-7...-FLR are stepper motor driven valves for precise control of refrigerant mass flow, released for R290 in refrigeration, air conditioning, heat pumps, industrial cooling process and close control systems.

⚠ Warning

The qualification /certification of EX4-7-...FLR is valid only in conjunction with EVC05A (Plug & Cable assembly).

The listed products are electrical devices and are in compliance with EN60079-0/-15 and directive 94/9/EC therefore rated / marked as:

Ex II 3G Ex nA IIA T3 Gc X

⚠ Safety Instructions

- **Read operating instructions thoroughly. Failure to comply can result in device failure, system damage or personal injury.**
- **According to EN 13313 it is intended for use by persons having the appropriate knowledge and skill.**
- **R290 requires special handling and care due to its flammability. Good ventilation is required during service of the system. Contact with rapidly expanding gases can cause frostbite and eye damage. Proper protective equipment (gloves, eye protection, etc.) has to be used.**
- **In a severely contaminated system, avoid breathing acid vapors and avoid contact with skin from contaminated refrigerant / lubricants. Failure to do so could result in injury.**
- **Ensure that the system is correctly labeled with applied refrigerant type and a warning for explosion risk.**
- **Before opening any system make sure pressure in system is brought to and remains at atmospheric pressure.**
- **Do not release any refrigerant into the atmosphere!**
- **Ensure that the system piping is grounded.**
- **Do not exceed the specified maximum ratings for pressure, temperature, voltage and current.**
- **Do not operate valve connected directly to supply voltage. Use suitable stepper motor driver.**
- **Do not operate system before all cable connections are completed.**
- **Do not operate the valve when the compressor is not running.**
- **Do not operate the valve when system is under vacuum except for closure of valve before refrigerant charging.**
- **Before installation or service disconnect all voltages from system and device.**
- **Do not use any other fluid media without prior approval of Emerson.**
- **Ensure that design, installation and operation are according to European and national standards/ regulations.**

Mounting Location

- The motor needs to be pointed downward or sideways (Fig. 1).
- For best result, locate the valve as close as possible to the distributor or inlet of evaporator.

Installation

- Direction of refrigerant flow must match with arrow on the label (except bi-flow valves).
- Check for sufficient refrigerant charge/subcooling and make sure no flash gas is present at the inlet of valve before attempting to check valve operation.
- Install an Emerson sight glass MIA...-FLR and an ADK....-FLR filter before the valve.

⚠ Warning

- **All valves are delivered at half open. Do not charge system before closure of valve. See operating instructions of used driver/controller.**
- **The interior parts of valve must be protected against moisture and water at any time. It is not permitted to use water, steam or any other solvent to the inside of valve for cleaning purpose.**

Recommended external pipe connection:

Nominal pipe connection	Outside diameter	
	Min. (mm)	Max. (mm)
3/8“	9.47	9.55
5/8” / 16 mm	15.80	16.05
7/8” / 22 mm	21.95	22.25
1-1/8”	28.50	28.63
10 mm	9.95	10.05
28 mm	27.95	28.05

Brazing (Fig. 2)

- Perform and consider the brazing joint as per EN 14324.
- Before and after brazing clean tubing and brazing joints.
- Minimize vibrations in the piping lines by appropriate solutions.
- **Do not exceed the max. body temperature of 120 °C!**
- Use flux and silver rod having a minimum of 30% silver.

Pressure Test

- After completion of installation, a pressure test must be carried out according to EN 378 for systems which must comply with European pressure equipment directive 97/23/EC.
- Max. system test pressure: 38.5 bar

⚠ Warning

- **Failure to do so could result in loss of refrigerant and personal injury.**
- **The pressure test must be conducted by skilled persons with due respect regarding the danger related to pressure.**

Tightness Test

- Conduct a tightness test according to EN 378-2 with appropriate equipment and method to identify leakages of external joints. The allowable leakage rate must be according system manufacturer's specification.

Electrical Connection:

⚠ Warning

- **Entire electrical connections have to comply with local regulations.**
- **Improper wiring will result wrong direction of rotation, no rotation of stepper motor or controller malfunction.**

Wiring / Mounting of Plug: (Fig. 4-6)

- 2 = White, 4 = Black, 3 = Blue, 1= Brown
- Use only ATEX approved prewired M12 Connector assembly EVC05A for connection to the valve.
- **See also EVC05A operating instructions for plug mounting and required protection.**
- There is no specific requirement for positioning of plug on pins (see Fig. 5).
- **Ensure that the cables are mounted without tension; always leave the cable a bit loose.**
- **Ensure that cables are not mounted near sharp edges.**
- **Do not bend or mechanically stress the cable outlet, maintain a clearance of 20 mm to neighboring parts.**
- **During operation the connector EVC05A must be protected by an appropriate housing against external mechanical damage or shock (min. required protection up to a mechanical action of 7 J - in accordance with EN60079-0).**
- **Cable end of EVC05A must be connected to a driver/ controller which is ATEX approved or located out of hazard zone.**
  - **If driver/controller is located out of hazard zone, appropriate ATEX approved cable gland shall be used in boundary of hazard zone and out of hazard zone.**
  - **If the cable needs to be extended in hazard zone, it is mandatory to use ATEX approved type coupling or junction box.**
- **Supply voltage to the valve shall never exceed 36 VDC at any time.**

Wiring / Mounting to Driver / Controller

- See the wiring diagram of used driver or controller.

⚠ Operation

- See operating instructions of used electronic driver/ controller.
- **Perform a functional test of electrical circuit before charging the system with refrigerant.**

⚠ Service / Maintenance

- Defective EX4-7-...FLR valves must be replaced, they cannot be repaired.
- **Disconnect electrical power to driver/controller before service.**
- **Before any debrazing ensure that the flammable refrigerant is pumped out of the system and the room around the system is well vented so no refrigerant left.**
- For motor check:
  - Remove cable plug from valve under no voltage.
  - Use an Ohm meter with suitable range.
  - Measure windings resistance per phase at opposite placed pins acc. Fig. 6 and data as in the table below.
- **The lowest pressure inside system must be at least 0.4 bar higher than ambient pressure at any time. Failure to do so could accumulate air inside the system and create an explosive mixture over time.**

Technical Data

Type	EX4-6-…FLR	EX7-…FLR
Max. allowable working pressure PS	35 bar	
Operating temp. at motor	Uni-flow versions:–50°C…+100°C Bi-flow versions: -40°C…+80°C	
Connection	see Fig. 3	
Refrigerant: R290	✓	✓
Nominal Supply Voltage to the valve U	24 VDC	24 VDC
Max. Current Imax	0.5 A	0.75 A
Winding resistance per phase	13 Ω ± 10%	8 Ω ± 10%
CE Marking acc. to directive 94/9/E	Yes	Yes

Fig. 1

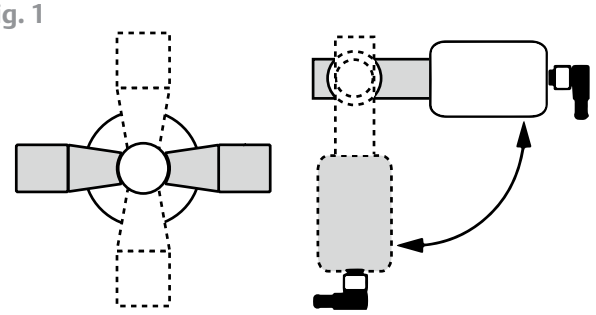


Fig. 2

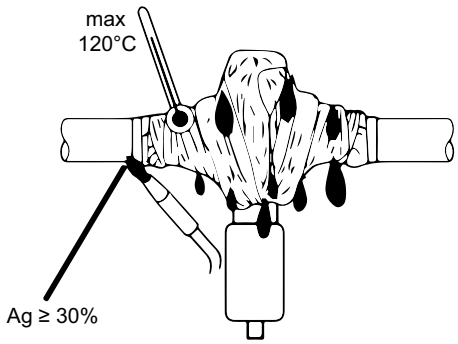


Fig. 3

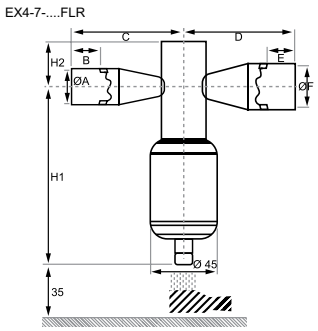


Fig. 4

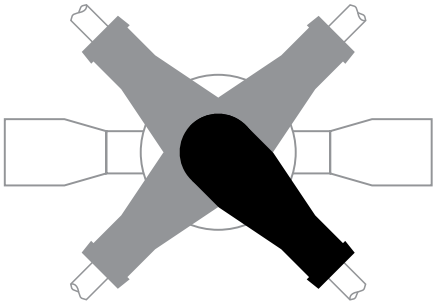


Fig. 5

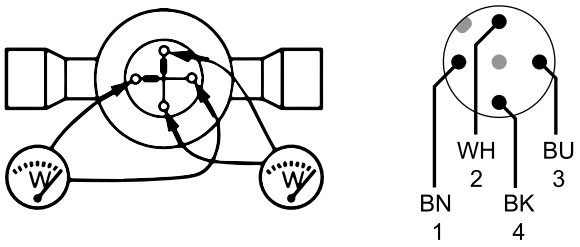
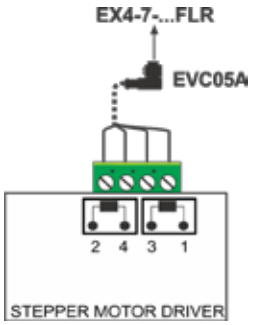


Fig. 6



EXV	Flow pattern	Part. no.	Ø A x Ø F(ODF)	B	C	D	E	H1	H2
EX4-I21FLR	Uni-flow	800430	3/8" x 5/8"	8	45	55	11	113	25
EX4-M21FLR		800431	10 x 16 mm	8	45	55	11	113	25
EX5-U21FLR		800432	5/8" x 7/8" (16 x 22 mm)	11	55	65	16	113	25
EX6-I21FLR		800433	7/8" x 1-1/8"	16	65	75	19	113	25
EX6-M21FLR		800434	22 x 28 mm	16	65	75	19	113	25
EX7-I21FLR		800440	1-1/8" x 1-1/8"	20	78	83	20	158	42
EX/-M21FLR		800441	28 x 28 mm	20	78	83	20	158	42
EX4-U31FLR	Bi-flow	800435	16 x 16 mm (5/8" x 5/8")	11	55	55	11	113	25
EX5-U31FLR		800436	7/8" x 7/8" (22 x 22 mm)	16	65	65	16	113	25
EX6-I31FLR		800437	1-1/8" x 1-1/8"	19	75	75	19	113	25
EX6-M31FLR		800438	28 x 28 mm	19	75	75	19	113	25
EX7-I31FLR		800442	1-1/8" x 1-1/8"	20	83	83	20	158	42
EX7-M31FLR		800443	28 x 28 mm	20	83	83	20	158	42

Sequence for driving of stepper motor and valve

Direction	Reverse direction	Number of steps	Identification code of pins for electrical connections to third party drivers/controllers			
			2	4	3	1
			Current direction			
Valve is opening ↓	Valve is closing ↑	Step 1	+	-	+	-
		Step 2	-	+	+	-
		Step 3	-	+	-	+
		Step 4	+	-	-	+
		Remark	The sequence is repeated from step 5 to 8 similar to step 1 to 4			
		Step 5	+	-	+	-
		Step 6	-	+	+	-
		Step 7	-	+	-	+
		Step 8	+	-	-	+
		Remark	The sequence is repeated from step 9 to 12 similar to step 1 to 4			
↓	↓	↓	↓			

Functions and Features

- Use in hazardous areas according to the classification

  II3G (Group II, category 3G, apparatus for gas atmosphere).
  Complies with the requirements of the standard EN 60079-15.

- Use in hazardous areas according to the classification

  II3G (Group II, category 20, apparatus for dust atmosphere). Complies with the requirements of the standards IEC 60079-0 and IEC 60079-31.

- EC component certificate: BVS 08ATEX E 109 U
- IEC Ex component certificate: IECEx BVS 08.0041 U
- Marking:

Ex II3G Ex nA IIC Gc (see table Operating temperature range)

Ex II20 Ex tb IIIC Db IP65/IP67

Operating temperature range	
-20…+60°C	for connection cables and jumpers with angled M12 plug and angled M12 sockets

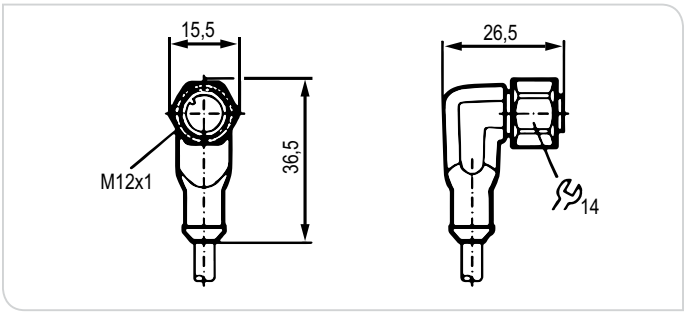
Installation / Set-up

The M12 connectors must only be installed connected and set up by qualified staff. The qualified staff must have knowledge of protection classes, regulations- and provisions for apparatus in hazardous areas.

Check whether the classification (see “Marking” above and marking on the M12 connector) is suitable for the application.

Installation Remarks / Installation

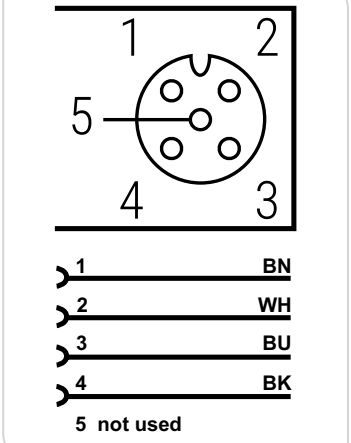
- Adhere to the relevant national regulations and provisions.
- Avoid electrostatic charging on plastic units and cables.
- Protect the M12 connectors efficiently against damage.
- The cables must be firmly laid and effectively protected against damage.
- The relevant installation regulations must be adhered to.
- For the technical data please refer to the data sheet. (see Technical Bulletin EX4-7-...-FLR).
- Avoid direct radiation with high UV components (sunlight); mount the unit in a protected place.
- M12 plugs may only be opened or closed in a sufficiently clean environment.
- Connectors must always be closed with a counterpart. They may be left open in the field only briefly for servicing purposes.



Wiring

Core colors

- BK black
- BN brown
- BU blue
- WH white



Caution: Not for interrupting current!

Special Conditions for Safe Operation

- The M12 connectors were tested in accordance with table 8 of EN 60079-0/table 5 of EN 61241-0 for group II and for a low mechanical risk with impact energy of 4 joules.
- Do not separate the connectors when energized.
- Secure the connector by tightening the nut sufficiently. Tightening torque approx. 1.2 Nm to
- 1.5 Nm. This tightening torque is ensured as follows:
  - Hand-fasten the coupling nut (0.4 to 0.5 Nm).
  - Then turn by 3 notches using a screwdriver across the flats 14.
- The connector conforms to the requirements for an M12 connector in EN 61076-2-101. The counterpart must also conform to this standard.
- Always refer to the operating-instructions as space restrictions may not allow markings to be applied to the unit.

Maintenance / Repair

The unit must not be modified nor can it be repaired. In case of a fault please contact the manufacturer.

The data sheets, the EC component certificates or IEC Ex component certificates are available from the manufacturer on request.

Thermo™ - Expansion Valves TX3-...FLR

Emerson Climate Technologies' **TX3-...FLR** series of Thermo™-Expansion Valves are designed for commercial refrigeration and heat pump applications operated with R290.

The **TX3-...FLR** is ideal for those applications requiring compact size combined with stable and accurate control over wide load and evaporating temperature ranges.

TX3-...FLR

Features

- Brazing connections with straight through configuration
- Stainless steel power element resists corrosion
- Large diaphragm provides smoother and consistent valve control
- External equalizer
- External superheat adjustment
- Packaging units with 24 pieces, no single packs

Selection Table

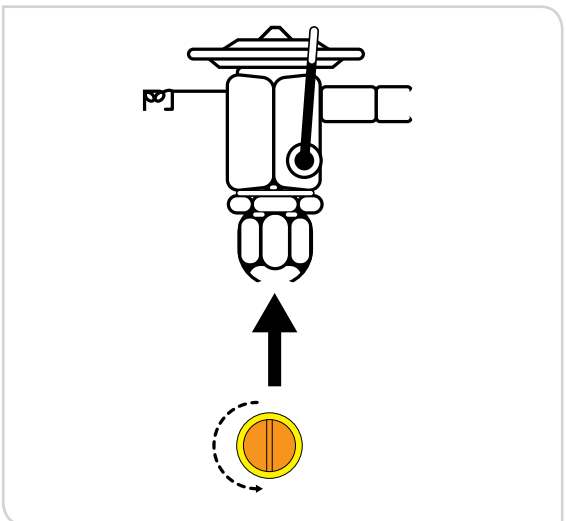
Nominal capacity [kW]	Without MOP		With MOP		Connection size	Inlet x Outlet
	Type	Part no.	Type	Part no.	Equalizer	
3.7	TX3-P23 FLR	801981M	TX3-P33 FLR	801988M	Ext. 1/4"	1/4" x 3/8"
5.4	TX3-P24 FLR	801982M	TX3-P34 FLR	802013M	Ext. 1/4"	3/8" x 1/2"
8.0	TX3-P25 FLR	801983M	TX3-P35 FLR	802014M	Ext. 1/4"	3/8" x 1/2"
11.0	TX3-P26 FLR	801984M	TX3-P36 FLR	802015M	Ext. 1/4"	3/8" x 1/2"
13.5	TX3-P27 FLR	801985M	TX3-P37 FLR	802016M	Ext. 1/4"	1/2" x 5/8"
16.1	TX3-P28 FLR	801986M	TX3-P38 FLR	802017M	Ext. 1/4"	1/2" x 5/8"
22.0	TX3-P29 FLR	801987M	TX3-P39 FLR	802018M	Ext. 1/4"	1/2" x 5/8"

Nominal capacity at +38°C liquid temperature, +4°C evaporating temperature and 1K subccoling. For other operating condition, see the next page.

Guideline

TX3-...FLR will be delivered with sufficient higher superheat setting to make sure match of valve with poor performance of evaporator. The setting can be lowered for high efficient evaporators capable to operate at lower superheat. The following table can be used as guideline:

Evaporating temperature	Readjustment, turn
-40	-1
-35	-1
-30	-1-1/8
-25	-1-1/8
-20	-1-1/8
-15	-1-1/8
-10	-1
-5	-3/4
0	-1/2
5	-1/8
10	-1/3



Quick Selection (included1.5 bar pressure drop for liquid line components and distributor)

Condensing temperature °C	R290 Capacity in kW Evaporating temperature °C											R290	Valve type
	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	
75	3.3	3.3	3.2	3.2	3.1	3.1	2.6	2.2	1.9	1.6	1.3	1.0	TX3-P23/33FLR
	4.8	4.7	4.7	4.6	4.5	4.4	3.8	3.2	2.7	2.2	1.8	1.5	TX3-P24/34FLR
	7.2	7.1	7.0	6.9	6.8	6.6	5.7	4.8	4.0	3.4	2.8	2.2	TX3-P25/35FLR
	9.8	9.8	9.7	9.5	9.3	9.1	7.8	6.6	5.5	4.6	3.8	3.1	TX3-P26/36FLR
	12.1	12.0	11.8	11.6	11.4	11.1	9.5	8.1	6.8	5.6	4.6	3.8	TX3-P27/37FLR
	14.4	14.2	14.1	13.8	13.6	13.2	11.3	9.6	8.1	6.7	5.5	4.5	TX3-P28/38FLR
	19.6	19.5	19.2	18.9	18.5	18.1	15.5	13.1	11.0	9.2	7.5	6.1	TX3-P29/39FLR
65	3.2	3.2	3.2	3.2	3.2	3.1	2.7	2.3	1.9	1.6	1.3	1.1	TX3-P23/33FLR
	4.6	4.7	4.7	4.6	4.6	4.5	3.9	3.3	2.8	2.3	1.9	1.6	TX3-P24/34FLR
	7.0	7.0	7.0	6.9	6.8	6.7	5.8	5.0	4.2	3.5	2.9	2.4	TX3-P25/35FLR
	9.6	9.6	9.6	9.5	9.4	9.2	8.0	6.8	5.8	4.8	4.0	3.3	TX3-P26/36FLR
	11.7	11.7	11.7	11.6	11.5	11.3	9.7	8.3	7.1	5.9	4.9	4.0	TX3-P27/37FLR
	13.9	14.0	14.0	13.8	13.7	13.4	11.6	9.9	8.4	7.0	5.8	4.8	TX3-P28/38FLR
	19.0	19.1	19.1	18.9	18.7	18.4	15.9	13.6	11.5	9.6	8.0	6.5	TX3-P29/39FLR
55	3.3	3.3	3.4	3.4	3.4	3.4	2.9	2.5	2.2	1.8	1.5	1.3	TX3-P23/33FLR
	4.7	4.8	4.9	4.9	4.9	4.9	4.3	3.7	3.1	2.7	2.2	1.8	TX3-P24/34FLR
	7.1	7.2	7.3	7.4	7.4	7.3	6.4	5.5	4.7	4.0	3.3	2.8	TX3-P25/35FLR
	9.7	9.9	10.0	10.1	10.1	10.0	8.8	7.6	6.5	5.5	4.6	3.8	TX3-P26/36FLR
	11.9	12.2	12.3	12.4	12.4	12.3	10.7	9.3	7.9	6.7	5.6	4.7	TX3-P27/37FLR
	14.2	14.5	14.7	14.7	14.7	14.6	12.8	11.0	9.4	8.0	6.7	5.5	TX3-P28/38FLR
	19.4	19.8	20.0	20.1	20.1	20.0	17.4	15.1	12.9	10.9	9.1	7.6	TX3-P29/39FLR
50	3.4	3.6	3.6	3.7	3.7	3.7	3.3	2.8	2.5	2.1	1.8	1.5	TX3-P23/33FLR
	5.0	5.1	5.3	5.3	5.4	5.4	4.7	4.1	3.5	3.0	2.5	2.1	TX3-P24/34FLR
	7.5	7.7	7.9	8.0	8.1	8.1	7.1	6.2	5.3	4.5	3.8	3.2	TX3-P25/35FLR
	10.2	10.6	10.8	11.0	11.1	11.1	9.7	8.5	7.3	6.2	5.2	4.4	TX3-P26/36FLR
	12.5	13.0	13.2	13.4	13.5	13.5	11.9	10.4	8.9	7.6	6.4	5.3	TX3-P27/37FLR
	14.9	15.4	15.8	16.0	16.1	16.1	14.2	12.3	10.6	9.1	7.6	6.4	TX3-P28/38FLR
	20.4	21.1	21.5	21.8	22.0	22.0	19.4	16.8	14.5	12.4	10.4	8.7	TX3-P29/39FLR
40	3.0	3.2	3.4	3.5	3.6	3.6	3.2	2.8	2.5	2.1	1.8	1.5	TX3-P23/33FLR
	4.3	4.7	4.9	5.1	5.2	5.3	4.7	4.1	3.6	3.1	2.6	2.2	TX3-P24/34FLR
	6.5	7.0	7.3	7.6	7.8	7.9	7.0	6.2	5.3	4.6	3.9	3.3	TX3-P25/35FLR
	8.9	9.6	10.1	10.4	10.7	10.8	9.6	8.4	7.3	6.3	5.3	4.5	TX3-P26/36FLR
	10.9	11.7	12.3	12.7	13.0	13.2	11.8	10.3	9.0	7.7	6.5	5.5	TX3-P27/37FLR
	13.0	14.0	14.7	15.2	15.5	15.8	14.0	12.3	10.7	9.2	7.8	6.5	TX3-P28/38FLR
	17.8	19.1	20.0	20.7	21.2	21.5	19.1	16.8	14.6	12.5	10.6	8.9	TX3-P29/39FLR
30	2.1	2.6	2.9	3.1	3.2	3.4	3.0	2.7	2.4	2.1	1.8	1.5	TX3-P23/33FLR
	3.1	3.7	4.1	4.4	4.7	4.9	4.4	3.9	3.4	3.0	2.5	2.1	TX3-P24/34FLR
	4.6	5.5	6.2	6.7	7.0	7.3	6.6	5.9	5.1	4.5	3.8	3.2	TX3-P25/35FLR
	6.4	7.6	8.5	9.1	9.6	10.0	9.0	8.0	7.0	6.1	5.2	4.4	TX3-P26/36FLR
	7.8	9.3	10.4	11.2	11.8	12.2	11.0	9.8	8.6	7.5	6.4	5.4	TX3-P27/37FLR
	9.3	11.1	12.4	13.3	14.0	14.6	13.1	11.7	10.3	8.9	7.6	6.4	TX3-P28/38FLR
	12.7	15.1	16.9	18.2	19.2	19.9	18.0	16.0	14.0	12.2	10.4	8.8	TX3-P29/39FLR
20		1.2	1.9	2.3	2.6	2.9	2.7	2.4	2.2	1.9	1.6	1.4	TX3-P23/33FLR
		1.7	2.7	3.4	3.8	4.1	3.8	3.5	3.1	2.7	2.4	2.0	TX3-P24/34FLR
		2.5	4.1	5.1	5.7	6.2	5.8	5.3	4.7	4.1	3.6	3.0	TX3-P25/35FLR
		3.5	5.6	6.9	7.8	8.5	7.9	7.2	6.4	5.7	4.9	4.2	TX3-P26/36FLR
		4.3	6.9	8.5	9.6	10.4	9.7	8.8	7.9	6.9	6.0	5.1	TX3-P27/37FLR
		5.1	8.2	10.1	11.4	12.4	11.5	10.5	9.4	8.2	7.1	6.1	TX3-P28/38FLR
		6.9	11.2	13.8	15.6	16.9	15.8	14.3	12.8	11.3	9.7	8.3	TX3-P29/39FLR

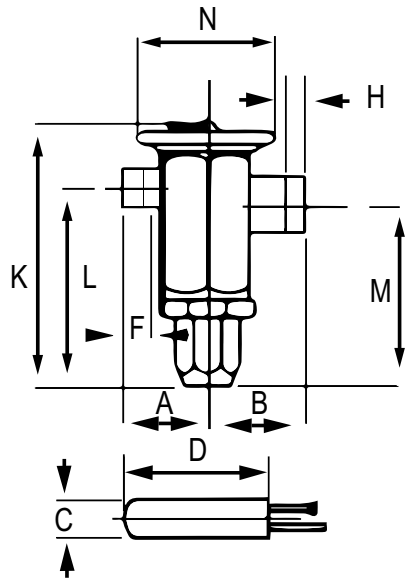
Select the valve type from tables for capacity value corresponding to system (evaporator) cooling capacity.

Technical Data

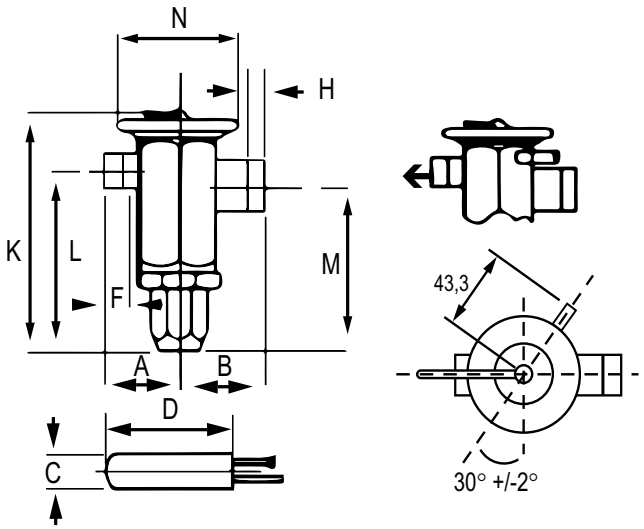
Compatibility	R290
Maximum working pressure PS:	35 bar
Factory test pressure PT:	38.5 bar
Burst pressure	175 bar
Medium temperature range	-45°C…+75°C
Maximum bulb temperature	+71°C

Seat leakage	≤ 1% nominal capacity
Connection	ODF, copper
Charges	CFC free
Protection	salt spray test
Weight	~ 0.5 kg (individual)
Pack quantity	24 (no single pack)

Dimensions [mm]



External Equalize Connection



Body

Type	Connection size [inch]		Roughing in dimensions [mm]							
	Inlet	Outlet	A	B	F	H	N	K	L	M
TX3-...3-FLR	1/4”	3/8”	43.3	44.1	7.9	7.9	44.5	86.5	64.7	54.4
TX3-...4-FLR	3/8”	1/2”	44.1	44.1	7.9	9.5				
TX3-...5-FLR	3/8”	1/2”	44.1	44.1	7.9	9.5				
TX3-...6-FLR	3/8”	1/2”	44.1	44.1	7.9	9.5				
TX3-...7-FLR	1/2”	5/8”	44.1	44.5	9.5	12.7				
TX3-...8-FLR	1/2”	5/8”	44.1	44.5	9.5	12.7				
TX3-...9-FLR	1/2”	5/8”	44.1	44.5	9.5	12.7				

Bulb

Dimensions of bulb [mm]		Capillary tube length
D (length)	Ø C	
53.2	12.8	1.5 m

General Information

TX3-...FLR are Thermo-Expansion Valves for superheat control.

The listed products are not in scope of ATEX product directive 94/9/EC as they do not incorporate an own source of ignition.

TX3-...FLR must be installed in an appropriate housing to protect them from mechanical damage or shock.

⚠ Safety Instructions

- **Read operating instructions thoroughly. Failure to comply can result in device failure, system damage or personal injury.**
- **According to EN 13313 it is intended for use by persons having the appropriate knowledge and skill.**
- **R290 requires special handling and care due to its flammability. Sufficient ventilation is required during service of the system. Contact with rapidly expanding gases can cause frostbite and eye damage. Proper protective equipment (gloves, eye protection, etc.) has to be used.**
- **In a severely contaminated system, avoid breathing acid vapors and avoid contact with skin from contaminated refrigerant / lubricants. Failure to do so could result in injury.**
- **Ensure that the system is correctly labeled with applied refrigerant type and a warning for explosion risk.**
- **Do not release any refrigerant into the atmosphere!**
- **Do not exceed the specified maximum ratings for pressure and temperature.**
- **Before opening any system make sure pressure in system is brought to and remains at atmospheric pressure.**
- **Observe and avoid mechanical damage of component housing.**
- **Ensure that design, installation and operation are according to European and national standards/ regulations.**

Installation (Fig. 1, 2)

- Valves may be installed in any position, but should be located as close as possible to the distributor or evaporator inlet.
- Attach the remote bulb to the suction line (Fig. 2) as close to the evaporator outlet as possible. Securely fasten the bulb with straps provided. Insulate bulb with a suitable material. Ensure that the capillary is mounted without tension, always leave the capillary a bit loose and it should not be strangulated. Maintain also a clearance from the capillary to other objects. The capillary should not be in contact with other objects.

Fig. 1

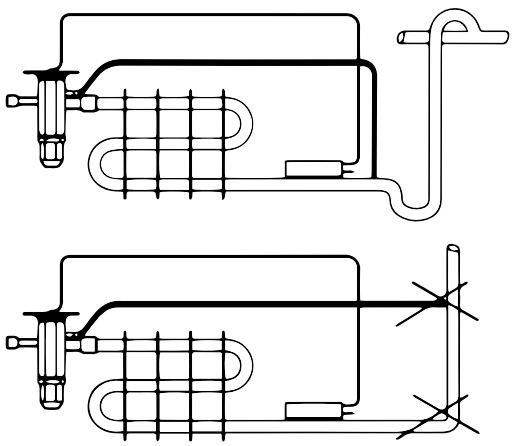
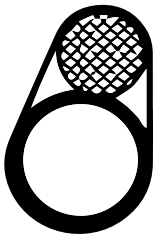


Fig. 2



- Connect equalizer line (1/4" or 6 mm tube) to valve and suction line. Be sure that it cannot siphon oil from the suction line (Fig. 1).
- The expansion valve must be free of all contaminants. Install an Emerson filter drier before the valve.

Recommended external pipe connections:

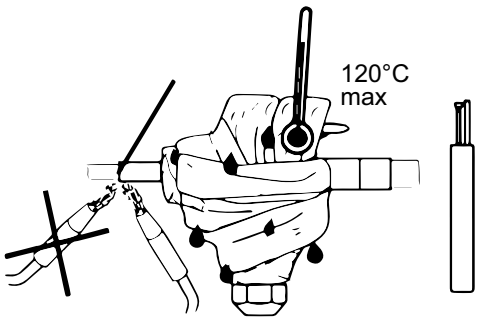
Nominal pipe connection	Outside diameter	
	Min. (mm)	Max.(mm)
1/4"	6.30	6.38
3/8"	9.47	9.55
1/2"	12.62	12.73
5/8"	18.80	15.90
7/8"	22.15	22.25
1-1/8"	28.50	28.63
6 mm	5.95	6.05
10 mm	9.95	10.05
12 mm	11.96	12.05
16 mm	15.95	16.05
22 mm	21.95	22.06
28 mm	27.95	28.05

Brazing (Fig. 3)

- Perform and consider the brazing joint as per EN 14324.
- Before and after brazing clean tubing and brazing joints.
- To avoid oxidization, it is advised to purge the system with an inert gas such as nitrogen while brazing.

Do not exceed max. body temperature of 120°C!

Fig. 3



- Be sure liquid line is connected to inlet of TX3-...FLR (marked "IN" on valve body).
- Minimize vibrations in the piping lines by appropriate solutions.

Pressure Test

- After completion of installation, a pressure test must be carried out according to EN 378 for systems which must comply with European pressure equipment directive 97/23/EC.
- Max. system test pressure: 38.5 bar.

⚠ Warning

- **Failure to do so could result in loss of refrigerant and personal injury.**
- **The pressure test must be conducted by skilled persons with due respect regarding the danger related to pressure.**

Tightness Test

Conduct tightness test according to EN 378-2 with appropriate equipment and method to identify tightness of external joint. The allowable leakage rate must be according system manufacturer's specification.

Operation

- Check for sufficient refrigerant charge and be sure no flash gas is present before attempting to check the expansion valve operation.
- Check/measure superheat.

Superheat Adjustment (Fig. 4)

TX3-...FLR are factory set to a standard setting (s. Technical Bulletin). If the superheat must be adjusted proceed as follows:

1. Remove seal cap from bottom of valve.
2. Turn adjustment screw clockwise to increase and counterclockwise to decrease superheat.

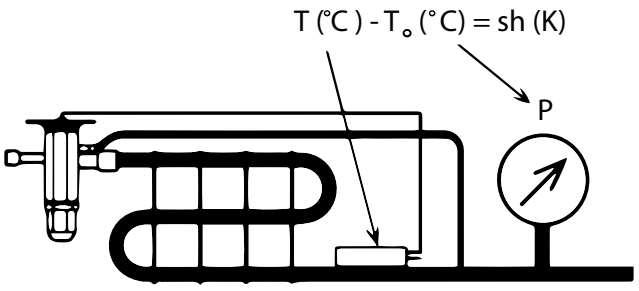
Warning: There are approx. 13 turns on the adjustment stem (from left to right stop). When stop is reached any further turning will damage valve. Changes in superheat (K) per stem turn depending on evaporating temperature and refrigerant; see below. 30 minutes are required for the system to stabilize after the adjustment is made.

Superheat change (K) per stem turn

	Evaporating temperature						
	-40°C	-30°C	-20°C	-10°C	0°C	10°C	20°C
R 290	4.8	3.6	2.7	2.1	1.7	1.4	1.1

3. Determine superheat according to Fig. 4.
4. Replace and tighten seal cap (hand-tighten with more than 2 Nm).
5. Check for external leakage.

Fig. 4



⚠ Service / Maintenance

- **Defective TX3-...FLR must be replaced; they cannot be repaired.**
- **Before any debrazing ensure that the flammable refrigerant is pumped out of the system and the room around the system is well vented so no refrigerant left.**

Technical Data of TX3 -...FLR

Charge	Recommended evaporating temperature
Liquid	-40°C...+20°C

- Max. allowable working pressure PS : 35 bar
- Test pressure PT : 38.5 bar
- Released / compatible for : R290, mineral-, alkyl benzene and ester lubricants

TX3 types, not listed in the following table, are not released for use with flammable refrigerants!

Type	Part no.
TX3-P23FLR	801981M
TX3-P24FLR	801982M
TX3-P25FLR	801983M
TX3-P26FLR	801984M
TX3-P27FLR	801985M
TX3-P28FLR	801986M
TX3-P29FLR	801987M
TX3-P33FLR	801988M
TX3-P34FLR	802013M
TX3-P35FLR	802014M
TX3-P36FLR	802015M
TX3-P37FLR	802016M
TX3-P38FLR	802017M
TX3-P39FLR	802018M

200RB...-FLR are normally closed solenoid valves for various application duties.

200RB...-FLR + ASC3-EX...

Features

- Normally closed
- Pilot operated requires minimum operating pressure differential
- Compact size
- Extended fittings: No disassembly necessary for brazing
- ATEX compliance coil in 24VAC/50Hz and 230VAC/50Hz

Coil

II 3G Ex nA IIA T3 Gc U

Selection Table Valves

Type	Part no.	Kv-Value [m3/h]	Capacity [kW] Liquid line duty	Connections Solder / ODF	
				[mm]	[inch]
200RB 3T3-FLR (mm)	801323	0.4	7.3	10	
200RB 3T3-FLR	801445				3/8”
200RB 4T10-FLR	801446	0.9	17.3	10	
200RB 4T4-FLR	801447				1/2”
200RB 4T3-FLR	801448				3/8”
200RB 4T12-FLR	801449			12	
200RB 6T4-FLR	801450	1.6	30.4		1/2”
200RB 6T12-FLR	801451			12	
200RB 6T5-FLR	801452			16	5/8”

Note: Nominal capacity at +38°C condensing temperature +4°C evaporating temperature, 1 K subcooling and 0.15 bar pressure drop.

Selection Table Coils

Type	Part no.
ASC3-EX24VAC, 50Hz	801125
ASC3-EX230VAC, 50Hz	801126

Technical Data Valve

Max. allowable working pressure PS	31 bar
Test pressure PT	34.1 bar
Operating temperature range TS	-40°C…+120°C
Max. ambient temperature	-40°C…+50°C

Technical Data Coils

Supply voltage ASC3-EX24VAC ASC3-EX230VAC	 24VAC ±10% 230VAC ±10%
Frequency	50 Hz
Ambient temperature range	-40°C…+50°C
Protection class	IP65
Cable length	3 m
Marking (only coil)	II 3G Ex nA IIA T3 Gc U, CE EAC

Quick Selection (0.15 bar pressure drop)

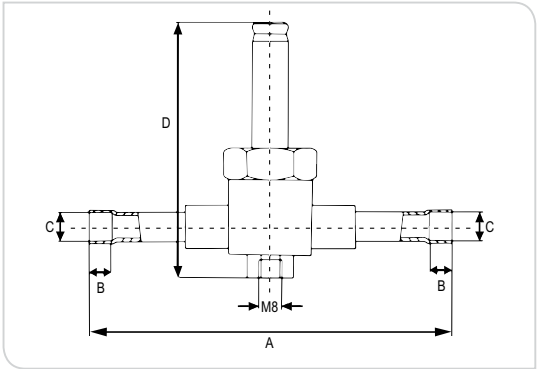
Liquid temperature °C	R290 Capacity in kW Evaporating temperature °C												R290	Valve type
	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	
70	4.6	4.5	4.4	4.2	4.1	4.0	3.8	3.7	3.5	3.4	3.3	3.1	3.0	200RB3...FLR
	10.9	10.6	10.3	10.0	9.7	9.4	9.0	8.7	8.4	8.0	7.7	7.4	7.0	200RB4...FLR
	19.2	18.6	18.1	17.5	17.0	16.4	15.9	15.3	14.7	14.1	13.5	12.9	12.4	200RB6...FLR
65	5.1	5.0	4.9	4.7	4.6	4.4	4.3	4.2	4.0	3.9	3.7	3.6	3.4	200RB3...FLR
	12.1	11.8	11.5	11.2	10.8	10.5	10.2	9.9	9.5	9.2	8.8	8.5	8.2	200RB4...FLR
	21.2	20.7	20.2	19.6	19.0	18.5	17.9	17.3	16.7	16.1	15.5	14.9	14.3	200RB6...FLR
60	5.6	5.5	5.3	5.2	5.1	4.9	4.8	4.6	4.5	4.3	4.2	4.1	3.9	200RB3...FLR
	13.3	12.9	12.6	12.3	12.0	11.6	11.3	11.0	10.6	10.3	9.9	9.6	9.3	200RB4...FLR
	23.3	22.7	22.2	21.6	21.0	20.5	19.9	19.3	18.7	18.1	17.5	16.9	16.2	200RB6...FLR
55	6.1	5.9	5.8	5.7	5.5	5.4	5.2	5.1	5.0	4.8	4.7	4.5	4.4	200RB3...FLR
	14.4	14.1	13.7	13.4	13.1	12.8	12.4	12.1	11.7	11.4	11.0	10.7	10.3	200RB4...FLR
	25.2	24.7	24.1	23.6	23.0	22.4	21.8	21.2	20.6	20.0	19.4	18.8	18.1	200RB6...FLR
50	6.5	6.4	6.3	6.1	6.0	5.8	5.7	5.6	5.4	5.3	5.1	5.0	4.8	200RB3...FLR
	15.5	15.2	14.8	14.5	14.2	13.8	13.5	13.1	12.8	12.4	12.1	11.7	11.4	200RB4...FLR
	27.2	26.6	26.1	25.5	24.9	24.3	23.7	23.1	22.5	21.9	21.2	20.6	20.0	200RB6...FLR
45	7.0	6.9	6.7	6.6	6.4	6.3	6.2	6.0	5.9	5.7	5.6	5.4	5.2	200RB3...FLR
	16.6	16.2	15.9	15.6	15.2	14.9	14.6	14.2	13.9	13.5	13.1	12.8	12.4	200RB4...FLR
	29.1	28.5	27.9	27.4	26.8	26.2	25.6	24.9	24.3	23.7	23.1	22.4	21.8	200RB6...FLR
40	7.5	7.3	7.2	7.0	6.9	6.7	6.6	6.4	6.3	6.1	6.0	5.8	5.7	200RB3...FLR
	17.6	17.3	17.0	16.6	16.3	16.0	15.6	15.3	14.9	14.5	14.2	13.8	13.5	200RB4...FLR
	31.0	30.4	29.8	29.2	28.6	28.0	27.4	26.8	26.2	25.5	24.9	24.3	23.6	200RB6...FLR
30	8.3	8.2	8.1	7.9	7.8	7.6	7.5	7.3	7.2	7.0	6.9	6.7	6.5	200RB3...FLR
	19.7	19.4	19.1	18.7	18.4	18.0	17.7	17.3	16.9	16.6	16.2	15.8	15.5	200RB4...FLR
	34.7	34.1	33.5	32.9	32.3	31.6	31.0	30.4	29.8	29.1	28.5	27.8	27.2	200RB6...FLR
25	8.8	8.6	8.5	8.3	8.2	8.0	7.9	7.7	7.6	7.4	7.3	7.1	7.0	200RB3...FLR
	20.8	20.4	20.1	19.7	19.4	19.0	18.7	18.3	18.0	17.6	17.2	16.8	16.5	200RB4...FLR
	36.5	35.9	35.3	34.7	34.1	33.4	32.8	32.2	31.5	30.9	30.2	29.6	28.9	200RB6...FLR
20		9.1	8.9	8.8	8.6	8.5	8.3	8.2	8.0	7.9	7.7	7.5	7.4	200RB3...FLR
		21.5	21.1	20.8	20.4	20.1	19.7	19.3	19.0	18.6	18.2	17.8	17.5	200RB4...FLR
		37.7	37.1	36.5	35.8	35.2	34.6	33.9	33.3	32.6	32.0	31.3	30.7	200RB6...FLR

Select the valve type from tables for capacity value corresponding to system (evaporator) cooling capacity. For other pressure drop than 0.15, please use the below correction factors.

Correction factors $K_{\Delta P}$														
ΔP, bar	0.05	0.1	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70
$K_{\Delta P}$	1.73	1.22	1.0	0.87	0.77	0.71	0.65	0.61	0.58	0.55	0.52	0.50	0.48	0.46

Dimensions [mm]

Type	A	B	Connection / ODF	D
200RB 3T3-FLR (mm)	126	8	10 mm	88.3
200RB 3T3-FLR	126	8	3/8"	88.3
200RB 4T10-FLR	126	8	10 mm	88.3
200RB 4T4-FLR	126	10	1/2"	88.3
200RB 4T3-FLR	126	8	3/8"	88.3
200RB 4T12-FLR	126	10	12 mm	88.3
200RB 6T4-FLR	126	10	1/2"	88.3
200RB 6T12-FLR	126	10	12 mm	88.3
200RB 6T5-FLR	126	13	16 mm & 5/8"	88.3



General Information

200RB...-FLR are solenoid valves for open or close of refrigerant flow.

The listed products are not in scope of ATEX product directive 94/9/EC as they do not incorporate an own source of ignition.

200RB...-FLR must be installed in an appropriate housing to protect them from mechanical damage or shock.

⚠ Safety Instructions

- **Read operating instructions thoroughly. Failure to comply can result in device failure, system damage or personal injury.**
- **According to EN 13313 it is intended for use by persons having the appropriate knowledge and skill.**
- **R290 requires special handling and care due to its flammability. Sufficient ventilation is required during service of the system. Contact with rapidly expanding gases can cause frostbite and eye damage. Proper protective equipment (gloves, eye protection, etc.) has to be used.**
- **In a severely contaminated system, avoid breathing acid vapors and avoid contact with skin from contaminated refrigerant/lubricants. Failure to do so could result in injury.**
- **Ensure that the system is correctly labeled with applied refrigerant type and a warning for explosion risk.**

  WARNING: Do not use a solenoid valve as a safety shut-off valve or for service purpose.

- **Do not release any refrigerant into the atmosphere!**
- **Do not exceed the specified maximum ratings for pressure, temperature.**
- **Before opening any system make sure pressure in system is brought to and remains at atmospheric pressure.**
- **Ensure that the system piping is grounded.**
- **Before installation or service disconnect voltage from system and device.**
- **Observe and avoid mechanical damage of component housing.**
- **Ensure that design, installation and operation are according to European and national standards/ regulations**

Installation

- Do not dent, bend, or use the enclosing tube as a lever. A damaged enclosing tube may result in coil burnout, inoperative valve or leakage.
- Direction of flow must match with arrow on valve body.

Recommended external pipe connection

Nominal pipe connection	Outside diameter	
	Min. (mm)	Max. (mm)
3/8”	9.47	9.55
1/2“	12.62	12.73
5/8“	15.80	15.90
10 mm	9.95	10.05
12 mm	11.96	12.05
16 mm	15.95	16.05

Mounting Location (Fig. 1, 2)

- Allow sufficient clearance above the valve for removal of Coil.
  Valves may be mounted in horizontal or vertical lines (Fig. 1). Up-side down position is not allowed and can cause mal-function (Fig. 2).

Fig. 1

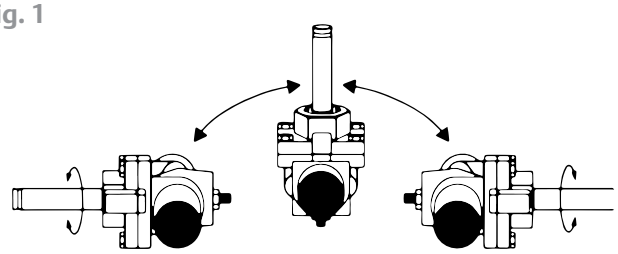
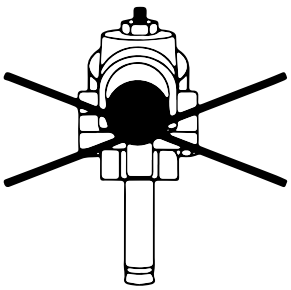


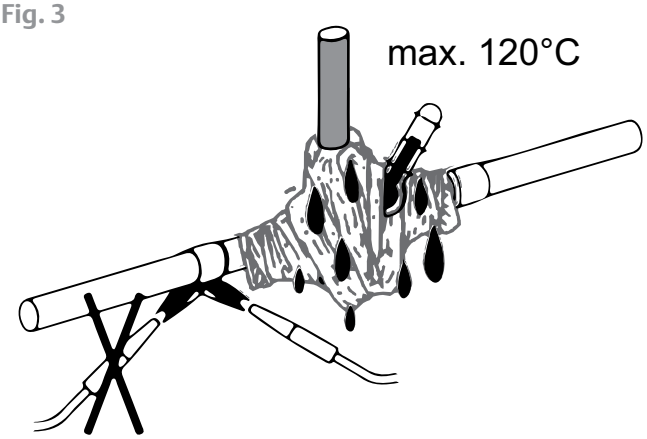
Fig. 2



Brazing (Fig. 3)

- Perform and consider the brazing joint as per EN 14324.
- Before and after brazing clean tubing and brazing joints.
- **Do not disassemble valve for brazing.**
- To avoid oxidization, it is advised to purge the system with an inert gas such as nitrogen while brazing.
- **Do not exceed max. body temperature of 120°C.**

Fig. 3



- Internal parts must be protected from foreign material and moisture. An Emerson filter drier is recommended to be installed.
- Minimize vibrations in the piping lines by appropriate solutions.

Pressure Test

- After completion of installation, a pressure test must be carried out according to EN 378 for systems which must comply with European pressure equipment directive 97/23/EC.
- Max. system test pressure: 34.1 bar.

⚠ Warning

- **Failure to do so could result in loss of refrigerant and personal injury.**
- **The pressure test must be conducted by skilled persons with due respect regarding the danger related to pressure.**

Tightness Test

Conduct tightness test according to EN 378-2 with appropriate equipment and method to identify tightness of external joint. The allowable leakage rate must be according system manufacturer's specification.

Operation

- Before operation let the parts cool down to a temperature < 40°C.
- Cycle valve several times. A distinct "click" should be heard each time the solenoid coil is energized.
  Note: Emerson solenoid valves are equipped with a continuous-duty coil, which when energized for an extended period of time becomes hot. This is normal.

⚠ Service / Maintenance

- **Defective 200RB...-FLR must be replaced; they cannot be repaired.**
- **Before any service disconnect electrical power of the coil and use permanent magnet to keep the valve open while emptying the system.**
- **Before any debrazing ensure that the flammable refrigerant is pumped out of the system and the room around the system is well vented so no refrigerant left.**
- **Warning: Never remove energized coil from valve. This applies also for testing purposes.**

Technical Data of 200RB... -FLR

- Max. allowable working pressure PS: 31 bar
- Test pressure PT: 34.1 bar
- Operating Temperature Range TS: -40°C...+120°C
- Max. ambient temperature: -40°C...+50°C
- Released / compatible for: R290, mineral-, alkyl benzene and ester lubricants
- Standards: EN 12284

200RB types, not listed in the following table, are not released for use with flammable refrigerants!

Type	Part no.
200RB 3T3-FLR (mm)	801323
200RB 3T3-FLR	801445
200RB 4T10-FLR	801446
200RB 4T4-FLR	801447
200RB 4T3-FLR	801448
200RB 4T12-FLR	801449
200RB 6T4-FLR	801450
200RB 6T12-FLR	801451
200RB 6T5-FLR	801452

General Information

ASC3-EX Series Coils are for use with Emerson 200 RB...-FLR series solenoid valves approved for use with R290.

Applied type of ASC3-EX coils

Voltage	Coil
24VAC 50 Hz	ASC3-EX24VAC
230VAC 50 Hz	ASC3-EX230VAC

Coils have following markings:
II 3G Ex nA IIA T3 Gc U

These components must be installed in an appropriate housing to protect them from mechanical damage or shock.

Safety Instructions

- **Read operating instructions thoroughly. Failure to comply can result in device failure, system damage or personal injury.**
- **According to EN 13313 it is intended for use by persons having the appropriate knowledge and skill.**
- **R290 requires special handling and care due to its flammability. Good ventilation is required during service of the system. Contact with rapidly expanding gases can cause frostbite and eye damage. Proper protective equipment (gloves, eye protection, etc.) has to be used.**
- **The coil should be fused in accordance with local codes.**
- **Ensure that the system piping is grounded.**
- **Ensure that the system is correctly labeled with applied refrigerant type and a warning for explosion risk.**
- **Do not exceed the specified maximum ratings for voltage and current.**
- **Before installation or service disconnect all voltages from system and device.**
- **Do not energize coil unless it is attached to the valve.**
- **Observe and avoid mechanical damage of component housing.**
- **Do not use any other fluid media without prior approval of Emerson. Use of fluids not listed could result in: Change of hazard category of product and consequently change of conformity assessment requirement for product in accordance with European pressure equipment directive 97/23/EC.**
- **Ensure that design, installation and operation are according to European and national standards/ regulations.**

Installation of Coils (Fig. 1)

- **Ensure that the cables are mounted without tension; always leave the cable a bit loose.**
- **Ensure that cables are not mounted near sharp edges.**
- **Do not bend or mechanically stress the cable outlet, maintain a clearance of 20 mm to neighboring parts.**
- Mount O-ring with smaller diameter over enclosing tube.
- Place coil over the enclosing tube.
- Insert O-ring with larger diameter inside of the orange color clip.
- Press the clip with mounted O-ring over the coil on the enclosing tube until it snaps.

Electrical Connection

- Before energizing the valve be sure that the source voltage and frequency matches that on the coil label.
- **Note:** ASC3-EX coils are intended for continuous-duty, which when energized for an extended period of time, it becomes hot. This is normal.
- **Molded plug and cable assembly**
  Brown and blue color wires to be connected to the power supply and yellow/green color wire to the ground.

Service / Maintenance

Warning

- **Disconnect electrical power before service and wait for coil temperature to cool down before attempting to dissemble it, or use gloves, failure to do so could lead to injury.**
- ASC3-EX disassembly: see Fig. 2

Technical Data

- Supply voltage variation: ±10%
- Frequency: 50 Hz

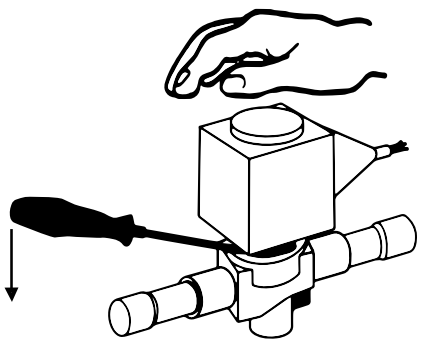
Coil	Inrush current [A]	Holding current [A]
ASC3-EX230VAC	0.22	0.052
ASC3-EX24VAC	2.23	0.57

- Ambient temperature range: -40...+50°C
- Protection class: IP65
- Marking: CE; EAC

II 3G Ex nA IIA T3 Gc U

Fig. 1: ASC3-EX...

Fig. 2



PT5-...-FLR Pressure Transmitter

Pressure Transmitters convert a pressure into a linear electrical output signal.

PT5-...FLR

Features

- Thin-film stainless steel sensor with output signal 4 to 20 mA and 2-wire connection
- Specially calibrated pressure ranges with ±1% accuracy performance
- Fully hermetic
- Protection class IP65
- Minimum lot size 20 pieces
- Ex II 3G Ex nC IIB T4 Gc X

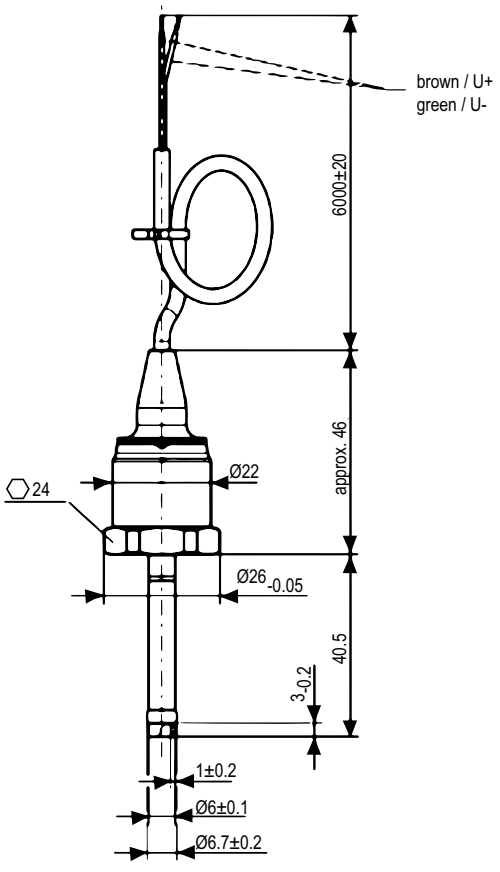
Selection Table

Type	Part no. multi-pack	Pressure connection	Cable length	Marking
PT5-30L-FLR	802389M	6 mm tube x 40 mm long	6.0 m	CE Mark acc. 2004/108/EC, EN61326 Emission (Group 1, Class B) & immunity (industrial locations) Ex II 3G Ex nC IIB T4 Gc X

Technical Data

Supply voltage (polarity protected)	Nominal : 24VDC Range : 7...30VDC
Permissible noise & ripple Influence of supply voltage	< 1 V_{p-p} < 0,02 % FS/V
Output signal	Maximum ≤ 24 mA 4...20 mA
Load resistance	$R_L \leq \frac{Ub - 7.0V}{0.02A}$
Response time	≤ 5 ms
Pressure sensing range	0...30 bar corresponding to 4...20 mA
Max. working pressure PS	35 bar
Test Pressure PT	38.5 bar
Temperatures: Transport and storage Operating ambient housing Medium	 -20...+80°C -20...+80°C -40...+100°C
Sensor lifetime	30 million load cycles with 1.3 times of nominal pressure
Protection class (EN 60529)	IP65
Vibration at 10...2000Hz	20 g according to IEC 60068-2-6
Materials Housing, pressure connector and diaphragm with medium contact	Stainless steel 316L, 1.4534

Dimensions [mm]



General Information

Pressure Transmitters convert a pressure into a linear electrical output signal.

PT5-...-FLR meets explosion protection requirements for electrical equipment, equipment group II, equipment categories 3G, in ignition protection class “nC” as hermetically sealed device in explosion group IIB and temperature class T4. They are marked with:

Ex II 3G Ex nC IIB T4 Gc X

PT5-...-FLR must be installed in an appropriate housing to protect them from mechanical damage, shock and light.

⚠ Safety Instructions

- **Read operating instructions thoroughly. Failure to comply can result in device failure, system damage or personal injury.**
- **According to EN 13313 it is intended for use by persons having the appropriate knowledge and skill.**
- **R290 requires special handling and care due to its flammability. Sufficient ventilation is required during service of the system. Contact with rapidly expanding gases can cause frostbite and eye damage. Proper protective equipment (gloves, eye protection, etc.) has to be used.**
- **In a severely contaminated system, avoid breathing acid vapors and avoid contact with skin from contaminated refrigerant / lubricants. Failure to do so could result in injury.**
- **Ensure that the system is correctly labeled with applied refrigerant type and a warning for explosion risk.**
- **Do not release any refrigerant into the atmosphere!**
- **Do not exceed the specified maximum ratings for pressure, temperature, voltage and current.**
- **Before opening any system make sure pressure in system is brought to and remains at atmospheric pressure.**
- **Ensure that the system piping is grounded.**
- **Before installation or service disconnect all voltages from system and device.**
- **Observe and avoid mechanical damage of housing in order to maintain protection class.**
- **Ensure that design, installation and operation are according to European and national standards/ regulations.**

Installation (Fig. 1)

- Mounting directions per Fig. 1 in order to prevent the collection of contaminant in pressure sensing element.

Brazing (Fig. 2)

- Perform and consider the brazing joint as per EN14324.
- Before and after brazing clean tubing and brazing joints.
- Minimize vibrations in the piping lines by appropriate solutions.
- Use of flux and silver rod having a minimum of 30% silver.

Fig. 1

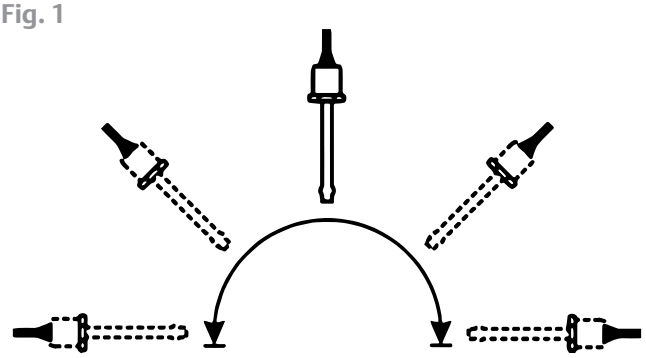
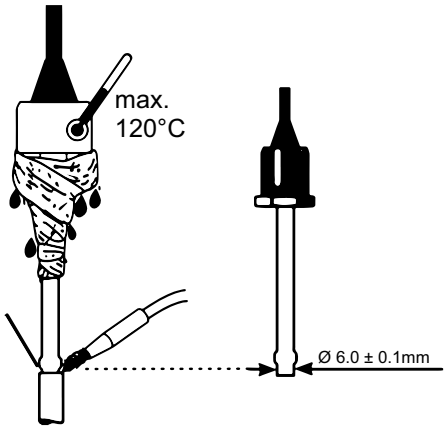


Fig. 2



Pressure Test

- After completion of installation, a pressure test must be carried out according to EN 378 for systems which must comply with European pressure equipment directive 97/23/EC.
- Max. system test pressure: 38.5 bar.

⚠ Warning

- **Failure to do so could result in loss of refrigerant and personal injury.**
- **The pressure test must be conducted by skilled persons with due respect regarding the danger related to pressure.**

Tightness Test

Conduct tightness test according EN378-2 with appropriate equipment and method to identify tightness of external joints. The allowable leakage rate must be according system manufacturer's specification.

⚠ Electrical Connection

- **Entire electrical connections have to comply with local regulations.**
- **Ensure that the cables are mounted without tension; always leave the cable a bit loose.**
- **Ensure that cables are not mounted near sharp edges.**
- **Do not bend or mechanically stress the cable outlet, maintain a clearance of 20 mm to neighboring parts.**

Wiring

- PT5-...-FLR are in compliance with European EMC directive and bear CE-marking.
- Connection cables should not be extended beyond standard 6 m length, otherwise entire system needs to be verified from the system manufacturer for free system signal emissions and immunity for conformity to EMC directive and standards.
- Signal line should not be installed parallel with power lines to avoid electrical interference.
- Ensure polarity for connection of 2-wire cable to controller:
- +24V DC to be connected to brown wire
- Output Signal / 0V to be connected to green wire

⚠ Operation

- **Perform a functional test of electrical circuit before charging the system with refrigerant.**

⚠ Service / Maintenance

- **Defective PT5-...-FLR must be replaced; they cannot be repaired.**
- **Disconnect electrical power before service.**
- **Before any debrazing ensure that the flammable refrigerant is pumped out of the system and the room around the system is well vented so no refrigerant left.**

Technical Data of PT5 -...-FLR:

- Max. allowable working pressure PS: 35 bar
- Test pressure PT: 38.5 bar
- Supply voltage: 7V...30V DC, class 2
- Output signal: 4 mA...20 mA
- Protection class (EN 60529): IP65
- Medium temperature: -40°C...+100°C
- Ambient temperature: -20°C...+80°C
- Released / compatible for: R290; mineral-, alkyl benzene and ester lubricants
- Cable length (2 wire): 6.0 m

Marking

- CE Mark according 2004/108/EC, EN61326 Emission (Group 1, Class B) and immunity (industrial locations)
- Ex II 3G Ex nC IIB T4 Gc X

PT5 types not listed in the following table are not released for use with flammable refrigerants!

Type	Range	Part no.
PT5-30L-FLR	0…30 bar	802389M

Features

- High and low pressure switches
- With molded cable
- Protection IP67
- TÜV approved
- Minimum lot size 100 pieces
- Other settings are not available

PS4-...ATEX

Marking

- CE ENEC05 and CE0035 according to PED 97/23/EC
- Ex II 3G ExnA IIA T2Gc U

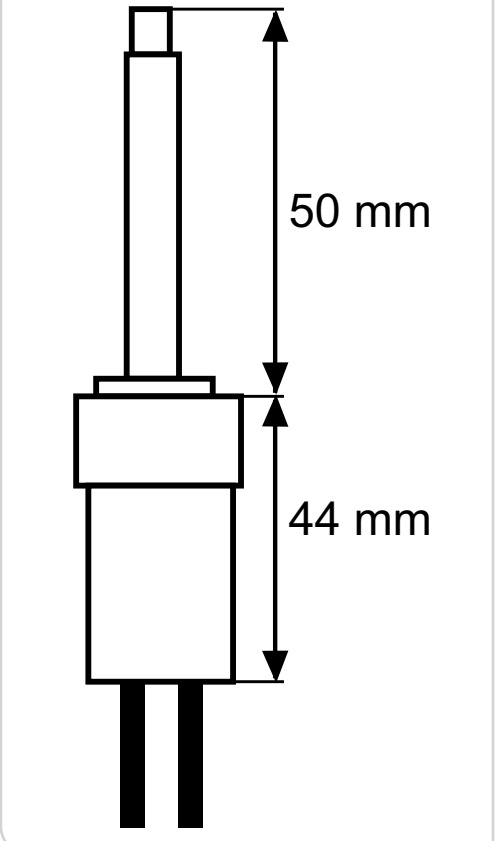
Selection Table

Type Part no.	Setting [bar] Cut-out	Cut-in	EN 12263	Contact function	Application	Pressure connection
Low pressure switches with automatic reset; Open on falling pressure						
PS4-W1 808301 0.6/1.8 bar ATEX	0.6	1.8	PSL	open on falling pressure	low pressure	6 mm
High pressure switches with automatic reset; Open on rising pressure						
PS4-W1 808300 20/26 bar ATEX	20	26	PSH	open on rising pressure	high pressure	6 mm

Technical Data

Max. allowable working pressure PS: PS4-W1 808301 0.6/1.8 bar ATEX PS4-W1 808300 20/26 bar ATEX	 17 bar 37.2 bar
Test pressure PT: PS4-W1 808301 0.6/1.8 bar ATEX PS4-W1 808300 20/26 bar ATEX	 30 bar 41 bar
Electrical rating:	50 mA max. at 24 VDC
Vibration resistance (10 ... 250 Hz)	4 g
Electrical connection Cable version Cable color	 18 AWG 0.8 mm², 600 V (max. 125°C) LP: (blue) HP: (black)
Type of electrical contact:	Single pole single throw (SPST)
Protection class (EN60259)	IP67
Temperature range:	Medium: -35°C...+135°C Ambient: -30°C...+65°C Storage: -30°C...+80°C
Cable length	3 m
Marking	CE ENEC05 and CE0035 acc. to PED 97/23/EC Ex II 3G ExnA IIA T2Gc U

Dimensions [mm]



⚠ **It is manadatory to protect pressure switch against supply voltage higher than 30 VDC and operating current over 50 mA at any time.**

General Information

The Pressure Controls PS4-...ATEX are intended to monitor the pressure and to act as a safety device.

The listed products are electrical operated switches with ignition source and are in compliance with EN 60079 / directive 94/9/EC therefore rated / marked as:

Ex II 3G ExnA IIA T2Gc U

PS4...ATEX must be installed in an appropriate housing to protect them from mechanical damage or shock.

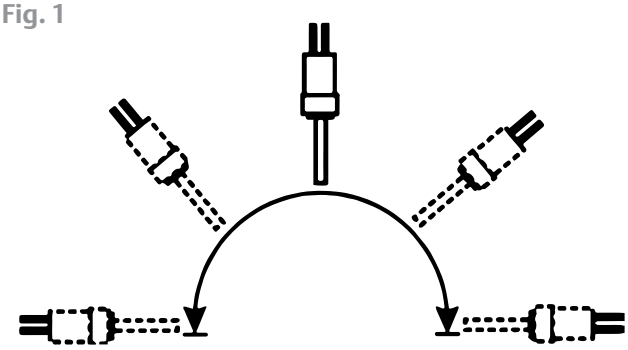
⚠ Safety Instructions

- **Read operating instructions thoroughly. Failure to comply can result in device failure, system damage or personal injury.**
- **According to EN 13313 it is intended for use by persons having the appropriate knowledge and skill.**
- **R290 requires special handling and care due to its flammability. Sufficient ventilation is required during service of the system. Contact with rapidly expanding gases can cause frostbite and eye damage. Proper protective equipment (gloves, eye protection, etc.) has to be used.**
- **In a severely contaminated system, avoid breathing acid vapors and avoid contact with skin from contaminated refrigerant / lubricants. Failure to do so could result in injury.**
- **Ensure that the system is correctly labeled with applied refrigerant type and a warning for explosion risk.**
- **Make sure that the high pressure switch is installed on high pressure side and low pressure switch on low pressure side of system. Failure to do will result in system without protection against high and low pressure and consequently risk of explosion and human injury.**
- **Do not release any refrigerant into the atmosphere!**
- **Do not exceed the specified maximum ratings for pressure, temperature, voltage and current.**
- **Before opening any system make sure pressure in system is brought to and remains at atmospheric pressure.**
- **Ensure that the system piping is grounded.**
- **Before installation or service disconnect voltage from system and device.**
- **Observe and avoid mechanical damage of housing in order to maintain protection class.**
- **Ensure that design, installation and operation are according European ATEX Directive, as well as the according national standards / regulations are respected.**

Installation (Fig. 1)

- PS4-...ATEX pressure controls should not be exposed to gas pulsations. When pulsations can be expected, use a pulsation damper or a capillary tube connection (min. 1m).
- Mounting directions per Fig. 1 in order to prevent the collection of contaminant in pressure sensing element.

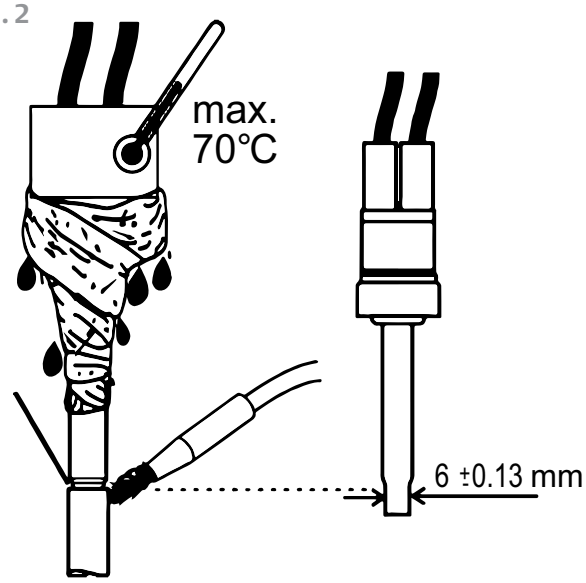
Fig. 1



Brazing (Fig. 2)

- Perform and consider the brazing joint as per EN 14324.
- Before and after brazing clean tubing and brazing joints.
- Minimize vibrations in the piping lines by appropriate solutions.

Fig. 2



Pressure Test

- After completion of installation, a pressure test must be carried out according to EN 378 for systems which must comply with European pressure equipment directive 97/23/EC.
- The max. system test pressure shall be 30 bar for low pressure side and 41 bar for high pressure side.

⚠ Warning

- **Failure to do so could result in loss of refrigerant and personal injury.**
- **The pressure test must be conducted by skilled persons with due respect regarding the danger related to pressure.**

Tightness Test

Conduct tightness test according to EN 378-2 with appropriate equipment and method to identify tightness of external joints. The allowable leakage rate must be according system manufacturer's specification.

Electrical Connection

- **Entire electrical connections have to comply with local regulations.**
- **Ensure that the cables are mounted without tension; always leave the cable a bit loose.**
- **Ensure that cables are not mounted near sharp edges.**
- **Do not bend or mechanically stress the cable outlet, maintain a clearance of 20 mm to neighboring parts.**

Operation

- **Perform a functional test of electrical circuit before charging the system with refrigerant.**

Service / Maintenance

- **Defective PS4-...ATEX must be replaced; they cannot be repaired.**
- **Disconnect electrical power before service.**
- **The lowest pressure inside system must be at least 0.4 bar higher than ambient pressure at any time. Failure to do so could accumulate air inside the system and create an explosive mixture over time.**
- **Before any debrazing ensure that the flammable refrigerant is pumped out of the system and the room around the system is well vented so no refrigerant left.**

Technical Data of PS4 -...ATEX:

- Max. allowable working pressure PS: (see table below)
- Test pressure PT: (see table below)
- Protection class (EN 60529): IP67
- Ambient temperature (housing): -30°C...+65°C
- Storage / transportation temperature: -30°C...+80°C
- Medium temperature: -35°C...+135°C
- Released / compatible for: R290, mineral- and alkyl benzene, ester lubricants
- Electrical rating: 50 mA max. at 24 VDC max
- Function: Pressure limiter, type approval EN 12263, PSL/PSH
- Pressure controls PS4...ATEX are factory preset to specific switch points (see label). The set points cannot be modified.
- Type of electrical contact: Single pole single throw (SPST)

Marking

- ENEC05 and CE0035 according to PED 97/23/EC
- Ⓔx II 3G ExnA IIA T2Gc U

PS4 types, not listed in the following table, are not released for use with flammable refrigerants!

Type	Part no.	Settings	PS	PT
PS4-W1	808301	0.6/1.8 bar ATEX	17 bar	30 bar
PS4-W1	808300	20/26 bar ATEX	37.2 bar	41 bar

Hermetic Liquid Line Filter Driers ADK-...FLR

ADK-...FLR filter driers are used for protection of systems against contaminant.

ADK-...FLR

Features

- Solid block
- Hermetic design
- Rugged steel shells
- Corrosion resistant epoxy paint
- Cushioned flow for non-turbulent performance
- High water adsorption capacity
- High acid adsorption capacity
- High filtration capacity / efficiency
- No CE marking according art. 3.3 PED 97/23 EC
- Max. working pressure PS: 35 bar

Selection Table

Type	Part. no	Connection ODF	Flow capacity [kW] Pressure drop	
			0.07 bar	0.14 bar
ADK-032S FLR	803650	1/4"	9.6	14.1
ADK-036MMS FLR	803651	6 mm	8.8	13.1
ADK-052S FLR	803652	1/4"	11.8	18.7
ADK-056MMS FLR	803653	6 mm	10.9	16.4
ADK-053S FLR	803654	3/8"	17.9	26.4
ADK-0510MMS FLR	804066	10 mm	17.9	26.4
ADK-082S FLR	804067	1/4"	13.1	19.0
ADK-086MMS FLR	804068	6 mm	11.7	17.5
ADK-083S FLR	804069	3/8"	18.0	26.4
ADK-0810MMS FLR	804070	10 mm	18.0	26.4
ADK-084S FLR	804071	1/2"	29.3	44.2
ADK-0812MMS FLR	804072	12 mm	28.8	43.2
ADK-163S FLR	804073	3/8"	20.5	29.3
ADK-1610MMS	804074	10 mm	20.5	29.3
ADK-164S FLR	804075	1/2"	39.4	54.7
ADK-1612MMS FLR	804076	12 mm	35.4	53.1
ADK-165S FLR	804077	5/8" / 16 mm	54.4	79.3
ADK-304S FLR	804078	1/2"	39.5	56.5
ADK-305S FLR	804079	5/8" / 16 mm	57.8	79.9
ADK-307S FLR	804080	7/8" / 22 mm	72.6	114.5
ADK-417S FLR	804081	5/8" / 16 mm	85.3	128.0
ADK-757S FLR	804082	7/8" / 22 mm	115.5	173.3

Correction Factors ADK

Use following simplified formula for operating conditions other than -15°C / +30°C

$$Q_n = Q_o \times K_t$$

Q_n : Nominal flow capacity
Q_o : Required cooling capacity
K_t : Correction factor for evaporating and liquid temperature

Liquid temperature °C	Correction factor K_t Evaporating temperature °C											
	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35
70	1.58	1.62	1.66	1.71	1.77	1.83	1.89	1.96	2.03	2.11	2.20	2.29
65	1.43	1.46	1.50	1.54	1.58	1.63	1.68	1.73	1.79	1.86	1.92	2.00
60	1.30	1.33	1.37	1.40	1.44	1.48	1.52	1.56	1.61	1.66	1.72	1.78
55	1.20	1.23	1.26	1.29	1.32	1.35	1.39	1.42	1.46	1.51	1.55	1.60
50	1.12	1.14	1.17	1.19	1.22	1.25	1.28	1.31	1.34	1.38	1.42	1.46
45	1.05	1.07	1.09	1.11	1.13	1.16	1.19	1.21	1.24	1.28	1.31	1.34
40	0.98	1.00	1.02	1.04	1.06	1.08	1.11	1.13	1.16	1.19	1.22	1.25
35	0.93	0.95	0.96	0.98	1.00	1.02	1.04	1.06	1.08	1.11	1.14	1.16
30	0.88	0.90	0.91	0.93	0.94	0.96	0.98	1.00	1.02	1.04	1.07	1.09
25	0.84	0.85	0.86	0.88	0.89	0.91	0.93	0.95	0.96	0.98	1.00	1.03
20	-	0.81	0.82	0.84	0.85	0.87	0.88	0.90	0.91	0.93	0.95	0.97

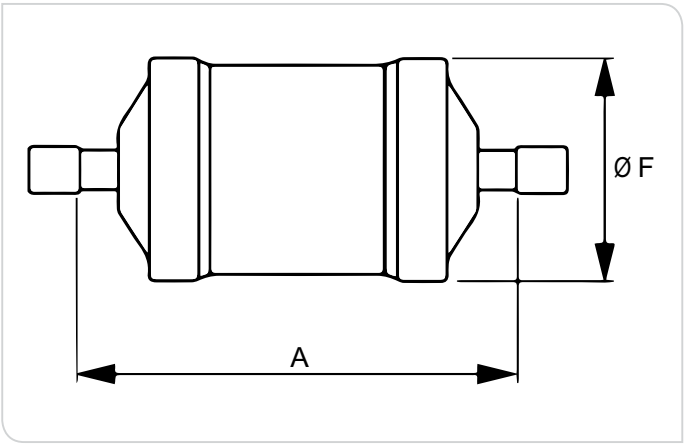
Technical Data

Max. working pressure PS	35 bar
Test pressure PT	38.5 bar
Medium temperature TS	-45…+65°C
Ambient temperature	-45…+65°C
Fluid group	II
Solder connections	Copper, ODF

Shell	Steel
Paint	Epoxy powder paint
Protection	500+ Hours salt spray test
Package	Individual packaged
Standards	EN 14276-1
Marking	HP

Dimensions [mm]

Type	Connection ODF	[mm]	
		A	Ø F
ADK-032S-FLR	1/4"	70.1	44.0
ADK-036MMS-FLR	6 mm	70.1	44.0
ADK-052S-FLR	1/4"	85.3	63.5
ADK-056MMS-FLR	6 mm	85.3	63.5
ADK-053S-FLR	3/8"	84.8	63.5
ADK-0510MMS-FLR	10 mm	84.8	63.5
ADK-082S-FLR	1/4"	102.7	63.5
ADK-086MMS-FLR	6 mm	102.6	63.5
ADK-083S-FLR	3/8"	102.1	63.5
ADK-0810MMS-FLR	10 mm	102.1	63.5
ADK-084S-FLR	1/2"	102.5	63.5
ADK-0812MMS-FLR	12 mm	102.6	63.5
ADK-163S-FLR	3/8"	126.6	63.5
ADK-1610MMS-FLR	10 mm	126.6	63.5
ADK-164S-FLR	1/2"	127.0	63.5
ADK-1612MMS-FLR	12 mm	127.0	63.5
ADK-165S-FLR	5/8" / 16 mm	127.6	63.5
ADK-304S-FLR	1/2"	193.6	76.2
ADK-305S-FLR	5/8" / 16 mm	194.2	76.2
ADK-307S-FLR	7/8" / 22 mm	193.6	76.2
ADK-417S-FLR	5/8" / 16 mm	199.9	88.9
ADK-757S-FLR	7/8" / 22 mm	337.4	88.9



General Information

ADK-...FLR filter driers are used for protection of systems against contaminant.

The listed products are not in scope of ATEX product directive 94/9/EC as they do not incorporate an own source of ignition.

ADK-...FLR must be installed in an appropriate housing to protect them from mechanical damage or shock.

⚠ Safety Instructions

- **Read operating instructions thoroughly. Non-observance can result in device failure, system damage or personal injury.**
- **According to EN 13313 it is intended for use by persons having the appropriate knowledge and skill.**
- **R290 requires special handling and care due to its flammability. Sufficient ventilation is required during service of the system. Contact with rapidly expanding gases can cause frostbite and eye damage. Proper protective equipment (gloves. eye protection. etc.) has to be used.**
- **In a severely contaminated system, avoid breathing acid vapors and avoid contact with the skin from contaminated refrigerant/lubricants. Failure to do so could result in injury.**
- **Ensure that the system is correctly labeled with applied refrigerant type and a warning for explosion risk.**
- **Do not release any refrigerant into the atmosphere.**
- **Do not exceed the specified maximum ratings for pressure and temperature.**
- **Before opening any system make sure pressure in system is brought to and remains at atmospheric pressure.**
- **Do not use on any other fluid media without prior approval of Emerson. Use of fluids not listed could result in chemical deterioration of the desiccant in filter drier.**
- **Ensure that design, installation and operation are according to European and national standards/ regulations.**

Mounting Location

- Filter driers may be installed in any position within the liquid line. Direction of refrigerant flow must be observed.
- For best results locate the filter drier as close as possible to the inlet of expansion device. If using a liquid line solenoid valve and/or moisture indicator. Locating filter drier upstream will provide protection for the solenoid valve and the moisture indicator will measure the effectiveness of the drier.
- Protect the filter drier against sunrays and vibration.

Installation

- Do not remove seal caps until ready for installation in order to minimize entering of moisture and dirt.

⚠ Avoid damaging the connections!

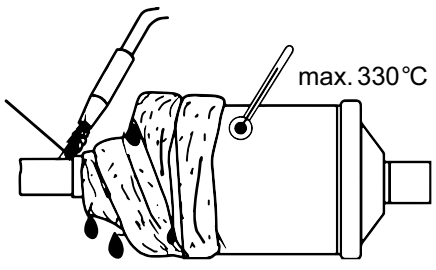
- Direction of refrigerant flow must match with arrow on the label. Reverse flow reduces the filtering ability and increases the pressure drop through the filter drier.

Recommended external pipe connection:

Nominal pipe connection	Outside diameter	
	Min. (mm)	Max. (mm)
1/4"	6.30	6.38
3/8"	9.47	9.55
1/2"	12.62	12.73
5/8"	15.80	15.90
7/8"	22.15	22.25
1-1/8"	28.50	28.63
6 mm	5.95	6.05
10 mm	9.95	10.05
12 mm	11.96	12.05
16 mm	15.95	16.05
22 mm	21.95	22.06
28 mm	27.95	28.05

Brazing (Fig. 1)

- Perform and consider the brazing joint as per EN 14324.
- Before and after brazing clean tubing and brazing joints.
- Minimize vibrations in the piping lines by appropriate solutions.



Pressure Test

- After completion of installation. a pressure test must be carried out according to EN 378 for systems which must comply with European pressure equipment directive 97/23/EC.
- Max. system test pressure: 38.5 bar.

⚠ Warning

- **Failure to do so could result in loss of refrigerant and personal injury.**
- **The pressure test must be conducted by skilled persons with due respect regarding the danger related to pressure.**

Tightness Test

Conduct a tightness test according to EN 378-2 with appropriate equipment and method to identify tightness of external joints. The allowable leakage rate must be according system manufacturer's specification.

Operation

- After leakage test start system and after sufficient running time check color of moisture indicator for moisture level. We recommend the use of Emerson moisture indicators.
- In systems with excessive moisture it may be necessary to replace the filter drier for several times in order to bring moisture in the system to a safe level.

Service / Maintenance

- **Before any debrazing ensure that the flammable refrigerant is pumped out of the system and the room around the system is well vented so no refrigerant left.**
- **Disconnect electrical power before service.**
- **Always install a new filter drier when existing ones become saturated with moisture and foreign materials.**
- **Do not attempt to dry out a used filter drier.**

Technical Data of ADK -...FLR

- Max. allowable working pressure PS: 35 bar
- Test pressure PT: 38.5 bar
- Temperature Range TS: -45°C...+65°C
- Released / compatible for: R290, mineral- and alkyl bezene, ester lubicants
- Standards: EN 14276-1

ADK types not listed in the following table are not released for use with flammable refrigerants!

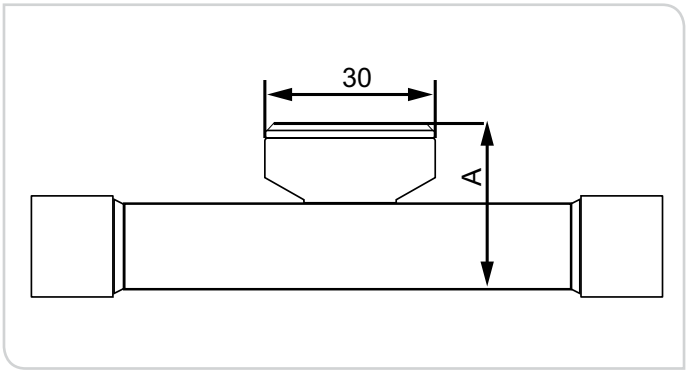
Type	Part no.
ADK-032S-FLR	803 650
ADK-036MMS-FLR	803 651
ADK-052S-FLR	803 652
ADK-056MMS-FLR	803 653
ADK-053S-FLR	803 654
ADK-0510MMS-FLR	804 066
ADK-082S-FLR	804 067
ADK-086MMS-FLR	804 068
ADK-083S-FLR	804 069
ADK-0810MMS-FLR	804 070
ADK-084S-FLR	804 071
ADK-0812MMS-FLR	804 072
ADK-0163S-FLR	804 073
ADK-0160MMS-FLR	804 074
ADK-164S-FLR	804 075
ADK-0162MMS-FLR	804 076
ADK-165S-FLR	804 077
ADK-304S-FLR	804 078
ADK-305S-FLR	804 079
ADK-307S-FLR	804 080
ADK-417S-FLR	804 081
ADK-757S-FLR	804 082

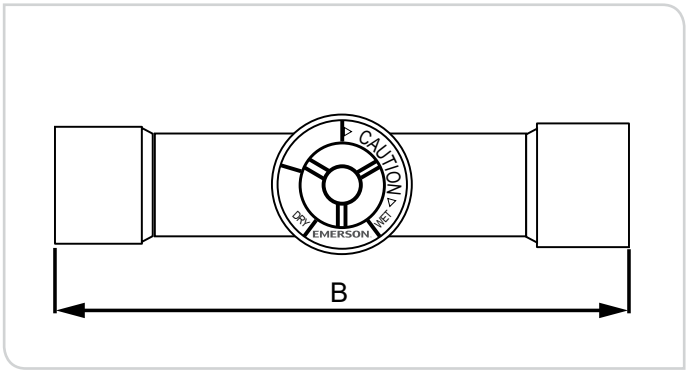
Features

- Fully hermetic
- Lower Pressure drop
- Corrosion free stainless steel body
- Crystal Indicator element for long lifetime and reliability
- Easily determination of moisture content
- Sensitive indicator with calibrated four colors. Conforms to requirement of most compressor manufacturers
- Large clear viewing area
- ODF extended tube configurations suitable for all commercial applications

MIA Moisture Indicator

Selection and Dimensions [mm]





Type	Part no.	For tube outside diameter	Height A [mm]	Length B [mm]	Weight [g]
MIA 014-FLR	805895	1/4"	25.7	98.0	60
MIA 038-FLR	805896	3/8"	28.5	109.0	70
MIA 012-FLR	805897	1/2"	31.8	113.0	75
MIA 058-FLR	805898	5/8"	31.8	108.5	85
MIA 078-FLR	805899	7/8"	37.8	122.5	150
MIA 118-FLR	805900	1 1/8"	43.5	122.5	190

Type	Part no.	For tube outside diameter	Height A [mm]	Length B [mm]	Weight [g]
MIA M06-FLR	805901	6 mm	25.9	98.0	60
MIA M10-FLR	805894	10 mm	28.5	109.0	70
MIA M12-FLR	805902	12 mm	28.5	113.0	75
MIA M28-FLR	805903	28 mm	43.5	122.5	190
MIA M10S-FLR	805904	10 mm	28.7	119	75
MIA M12S-FLR	805905	12 mm	28.5	113	75

Technical Data

Maximum working pressure PS	35 bar
Test pressure PT	49.5 bar
Medium compatibility	R290, mineral-, alkyl benzene and ester lubricants
Connections	ODF extended copper tubes, solder connections only

Pressure drop	negligible
Operating temperature TS	-40…+100°C
External leakage (100% - production tested with Helium - Spectrometer)	5.0 x 10-6 mbar l/sec = 4.9 x 10-6 cc/sec
Standards	EN 12178

Determining the Moisture Content with the Color Code

Refrigerant	Liquid temperature °C	Moisture content in mg water per kg refrigerant (ppm)			
		Blue	Purple	Fuchsia	Rose
		Dry		Caution	Caution wet
R290	25	2	4	9	14
	38	5	8	18	29
	52	10	16	36	59

Note: In area “Caution” and “Caution wet” filter drier should be changed.

General Information

MIA...-FLR are sight glasses with moisture indicator.

The listed products are not in scope of ATEX product directive 94/9/EC as they do not incorporate an own source of ignition.

MIA...-FLR must be installed in an appropriate housing to protect them from mechanical damage or shock.

⚠ Safety Instructions

- **Read operating instructions thoroughly. Non-observance can result in device failure, system damage or personal injury.**
- **According to EN 13313 it is intended for use by persons having the appropriate knowledge and skill.**
- **R290 requires special handling and care due to its flammability. Sufficient ventilation is required during service of the system. Contact with rapidly expanding gases can cause frostbite and eye damage. Proper protective equipment (gloves. eye protection. etc.) has to be used.**
- **In a severely contaminated system. avoid breathing acid vapors and avoid contact with skin from contaminated refrigerant / lubricants. Failure to do so could result in injury.**
- **Ensure that the system is correctly labeled with applied refrigerant type and a warning for explosion risk.**
- **Do not release any refrigerant into the atmosphere!**
- **Do not exceed the specified maximum ratings for pressure and temperature.**
- **Before opening any system make sure pressure in system is brought to and remains at atmospheric pressure.**
- **Ensure that design. installation and operation are according to European and national standards/ regulations.**

Mounting Location

- MIA...-FLR has to be installed only in the liquid line, otherwise the humidity reading can show wrong values.
- MIA...-FLR is bi-directional and may be installed in any position which allows visual access to the indicator window itself.
- The moisture indicator is normally located after the filter drier and before the expansion valve.

Installation

- Do not remove seal caps until ready for installation in order to minimize entering of moisture and dirt.

⚠ Avoid damaging the connections!

- The MIA...-FLR is fully hermetic and cannot be disassembled.

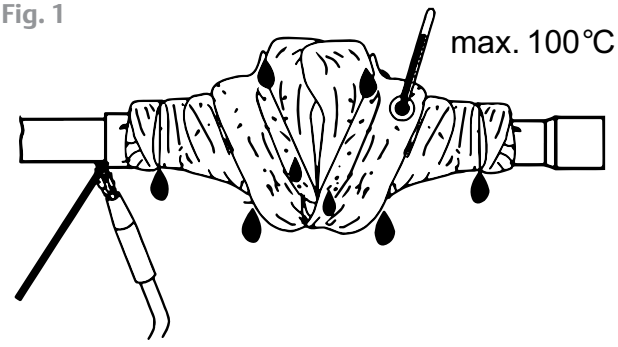
Recommended external pipe connection:

Nominal pipe connection	Outside diameter	
	Min. (mm)	Max. (mm)
1/4 “	6.30	6.38
3/8“	9.47	9.55
1/2“	12.62	12.73
5/8“	15.80	16.05
7/8“	22.15	22.25
1-1/8”	28.50	28.63
6 mm	5.95	6.05
10 mm	9.95	10.05
12 mm	11.96	12.05
28 mm	27.95	28.05

Brazing (Fig. 1)

- Perform and consider the brazing joint as per EN 14324.
- Before and after brazing clean tubing and brazing joints.
- To avoid oxidization, it is advised to purge the system with an inert gas such as nitrogen while brazing.
  Do not exceed the maximum temperature of 100°C.

Fig. 1



- To avoid overheating it is advised to make the join at one end and cool the indicator completely before repeating the procedure on the other end connection.
- Minimize vibrations in the piping lines by appropriate solutions.

Fig. 2

Refrigerant	Liquid temperature °C	ppm			
		Blue / Dry	Purple	Fuchsia / Caution	Rose / Caution wet
R290	25	2	4	9	14
	38	5	8	18	29
	52	10	16	36	59

Pressure Test

- After completion of installation, a pressure test must be carried out according to EN 378 for systems which must comply with European pressure equipment directive 97/23/EC.
- Max. system test pressure: 38.5 bar.

⚠ Warning

- **Failure to do so could result in loss of refrigerant and personal injury.**
- **The pressure test must be conducted by skilled persons with due respect regarding the danger related to pressure.**

Tightness Test

Conduct tightness test according to EN 378-2 with appropriate equipment and method to identify tightness of external joint. The allowable leakage rate must be according system manufacturer's specification.

Humidity Reading (Fig. 2)

- The humidity content in mg Water per kg refrigerant (ppm) can be identified by the color code in Fig. 2.
- A minimum period of 12 hours is recommended after installation before attempting to determine system moisture content.
- In case of indicator is showing **fuchsia** or **rose** color the change of the filter drier is required.

⚠ Service / Maintenance

- Defective MIA...-FLR must be replaced; they cannot be repaired.
- Disconnect electrical power before service.
- Before any debrazing ensure that the flammable refrigerant is pumped out of the system and the room around the system is well vented so no refrigerant left.

Technical Data of MIA... -FLR

- Max. allowable working pressure PS: 35 bar
- Test pressure PT: 49.5 bar
- Medium temperature TS: -40°C...+100 °C
- Released / compatible for: R290, mineral- and alkyl benzene, ester lubricants
- Standards: EN 12178

MIA types not listed in following table are not released for use with flammable refrigerants!

Type	Part no.
MIA 014-FLR	805895
MIA 038-FLR	805896
MIA 112-FLR	805897
MIA 058-FLR	805898
MIA 078-FLR	805899
MIA 118-FLR	805900
MIA M6-FLR	805901
MIA M10-FLR	805894
MIA M12-FLR	805902
MIA M28-FLR	805903
MIA M10S-FLR	805904
MIA M12S-FLR	805905

Product material compatible with R290 only for Non explosive environment

Content **Page**

Products

Superheat Controllers EC3-P32* / EC3-P33* and ECD-002*

Technical Bulletin 46

Oil Management/ Special Version of OM3*

Technical Bulletin 49

Compressor Soft Starter CSS*

Technical Bulletin 51

⚠ ***) These devices have potential ignition source and do not comply with ATEX requirements. Installation only in "non explosive location".**

EC3-P32 / -P33 Superheat Controller & Standard ECD-002

EC3-P32 / -P33 are stand-alone universal superheat controllers.

EC3-P32 offers remote access with built-in TCP/IP Ethernet communications and WebServer functionality. Any standard WebBrowser (e.g. Internet Explorer® or Mozilla Firefox) can be used for monitoring or parameter setting. EC3-P33 has no network communication.

EC3-P32

EC3-P33 with ECD-002

Features EC3-P33 / EC3-P32

- Superheat control in conjunction with Emerson stepper motor driven Electrical Control Valves EX4-7...-FLR
- Selectable refrigerants: R290, R1234Ze, R1234yf, R32, R1270 (The valves compatibility release for R290 and R32 for time being)
- Low superheat alarm and MOP function
- Feed through of 4...20 mA signal from evaporator pressure sensor to analogue output. This may also be connected to pressure input of any other controller to avoid need for multiple pressure sensors
- Monitoring of sensors and sensor wiring and detection of sensor and wiring failures
- Intelligent alarm management in order to protect the compressor i.e. fail safe operation
- Integral rechargeable battery to close electrical control valve in case of power loss
- Electrical connection via plug-in type screw terminals
- Aluminum housing for DIN rail mounting

Additional Features EC3-P32 only

- High superheat alarm
- Low pressure switch function/alarm
- Freeze protection function/alarm
- Pump down function

Selection Table

Description	Type	Part No.
Superheat Controller	EC3-P33	807858
Terminal kit EC3-P33	K03-X33	807645
Display / keypad unit (opt.)	ECD-002	807657
Superheat Controller	EC3-P32	807857
Terminal kit EC3-P32	K03-X32	807644

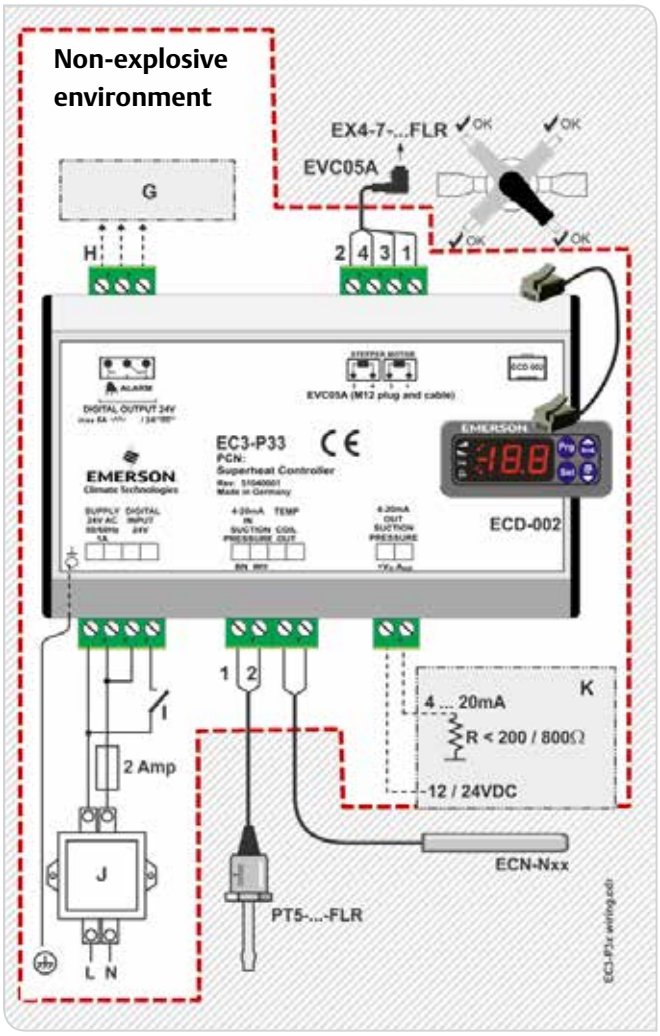
⚠ **These devices have potential ignition source and do not comply with ATEX requirem ents. Installation only in "non explosive location".**

Selection Table Accessories

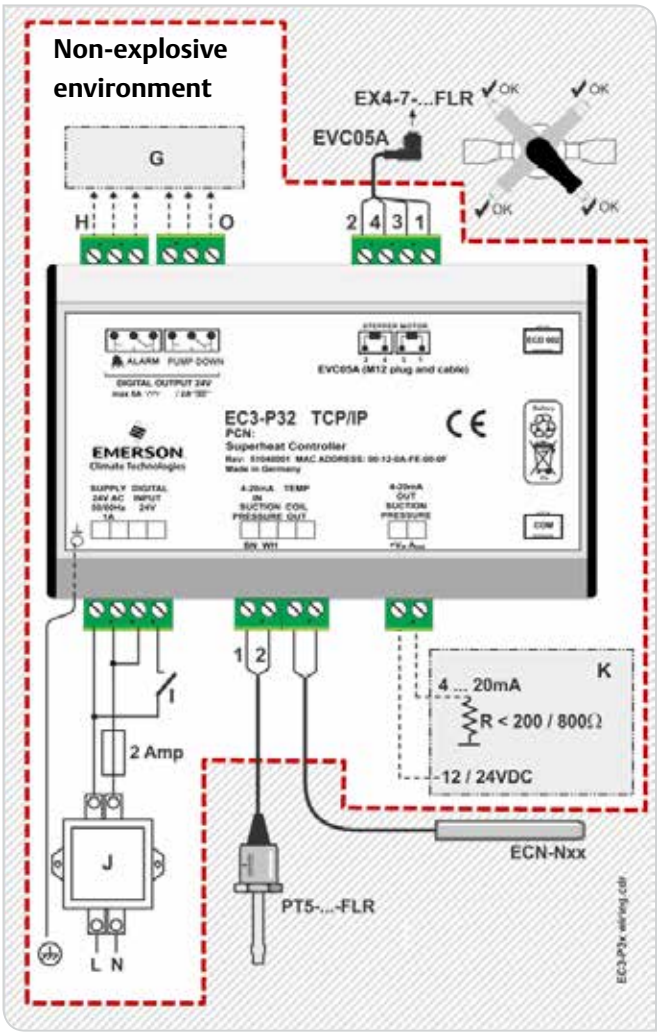
Description		Type	Part no.
Temperature sensor	Cable length 3.0 m	ECN-N30	804496
	Cable length 6.0 m	ECN-N60	804497
	Cable length 12.0 m	ECN-N99	804499
Pressure transmitter	0…30 bar	PT5-30L FLR	802389M

Wiring Diagram

EC3-P33



EC3-P32



2: White 4: Black 3: Blue 1: Brown wire

G: Remote control panel, system controller

H: Alarm relay, dry contact; Relay coil is not energized at alarm condition or power off

⚠ **The use of the relay is essential to protect the system in case of power failure if the communications interface or the ECD-002 are not utilized.**

I: Digital input (0V/open = Stop; 24V/closed = Start)

J: Transformer Class II, 24VAC secondary / 25VA

K: Third party controller (can use analog output signal of EC3)

O: Pump down relay, dry contact; Relay is energized during normal operation.

Note: The internal resistor of a third party controller must fulfill the following conditions:

Supply voltage 12VDC: R ≤ 200Ω

Supply voltage 24VDC: R ≤ 800Ω

Network Connection EC3-P32 only

Cross over cable

Connection via router

Technical Data

EC3-P32 / -P33

Supply voltage	24VAC ±10%, 50/60Hz
Digital input	24 V AC ±10%, 50-60HZ 24 V DC ±10%
Power consumption	25VA max. including connected ECV and display / keyboard
Internal battery charging time	Approximately 2 hours if battery is fully empty
Plug-in connector size	Removable screw version wire size 0.14…1.5 mm^2
Ground connection	6.3 mm spade earth connector
Marking	CE
Protection class	IP 20 (DIN EN60529)
Vibration	4 g, 10-1000 Hz
Temperature storage operating	 -20…+65°C 0…+60°C 1…+25°C for optimum battery life
Applied detective EMC LVD ROHS	 EN 61326, EN 50081, EN 61000-6-2, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11
Humidity	0…80% r.h. non condensing
Weight	~ 800 g
Mounting	DIN rail mounted

ECD-002

ECD-002 Display Unit

Supply	From EC3 Series Controller via connecting cable
LED indicators	Valve opening, valve closing, alarm, demand
Display LED	Numeric segmental display. 2½-digits, red, with automatic decimal point between ±19.9, switchable between °C and °F
Connecting cable	ECC-Nxx or standard CAT5 patch cord with RJ45 connectors
Temperature storage operating	-20…+65°C 0…+60°C
Humidity	0…80% r.h. non condensing
Protection class (DIN EN 60529)	IP65 (mounting in front panel with gasket)
Weight	~ 52 g
Mounting	Panel mount (71 x 29 mm cutout)

⚠ **These devices have potential ignition source and do not comply with ATEX requirements. Installation only in "non explosive location".**

Oil Management OM3-020P TraxOil

The OM3-020P TraxOil oil management is a self-contained system which provides both functions of oil level monitoring and active oil level balancing including alarm relay activation for compressor protection

OM3-020P TraxOil with ASC3 Coil

Features

- Supply 24VAC or 230VAC
- 3 Zone Level Control by using precise Hall-Sensor measurement, not prone to errors by foaming or light like optical sensors
- SPDT output contact for compressor shut down or alarming, rating 230VAC / 3A
- Easy installation by sight-glass replacement and front side mounting without nuts
- Self-contained unit with oil level sensor and integral solenoid to manage oil level supply
- Alarm, status and level indication by LED's
- Braze adapter suitable for Copeland Compressors
- Recommended by leading compressor manufacturers
- Adapter with brazing connection for Copeland Compressors

Selection Table

1. Type main body	Description	Part no.
OM3-020P		805270

2. Type braze adapter	Description	Part no.
OM0-CCP	22.5 mm	805260

Other Required Parts

Supply voltage 24V

3. Solenoid Coil

Type	Part no.	
ASC3-24VAC	801079	50 HZ, 15 VA

4. Cable Assembly Power Supply and Solenoid

OM3-P30	805151	24V, 3 m
OM3-P60	805152	24V, 6 m
OM3-P100	805153	24V, 10 m

Supply voltage 230V

3. Solenoid Coil

Type	Part no.	
ASC3-230VAC	801077	50 Hz, 15 VA

4. Cable Assembly with 230V module

OM-230V-3	805161	230V, 3 m
OM-230V-6	805162	230V, 6 m

⚠ **These devices have potential ignition source and do not comply with ATEX requirements. Installation only in "non explosive location". OM3-020P has special O-rings released for propane, installation in combination with OM0-CCP brazing adapter only.**

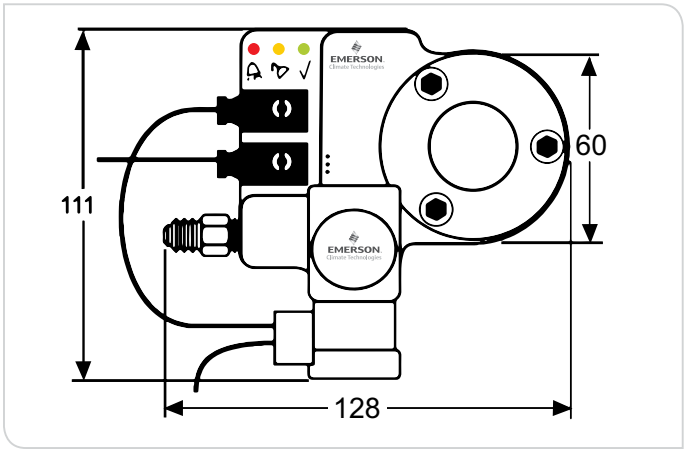
Technical Data

Markings:	CE under: Low Voltage Directive 2006/95/EC. EMC Directive 89/336/EC EAC
Applied Standards:	EN 12284, EN 378, EN 61010, EN 50081-1, EN 50082-1
Max. working pressure PS: Max. test pressure PT: Burst Pressure:	35 bar 39 bar 175 bar
Supply voltage / total power: OM3/4 with 24VAC ASC3 coil OM3/4 with OM-230V-x module	 24VAC, 50 Hz, +10/-15%, 17VA 230VAC, 50 Hz, 17VA
Solenoid valve MOPD	21 bar
Vibration resistance (EN60068-2-6)	max. 4 g, 10…250 Hz
Medium temperature Ambient/Storage temperature	-20…+80°C -20…+50°C
Medium compatibility	R290

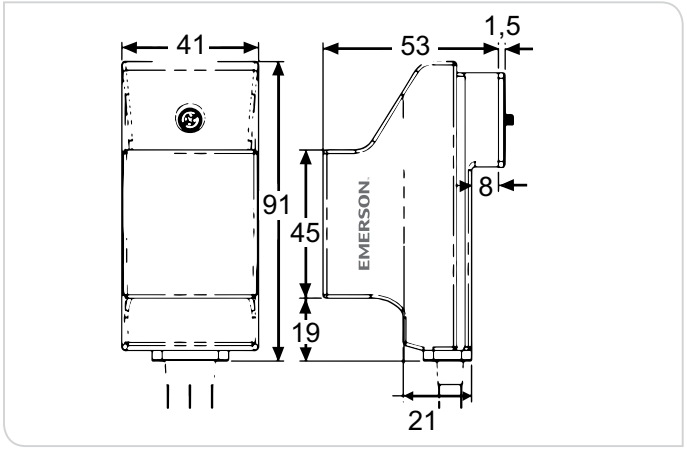
Materials: Body and Adapter Screws Sight Glass	 Aluminum (EN AW 6060) Stainless Steel (ISO 4762) Nickel-plated Steel (ISO 2081)
Flow rate at ΔP =3.5 bar	0.9 ltr/min. water at 20°C ambient
Orientation of base unit: Level control:	Horizontal, +/- 1° 40%...60% of sight glass height
Alarm contact:	max. 3A, 230VAC SPDT dry contact
Time Delay Alarm:	20 sec.
Time Delay Filling:	10 sec.
Protection class	IP65 (IEC529/EN 60529)
Weight: 24V System 230V System	 750…920 g incl. adapter 1100…1270 g incl. adapter
Oil connection	7/16”-20 UNF male. with strainer and O-ring (replaceable. see acc.)

Dimensions [mm]

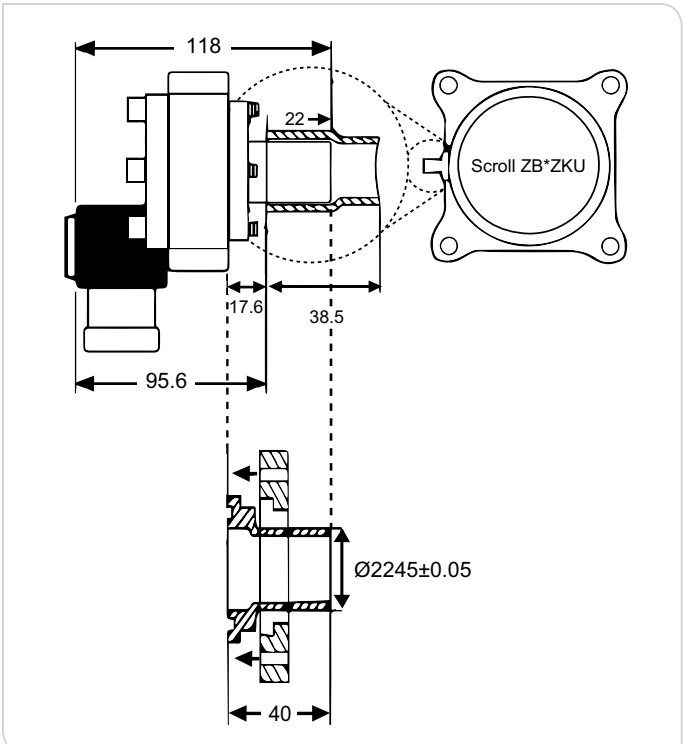
Base Unit with Adapter and Coil ASC3



OM-230V-x Module



Adapter OM0-CCP



The first VDE certified **Compressor Soft Starter** for safety of household. It is used for switching, protection and starting current limitation of single phase compressors in residential heat pumps, refrigeration and air-conditioning applications.

CSS-32U Soft Starter

Features

- For motors with maximum operating current up to 25A / 32A
- Limitation of starting current to less than 45A; PCN 805209 less than 30A
- Self adjusting for use in 50 Hz or 60 Hz supply
- Self adjusting to motor current - no manual adjustment or calibration necessary
- Alarm relay output
- Start capacitor for improved motor acceleration is switched off after start
- Low voltage shutdown
- Locked rotor recognition and shutdown
- Delay function to limit number of motor starts per hour
- Thyristor protected contactor for long life
- No extra motor contactor needed
- Self diagnostics
- Mounting clip for easy installation allows DIN rail mounting in two directions
- Easy wiring by cage type screw terminals
  CSS-...U: 4mm² cross section terminals
  CSS-...W: 6mm² cross section terminals

CSS-32W Soft Starter

Selection Table

Type	Part no.	Description	Screw terminals	Nom. compr. current	Max. start current
CSS-32U	805204	Compressor Soft Starter incl. mounting clip and operating manual	4 mm²	32A max	45 A
CSS-32U	805204M	Box with 20 pieces. mounting clips and one operating manual	4 mm²	32A max	45 A
CSS-32W	805211	Compressor Soft Starter incl. mounting clip and operating manual	6 mm²	32A max	45 A
CSS-32W	805211M	Box with 20 pieces. mounting clips and one operating manual	6 mm²	32A max	45 A
CSS-25U	805205	Compressor Soft Starter incl. mounting clip and operating manual	4 mm²	25A max	45 A
CSS-25U	805205M	Box with 20 pieces. mounting clips and one operating manual	4 mm²	25A max	45 A
CSS-25U	805209	Compressor Soft Starter Im30 incl. mounting clip and operating manual	4 mm²	25A max	30 A
CSS-25U	805209M	Box with 20 pieces. mounting clips and one operating manual	4 mm²	25A max	30 A

⚠ **These devices have potential ignition source and do not comply with ATEX requirements. Installation only in "non explosive location".**

Accessory

Type	Part no.	Description
K00-003	807663	3-pol screw connector to alarm output for wires up to 2.5 mm²; bag with 50 pieces

Technical Data

Operating voltage	230V 50 / 60 Hz nominal
Nominal compressor current	CSS-32U / - 32W : 32A max. CSS-25U : 25A max.
Maximum start current	CSS-32U / -32W : 45A CSS-25U (805 205) : 45A CSS-25U (805 209) : 30A
Operating temperature	-20…+55°C non condensing
Storage temperature	-20…+65°C non condensing
Start capacitor	200…240 uF
Time delay after stop	0.5…5 Min

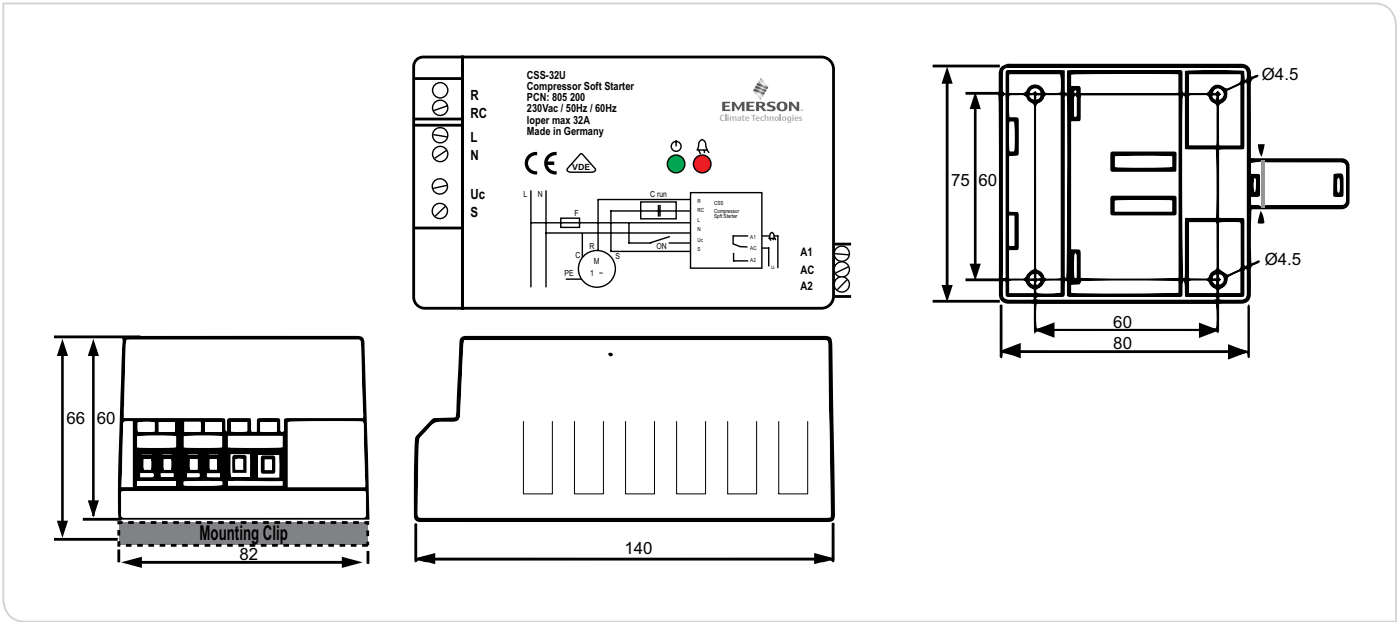
Alarm relay. AgNi (SPDT) Resistive (AC1) max.	250V~ / 3A 30V= / 3A
Flexible cable cross section CSS-32U/-25U all terminals CSS-32W (R, RC, L terminals)	 0.25…4 mm² 0.25…6 mm²
Flexible cable cross section alarm output connector K00-003	 0.25…2.5 mm²
Max. vibration (at 10 to 1000 Hz)	4 g
Weight	430 g
Protection acc. IEC 529	IP20

Standards

EN 60947-1 EN 60947-4-2	Low voltage switch gear and control gear Contactors and motor-starters - AC semiconductor motor controllers and starters
EMC 2004/108/EC	Electromagnetic Compatibility (EMC) Directive
LVD 2006/95/EC	Low Voltage Directive

EN 60335-1 EN 60335-2-40	Safety of household and similar electrical appliances - Part 2-40 Particular requirements for electrical heat pumps. air-conditioners and dehumidifiers
ROHS 2002/95/EC	Restriction of Hazardous Substances Directive
Marking	CE, VDE Reg.-Nr. D967 / D663

Dimensions [mm]



Emerson Climate Technologies at a Glance

Emerson Climate Technologies is the world's leading provider of heating, ventilation, air conditioning, and refrigeration solutions for residential, industrial and commercial applications. We combine technically superior products and services from our industry leading divisions and brands with our global engineering, design and distribution capabilities to create reliable, energy efficient climate systems that improve human comfort, safeguard food, and protect the environment.

TGE-175-EN-1409

For more details, see www.emersonclimate.eu

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