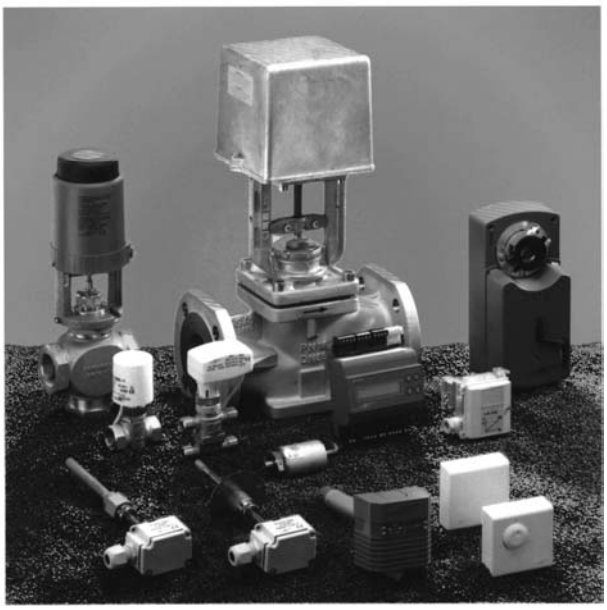
JOHNSON CONTROLS

2004

The Complete Products Catalogue

Get control, quality and reliable solutions.

Where people live, work and relax there's a need for comfort.



Ever-increasing demands are being placed on the environments in which we live, work and relax. We expect the optimum level of heating, air-conditioning and ventilation, whether we're shopping, sleeping or socialising. We enjoy a wide variety of perishable goods than ever before, thanks to advances in refrigeration.

You need to be confident that you can provide the most comfortable and safest environment for building occupants, while managing energy usage to achieve the best performance at the lowest cost. You need to know that the equipment used is well maintained and meets the standards set out in the relevant legislation.

This is where the strength of Johnson Controls comes in. As specialists in the design, development, installation and maintenance of Building Management Systems for all types of environments, we understand your needs. We offer the latest technologies for your current requirements, and the flexibility to take on board changes in the future. Our broad range of technological expertise and commitment to excellence is your guarantee of quality in both product and service.

JOHNSON CONTROLS

Control Products

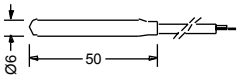
Index

JOHNSON CONTROLS

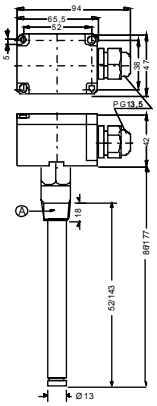
A99 Temperature Sensors

Temperature Sensors and Transducers

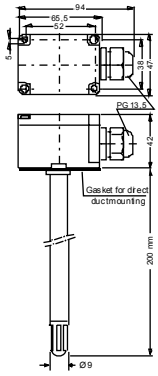
A99 Temperature Sensors



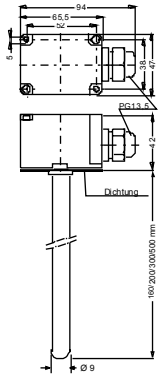
Dimensions Bulb



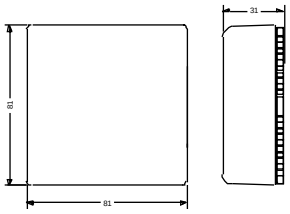
Bulbwell



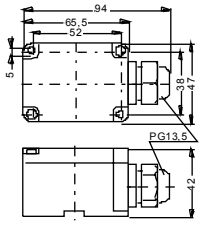
Duct/fast response sensor



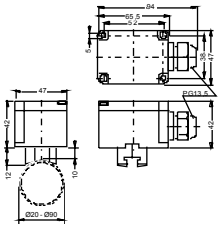
Rod Sensor



Room Sensor



Outdoor Sensor



Strap-on Sensor

Description

The A99 Temperature sensor line offers an economical solution for a wide variety of temperature sensing needs, in the cooling, heating, ventilation and air conditioning application field.

The A99 temperature sensor line includes various models, such as:

- bulb sensors
- bulb well sensors
- room sensors
- outdoor sensors
- duct sensors
- rod sensors
- strap-on sensors

The A99 series is based on a PTC- thermistor-sensing element. Each sensor is calibrated which results in a high accuracy over a wide temperature range.

Features

- Wide range of enclosures for sensing elements
- PG 13,5 cable inlet for all models with polycarbonate housing
- Very accurate sensing element
- 3 types of sensor cable
- High resistance variation per °C
- Several sensor accessories are available
- Stainless steel sensor bulb

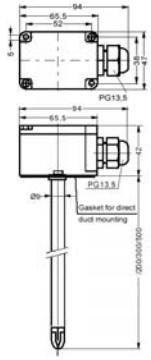
Selection Table

Sensor Type	Cable length (m)	Sensor material	Diam. x length	Additional features	Type-Model Number	
Bulb	2 shielded	Stainless steel bulb,	6 x 50	Temp range : -40 to +100°C (standard + shielded cable models) : -50 to +120°C (Silicon cable models)	**A99BA-200C**	
	2 PVC				**A99BB-200C**	
	0.25 PVC				**A99BB-25C**	
	3 PVC				**A99BB-300C**	
	5 PVC				**A99BB-500C**	
	6 PVC				**A99BB-600C**	
	3 silicon				**A99BC-300C**	
Duct 200 mm		Copper rod, polycarbonale encl.			**A99DY-200C**	
Outdoor		Polycarbonalte			**A99EY-1C**	
Rod 160mm		Copper rod, polycarbonale encl.			**A99LY-160C**	
Rod 200 mm					**A99LY-200C**	
Rod 300 mm					**A99LY-300C**	
Rod 500 mm					**A99LY-500C**	
Room		ABS, Colour RAL9010			**A99RY-1C**	
Strap-on		Polycarbonate			**A99SY-1C**	
Well, 52mm		Brass bulbwell, Polycarbonate enclosure			**A99WD-52C**	
Well, 143mm		Brass bulbwell, Polycarbonate enclosure			**A99WD-143C**	
Well, 143mm		Stainless steel bulbwell, Polycarbonate enclosure			**A99WE-143C**	

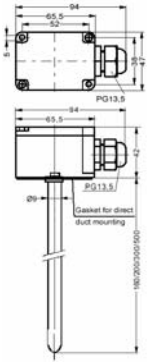
TS-9100/TE-9100 Electronic Sensors and Transducers

Temperature Sensors and Transducers

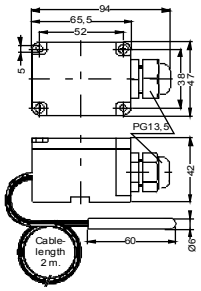
Ceiling sensor
TS-910x-870x



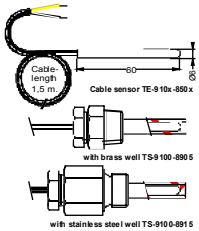
Rod fast response sensor



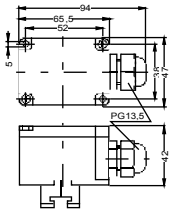
Rod sensor



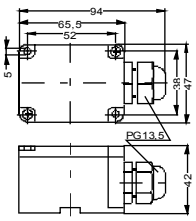
Remote sensor
TS-9101-810x



Cable sensor
TE-910x-850



Strap-on sensor
TS-910x-860x



Outdoor sensor
TS-910x-840x

Description

The TS-9100/TE-9100 series of electronic temperature sensors and transducers provides a passive or active signal that corresponds with the air or water temperature in heating, ventilating and air conditioning applications.

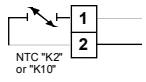
They provide either a 0…10V signal directly proportional to the sensed temperature, or a passive resistive signal NTC or Pt 100.

They are primarily designed to be used as an input to a digital controller of the system 9100 family (except for Pt 100), but can be used with other electronic devices.

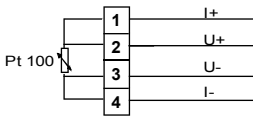
Features

- Wide range of enclosures and signal outputs
- PG 13.5 cable inlet for all models with makrolon housing
- For immersion applications, well can be mounted before rod sensor is mounted
- Rubber gasket and reduced tube diameter for "rod" and "fast rod response" sensors
- Various lengths of tubes and wells for duct and immersion applications
- IP 54 enclosure

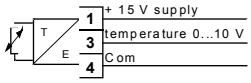
Dimensions



NTC “K2” and “K10” models



Pt-100 models



Active 0…10 V models
Supply Voltage 15 V DC ± 5%,
Output load max. 2 mA,

Wiring

TS-9100 Electronic Sensors and Transducers Selection Table

Output Signal	Mounting	Length in mm.	Range (°C)	Applications					Type-Model Number	
				DX-9100, DX-9200, *1)	TC-9100	SC-9100	TC-9102, TC-8900,	Controllers or electronic devices with Pt100 inputs		
0…10 VDC	Remote Element	60	-40…50	X	X	-	-	-	**TS-9101-8101**	
			0…40	X	X	-	-	-	**TS-9101-8103**	
			0...100	X	X	-	-	-	**TS-9101-8104**	
	Rod *2)	160	-20...40	X	X	-	-	-	**TS-9101-8212**	
			0...40	X	X	-	-	-	**TS-9101-8213**	
			0...100	X	X	-	-	-	**TS-9101-8214**	
		200	-20...40	X	X	-	-	-	**TS-9101-8222**	
			0...40	X	X	-	-	-	**TS-9101-8223**	
			0...100	X	X	-	-	-	**TS-9101-8224**	
			0...150	X	X	-	-	-	**TS-9101-8225**	
			20…120	X	X	-	-	-	**TS-9101-8226**	
			50…150	X	X	-	-	-	**TS-9101-8227**	
		300	-20...40	X	X	-	-	-	**TS-9101-8232**	
			0...40	X	X	-	-	-	**TS-9101-8233**	
			0...100	X	X	-	-	-	**TS-9101-8234**	
			0...150	X	X	-	-	-	**TS-9101-8235**	
		500	-20...40	X	X	-	-	-	**TS-9101-8252**	
			0...40	X	X	-	-	-	**TS-9101-8253**	
			0...100	X	X	-	-	-	**TS-9101-8254**	

*1) Or other electronic devices with 0...10 V inputs.

*2) Rod sensors can either be for: - Duct applications (alone)
- Immersion applications (with well); see dimension drawings

TS-9100 Electronic Sensors and Transducers (continued)

Temperature Sensors and Transducers

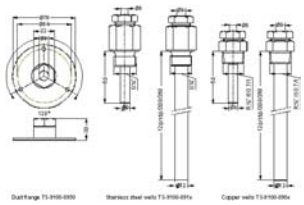
TS-9100 Electronic Sensors and Transducers Selection Table

Output Signal	Mounting	Length in mm.	Range (°C)	Applications					Type-Model Number	
				DX-9100, DX-9200, *1)	TC-9100	SC-9100	TC-9102, TC-8900,	Controllers or electronic devices with Pt100 inputs		
0...10 VDC	Rod fast response	200	-20...40	X	X	-	-	-	TS-9101-8322	
			0...40	X	X	-	-	-	TS-9101-8323	
			0...100	X	X	-	-	-	TS-9101-8324	
		300	0...40	X	X	-	-	-	TS-9101-8333	
		500		X	X	-	-	-	TS-9101-8353	
	Outdoor	-	-40...50	X	X	-	-	-	TS-9101-8401	
			-20...40	X	X	-	-	-	TS-9101-8402	
	Strap-on			X	X				TS-9101-8602	
			0…100	X	X	-	-	-	TS-9101-8604	
	Ceiling			X	X	-	-	-	TS-9101-8703	
NTC „K2“	Bulb	60	0...40	-	-	X	-	-	TE-9100-8501	
	Rod *2)	200		-	-	X	-	-	TS-9103-8220	
		500		-	-	X	-	-	TS-9103-8250	
	Rod fast response	200		-	-	X	-	-	TS-9103-8320	
	Outdoor	-		-	-	X	-	-	TS-9103-8400	
	Strap-on			-	-	X	-	-	TS-9103-8600	
	Ceiling			-	-	X	-	-	TS-9103-8700	
NTC „K10“	Bulb		20...120	-	-	-	X	-	TE-9100-8502	
	Rod *2)	200	0...120	-	-	-	X	-	TS-9104-8220	
		300		-	-	-	X	-	TS-9104-8230	
	Strap-on	-		-	-	-	X	-	TS-9104-8600	
Pt 100	Rod *2)	200	-20...120	-	-	-	-	X	TS-9105-8220	
		300		-	-	-	-	X	TS-9105-8230	
		500		-	-	-	-	X	TS-9105-8250	
	Outdoor	-		-	-	-	-	X	TS-9105-8400	
	Strap-on			-	-	-	-	X	TS-9105-8600	
	Ceiling			-	-	-	-	X	TS-9105-8700	

*1) Or other electronic devices with 0...10 V inputs.

*2) Rod sensors can either be for: - Duct applications (alone)
- Immersion applications (with well); see dimension drawings

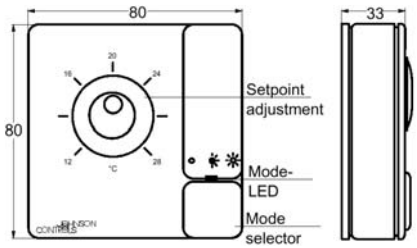
Accessories (order separately)

	Description	Material	Length (mm)	Max. pressure (Acc. DIN 43763)	Internal Diam.	Type-Model Number	
	Immersion well	Copper	50	1600 kPa	6 mm	TS-9100-8905	
		Stainless steel		4000 kPa		TS-9100-8915	
		Copper	120	1600 kPa	9 mm	TS-9100-8901	
		Stainless steel		4000 kPa		TS-9100-8911	
		Copper	150	1600 kPa		TS-9100-8907	
		Stainless steel		4000 kPa		TS-9100-8917	
		Copper	200	1600 kPa		TS-9100-8902	
		Stainless steel		4000 kPa		TS-9100-8912	
		Copper	260	1600 kPa		TS-9100-8903	
		Stainless steel		4000 kPa		TS-9100-8913	
		Copper	50	1600 kPa	6 mm	TS-9100-8905	
		Stainless steel		4000 kPa		TS-9100-8915	
	Duct flange	-	-	-	-	TS-9100-8950	

RS-9100 Electronic Room Temperature Sensors and Transducers

Temperature Sensors and Transducers

RS-914x RS-915x
RS-919x RS-916x



Dimensions Basic model RS-91xx-00xx-W

Description

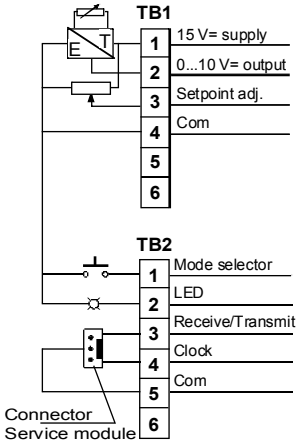
The RS-9100 series of electronic room temperature sensors and transducers provides a passive or active signal, that corresponds with the room temperature in heating, ventilating and air conditioning applications.

They provide either a 0/10V signal directly proportional to the sensed temperature, or a passive resistive signal using NTC or Pt 100 sensors.

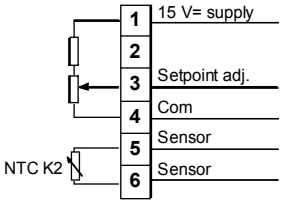
The RS-9100 series is primarily designed to be used as an input to a digital controller of the system 9100 family (except for Pt 100), but can be used with other electronic devices..

Features

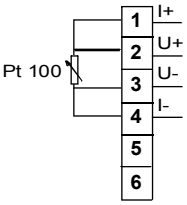
- Modern and discreet cover which snaps onto a plug-in mounting base
- Terminals located on mounting base.
- Active or Passive output.
- Standard range of mounting kits.
- Service module connection.



0…10 V models



NTC K2 models



Pt100 model

Used terminals 0…10 V

T-Blocks	TB1						TB2					
Model	1	2	3	4	5	6	1	2	3	4	5	6
RS-9140-0000-W	x	x		x								
RS-9150-0010-W	x	x		x			x	x	x	x	x	
RS-9160-000x-W	x	x	x	x			x	x				
RS-9160-001x-W	x	x	x	x			x	x	x	x	x	
RS-9190-000x-W	x	x	x	x								
RS-9191-0005-W	x	x	x	x								

NTC K2 models

Model	1	2	3	4	5	6
RS-9143-0000-W					x	x
RS-9193-000x-W	x		x	x	x	x

Pt100 models

Model	1	2	3	4	5	6
RS-9145-0000-W	x	x	x	x		

Wiring

RS-9100 Electronic Room Temperature Sensors and Transducers Selection Table

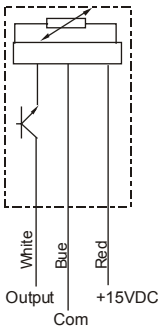
Output Signal	Set point Dial	Mode selection and indication.	Service Module	Sensor location	Applications					Type-Model Number	
					TC-9102, TCU	TC-9100	SC-9100	DX-9100, DX9200, *1)	Controllers or electronic devices with Pt100 inputs		
0…10 VDC	-	-	-	enclosed	-	X	X	X	-	RS-9140-0000-W	
	-	x	x		-	X	-	-	-	RS-9150-0010-W	
	12/28°C	x	-		-	X	-	-	-	RS-9160-0000-W	
	-3/+3K	x	-		-	X	-	-	-	RS-9160-0005-W	
	12/28°C	x	x		-	X	-	-	-	RS-9160-0010-W	
	-3/+3K	x	x		-	X	-	-	-	RS-9160-0015-W	
	12/28°C	-	-		-	X	X	X	-	RS-9190-0000-W	
	-3/+3K	-	-		-	X	X	X	-	RS-9190-0005-W	
	-/+	-	-		-	X	X	X	-	RS-9190-0006-W	
	-3/+3K	-	-	remote (cable 2 m)	-	X	X	X	-	RS-9191-0005-W	
NTC K2	-	-	-	enclosed	X	-	X	-	-	RS-9143-0000-W	
	12/28°C	-	-		-	-	X	-	-	RS-9193-0000-W	
	-3/+3K	-	-		-	-	X	-	-	RS-9193-0005-W	
Pt100	-	-	-		-	-	-	-	X	RS-9145-0000-W	

*1) Or other electronic devices with 0...10 V inputs.

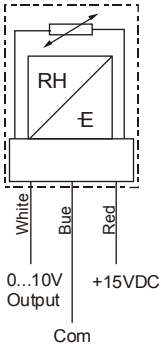
HX-9100 Dew point Sensor

Temperature Sensors and Transducers

HX-9100 Dew point Sensor



Wiring HX-9100-8001



Wiring HX-9100-9001

Description

The HX-9100 Dew Sensor is used to prevent condensation on surfaces such as cold water pipes, cool ceilings and windows. The HX-9100 can be connected to Johnson Controls System 91 controllers to provide override functions when condensation is forming.

Features

- Determines precisely the dew point with electronic measurement
- 0…10V or open collector output

Dew point Sensor Selection Table

Output	Output at 98%…100% RH	Output at ≤ 75% RH	Type-Model Number	
Open collector	Open collector open, 15 VDC max., 10 mA max		**HX-9100-8001**	
0…10 VDC	≤ +0.5 V	+10 V ± 5%	**HX-9100-9001**	

Accessories

Accessories for Temperature Sensors

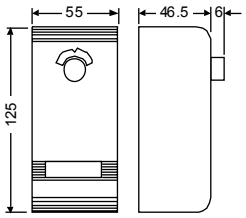
Selection Table

Description	Primary usage	Inner Ø x Tube length Bulb well (mm)	Inside & outside connector (NPT)	Material Connector Pocket	Type-Model number	
Room enclosure	A99				**GRD004N611**	
Outdoor enclosure	A99				**HSG012N600**	
A99L-9100 enclosure	A99				**WEL003N601**	

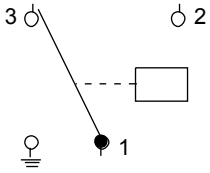
A19 Series IP30, Capillary and Space Thermostats

One-stage Temperature Controls

A19A style 1b and A19B style 3 Series



Dimensions



Wiring

Description

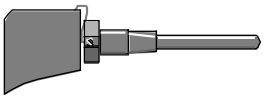
These thermostats are available with fixed or adjustable differential. The various control ranges cover a broad range of temperature applications with a minimum number of models. On request a built-in high or low limit stop is possible and can be adjusted quickly and easily in the field. All models have a universal way of adjustment. For this purpose a knob and sealing cap are enclosed. All are equiped with a NEMA1 enclosure
All A19 style 1 wholesaler code models have a bulb clamp plus screw also enclosed.

Features

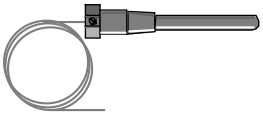
- Liquid filled sensing element
- Dust tight Penn switch
- Trip free manual reset
- Front adjustment

Application

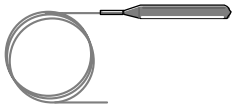
These thermostats are designed for refrigeration, cooling, heating, ventilation and air-conditioning applications. Standard models are provided for remote sensing or room sensing. Models with manual reset are available for low or high limit functions.



Style 2



Style 4H



Style 1a

Style 3

A19A Capillary Thermostats Selection Table

Range (° C)	Diff. (K) fixed	Style	Cap. length (m)	Bulb size (mm)	Switch 8A Auto recycle	Additional features	Type-Model Number	
-5 to +28	2	1b	2	135	SPDT Open Low		**A19AAC -9005**	
40 to 120	3.5	1b	2	100	SPDT Open High		**A19AAC -9009**	
-35 to +10	2.5	1b	2	110			**A19AAC -9102**	
35 to 150	4	1a	2	265		Diam. 5mm bulb,	**A19AAC-9107**	
90 to 290	5.5	1a	2	155			**A19AAC –9108**	
0 to 10	2.5	1a	2	80	SPDT Open Low	Bulb diam. 9.3 mm	**A19AAC –9123***	
-5 to +28	2	1b	5	135			**A19AAC-9124**	
1 to 60	1.5	1b	3	115		Maximum bulb temperature 85 °C	**A19AAC -9127**	
-10 to +14	2.5	1b	2	110		Case compensation, low limit stop at 2°C	**A19AAC -9130**	

Range (° C)	Diff. (K) close fix.	Style	Cap. length (m)	Bulb size (mm)	Switch 3A Auto recycle	Additional features	Wholesale code	Type-Model Number	
0 to 10	1.5	1a	2	80	SPDT Open Low	Diam. 9.3 mm bulb,		**A18AAF-9101**	
						Diam. 9.3 mm bulb, Case compensation	A19M	**A19AAF -9102**	
5 to 32	0.8	1b	2	155	SPDT Open High			**A19AAF -9103**	

* Quantity orders only

For accessories, see Section Accessories

A19 Series IP30 (continued)

One-stage Temperature Controls

A19A Capillary Thermostats Selection Table (cont.)

Range (° C)	Diff. (K) Adjust.	Style	Cap. length (m)	Bulb size (mm)	Switch 8A Auto recylce	Additional features	Wholesale code	Type-Model Number	
40 to 120	3 to 13	2	-	-	SPDT Open High	½.14NPT Connector,		**A19ABC -9011**	
		4H	2	-				**A19ABC-9012**	
-35 to +40	2.8 to 8	1b	6.5	110	5 A Switch, SPDT Open Low	Universal replacement	A19-A5	**A19ABC -9036**	
-35 to +40	2.8 to 8	1b	3.5	110			A19-A4	**A19ABC -9037**	
-35 to +10	2.8 to 11	1b	2	110	SPDT Open Low		A19-A1	**A19ABC -9103**	
-5 to +28	2 to 8	1b	2	135			A19-A2	**A19ABC -9104**	
10 to 95	3.5 to 14	1a	3.5	75	SPDT Open High	Diam. 7.4 mm bulb,		**A19ABC -9106**	
1 to 60	2 to 8.5	1b	3	115	SPDT Open Low	Max. bulb temp. 85 °C	A19-A3	**A19ABC -9116**	
			5					**A19ABC-9117**	
			3		SPDT Open High			**A19ABC-9119**	

A19ACC Capillary thermostat, lock-out low with manual reset

Range (° C)	Diff. (K) fixed	Style	Cap. length (m)	Bulb size (mm)	Switch 8A Manual reset	Additional features	Wholesale code	Type-Model Number	
-35 to +10	6	1b	2	110	SPDT Open Low			**A19ACC -9100**	
-5 to +28	4	1b	2	135				**A19ACC -9101**	
	4	1b	5					**A19ACC-9103**	
-35 to +10	6	1b	3.5	110		Low limit stop set at 2 °C		**A19ACC -9105**	
-5 to +28	4	1b	3	135				**A19ACC-9107**	
-35 to +10	6	1b	5	110		Low limit stop set at 2 °C		**A19ACC-9111**	
			6.5			Low limit stop set at 3 °C, Universal replacement	A19F	**A19ACC -9116**	

A19ADC Capillary thermostat, lock-out high with manual reset

40 to 120	7	2			SPDT Open High	$^1/_2$-14 NPT connector		**A19ADC -9200**	

A19B Space Thermostats Selection Table

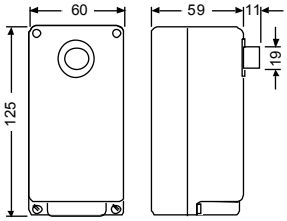
Range (° C)	Diff. (K)	Style	Switch 8A Auto recycle	Additional features	Wholesale code	Type-Model Number	
0 to 43	2	3	SPDT Open High	Vinyl coated element	A19-B3	**A19BAC-9001**	
-35 to +10	2.5	3			A19-B1	**A19BAC-9250**	
-5 to +28	2	3	SPDT Open Low		A19-B2	**A19BAC-9251**	
-35 to +40	2.8 to 8	3	SPDT Open Low, 5A		A19-B4	**A19BBC-9275**	

For accessories, see Section Accessories

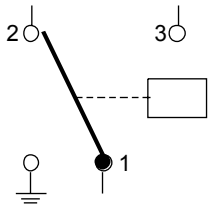
A19 Series IP65, Capillary and Space Thermostats

One-stage Temperature Controls

A19A, style 1b



Dimensions



Wiring

Description

These thermostats are available with fixed or adjustable differential. The various control ranges cover a broad range of temperature applications with a minimum number of models.
SPDT contacts are standard on all models.

Features

- Liquid filled sensing element
- Dust tight Penn switch
- IP65 protection class
- Front adjustment

Application

These thermostats are designed for applications where a splash-proof and/or dust-tight enclosure is required. Four types are available.

- Types A19ARC are general purpose capillary thermostats.
- Types A19BRC and A19BQC are space thermostats with coiled element to be used as farm control, outdoor thermostats or in cold storage rooms.
- Types A19AQF is specially designed for milkcool-tank applications.
- Type A19AQC-9101 is specially designed for ice-bank application.

A19A Capillary Thermostats Selection Table

Range (° C)	Diff. (K) Adjust.	Style	Cap. length (m)	Bulb size (mm)	Switch 8A Auto recycle	Additional features	Wholesale code	Type-Model Number	
-35 to +10	2.8 to 11	1b	2	110	SPDT Open Low		A19-AS1	**A19ARC -9100**	
-5 to +28	2 to 8	1b	2	135			A19-AS2	**A19ARC -9101**	
-20 to +65	3.5 to 13	1a	3.5	75		Diam. 7.4 mm bulb		**A19ARC-9104**	
5 to 50	2.5 to 11	1b	2	110		Concealed scale, Screwdriver adjustment, Bulb and cap. rubber coated		**A19ARC –9105**	
40 to 120	3.5 to 13.5	1a	2	100				**A19ARC –9107**	
1 to 60	2 to 8.5	1a	3	115		Maximum bulb temperature 85 °C	A19-AS3	**A19ARC –9109**	
-10 to +50	2.5 to 11	1b	2	110		Concealed scale, Screwdriver adjustment,		**A19ARC-9110**	
40 to 120	3.5 to 13.5	1a	2	100		Concealed scale,		**A19ARC-91112**	
-35 to +40	2.8 to 11	1b	2	110			A19-AS4	**A19ARC -9113**	
0 to 13	1.5 fixed	1a	2	80	SPDT Open Low	3 A Switch (see bull. 3545), No enclosure, Cal. pointer with dial, Screwdriver slot, Fig. 3, Case compensation, Bulb diam. 9.3 mm, Bulk pack		**A19AGF -9101***	
-5 to +5	2 fixed	1a	2	80		5 A Switch, Ice bank control, Bulb diam 9.3 mm, Case compensation, Concealed scale, Screwdriver adjustment, Scale calibrated at increasing temperature		**A19AQC -9101**	
-35 to +10	2 fixed	1b	2	110		Case compensation, Knob adjusyment		**A19AQC -9104**	
-5 to +28	2 fixed	1b	2	135		8 A Switch, calibrated and set at 2°C,		**A19AQC-9102**	
-5 to +55	2.5 fixed	2	-	-		Case compensation, pointer adjust, PG16 connect., ½ - 14 NPT WELL connector		**A19AQC-9200**	
0 to 13	1.5 fixed	1a	2	80		3 A Switch, Bulb diam. 9.3 mm, Case compensation, Concealed scale, Screwdriver adjustment		**A19AQF -9100**	
0 to 13	1.5 fixed	1a	3	80		3 A Switch, Cap. thermostat, Bulb diam. 9.3 mm, Case compensation, Concealed scale, Screwdriver adjustment		**A19AQF -9102**	

For accessories, see Section Accessories
* Quantity orders only

A19 Series IP65 (continued)

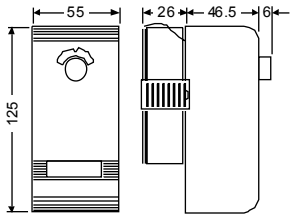
One-stage Temperature Controls

A19A Space Thermostats Selection Table

Range (° C)	Diff. (K) Adjust.	Style	Switch 8A Auto recycle	Additional features	Wholesale code	Type-Model Number	
-5 to +28	2 to 8	3	SPDT Open Low	Vinyl coated element	A19BS-2	**A19BRC-9250**	
0 to 43	2 to 8	3			A19BS-3	**A19BRC-9251**	
-35 to +10	2.8 to 11	3			A19BS-4	**A19BRC-9252**	
-35 to +40	2.8 to 11	3				**A19BRC-9253**	
-5 to +25	2 fixed	3		Concealed scale, screwdriver adjustment		**A19BQC-9252**	

A19A Strap-On Thermostats Selection Table

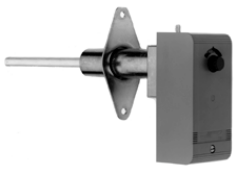
Range (° C)	Diff. (K) Fixed	Style	Switch Auto recycle	Additional features	Type-Model Number	
40 to 120	4.5	20	SPDT Open High	8 A Switch, NEMA 1 enclosure, Universal adjustment, Including mounting strap	**A19DAC-9001**	
92 to 116	2	20		3 A Switch, Universal adjustment, Including mounting strap	**A19DAF-9001**	



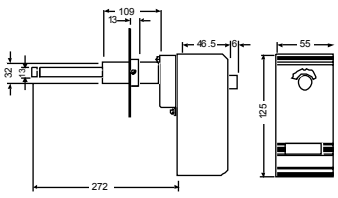
Dimensions

A25 Series IP30, Rod and Tube Sensing Element

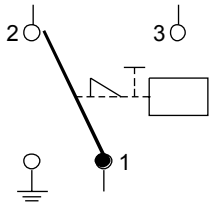
Temperature Limit Controls



A25



Dimensions



Wiring

Description

A rod and tube type sensing element actuates the switch contacts. Main contacts (1 - 2) are normally closed, and open when the temperature at the element rises to the dial setpoint. Contacts are re-closed only by operation of the reset lever. The reset lever is "trip-free" and cannot be used to block contacts
in a closed position.

Features

- Rod and tube type of element
- Adjustable duct mounting flange
- Trip-free manual reset
- Dust-tight Penn switch

Application

These warm air limit controls "lock out" on a temperature increase to the control setpoint. Manual reset is required to re-close the electrical contacts. A typical application is to stop air-conditioning or ventilating fans in the event of excessive return air temperature, as from a fire.

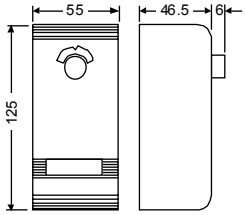
A25 Temperature Limit Control Selection Table

Range (° C)	Switch 8A Manual reset	Additional features	Type-Model Number	
0 to 100	SPDT Open High	Visible scale, Knob adjustment, NEMA 1 enclosure, With flange for duct mounting	**A25CN-9001**	

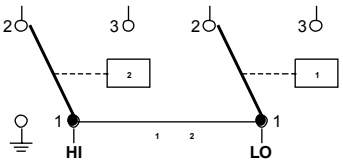
A28 Series IP30, Two-stage Capillary and Space Thermostats

Two-stage Temperature Controls

A28AA, style 1b and style 3 (IP30)

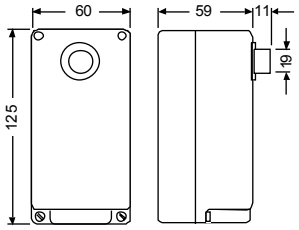


Dimensions



Wiring

A28QA, style 1b (IP65)



Dimensions

Description
Controls are compact with fixed differential per stage and (on most models) adjustable differential between stages. Liquid filled element provides wide range, constant differential over whole range and no influence from barometric pressure. Since the bulb contains the major portion of the total fill the thermostat may by considered as cross-ambient, capillary and cup temperature variations affect the operating point only slightly due to the small amount of fill they contain.
For quantity orders it is possible to have the below stated optional constructions
- Without case and cover for panelmounting
- Close differential per stage
- Different capillary lengths

All standard IP30 enclosure models have a universal way of adjustment. For this purpose a knob and sealing cap are enclosed.

Features
- Liquid filled sensing element
- Dust tight Penn switch
- IP65 protection class models available
- Front adjustment

Application
These thermostats are designed for various types of heating, cooling, ventilation, or air-conditioning applications. All models have two SPDT switches providing the following control possibilities:
- 2 stage heating
- 2 stage cooling
- Heating/cooling with automatic changeover

A28 Capillary and Space Thermostats, IP30, Selection Table

Range (° C)	Diff. (K)		Style	Cap. length (m)	Bulb size (mm)	Switch 5A Auto recycle	Additional features NEMA 1 Enclosure	Type-Model Number	
	stage	betw							
-35 tp +10	2	1 to 4	1b	2	110	SPDT Open Low	General purpose	**A28AA-9006**	
-5 to +28	1.5	1 to 4	1b	2	135			**A28AA-9007**	
				5				**A28AA-9106**	
0 to 43	1.5	1 to 4	3	-	-	SPDT Open High	Bulb stainless steel, General purpose	**A28AA-9113**	
1 to 60	2	1 to 4	1b	3	115		Max. bulb temp. 85 °C, General purpose	**A28AA-9118**	

A28 Capillary and Space Thermostats, IP65

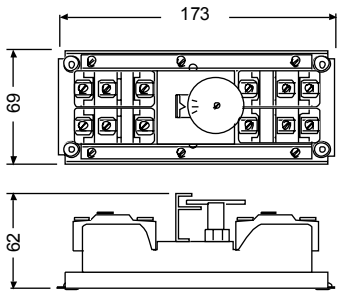
Range (° C)	Diff. (K)		Style	Cap. length (m)	Bulb size (mm)	Switch 5A Auto recycle	Additional features	Type-Model Number	
	stage	betw							
5 to 50	2	4	1b	2	110	SPDT Open Low	Concealed scale, Screwdriver adjustment	**A28QA-9101**	
-35 to +10	2	1 to 4						**A28QA-9110**	
-5 to +28	1.5	1 to 4	1b	2	135			**A28QA-9111**	
-35 to +40	2	1 to 4	1b	3.5	110			**A28QA-9114**	
0 to 43	1.5	1 to 4	3			SPDT Open High	Bulb Stainless Steel	**A28QA-9113**	
1 to 60	2	1 to 4	1b	3	115			**A28QA-9115**	
20 to 40	1.5	1 to 4	3	-	-		Bulb Stainless Steel	**A28QA-9117**	
!0 to 95	1.5	1 to 5	1b	3	100	SPDT Open Low	3 A Switch	**A28QJ-9100**	

For accessories, see Section Accessories

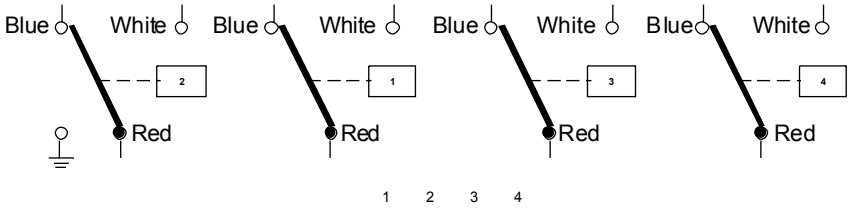
A36 Series, 3- or 4-stage Thermostats

3- or 4-stage Temperature Controls

A36 3- or 4-stage Thermostat



Dimensions



Wiring

Description

Models are available in 'open' construction for panel mounting. Splash-proof enclosure IP 55 is an accessory. Single knob adjustment moves the entire staging band up and down within the range of the control. The differential on each stage and sequencing between stages are factory set.

This permits the OEM to completely engineer the cycling of their equipment without the hazard of field mis-adjustments and erratic sequencing.

Features

- Dust-tight SPDT switches
- Cushion mounted
- Operation from a single, liquid filled element
- Case compensation standard on all models

Application

Designed for multi-stage thermostatic operation of electrically controlled equipment such as:
- packaged liquid chillers
- heat pumps
- electric duct heaters
- computer room airconditioners

A36 Series, 3-stage Thermostats Selection Table

Range (° C)	Adjustment Code (see bulletin)	Cap. length (m)	Bulb size (mm)	Switch Auto recycle	Additional features	Type-Model Number	
-18 to +20	B1	5	125	5 A	Armored PVC capillary	**A36AGA-9101**	
		3.5				**A36AGA-9102**	
15 to 35	C1		140			**A36AGA-9103**	
-18 to +20	B2		125	3 A		**A36AGB-9103**	

A36 Series, 4-stage Thermostats Selection Table

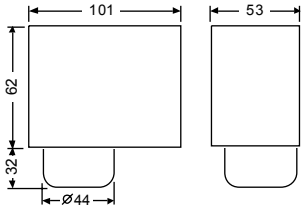
-18 to +20	B1	3.5	125	5 A	Armored PVC capillary	**A36AHA -9105**	
-16 to +20	B1	5	125			**A36AHA -9107**	
15 to 35	C1	3.5	140			**A36AHA-9108**	
10 to 95	D2	3	100	3 A	Max. bulb temp.115 °C	**A36AHB -9103**	
-18 to +20	B2	3.5	125		Armored PVC capillary	**A36AHB -9104**	
		5	125		Braided Copper capillary	**A36AHB--9105**	
-15 to +30	B2	5	110		Max. bulb temp. 75 °C	**A36AHB -9109**	

For accessories, see Section Accessories

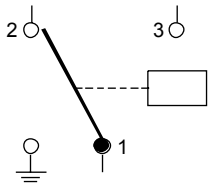
270XT Series Freeze Protection Control, IP30

Freeze Protection Controls

270XT-95008, style 9



Dimensions



Wiring

Description

Sensing element is 3 or 6 meters long to permit attaching across the surface of a coil to guard against freezing at any point. When any 30 cm or more of this element senses a temperature as low as the control setpoint, it will "switch off".

A special version is available with bulb and 2 m capillary, range -24/+18°C for clamp-on or immersion purposes.

SPDT change over contacts permit the use of an alarm signal

Features

- Dust tight Pennswitch
- SPDT contacts
- 270XTAN provided with trip-free manual reset
- Controls have adjustable range

Application

These controls are designed for protection against freeze-up of hydronic heating coils, cooling coils and similar application.

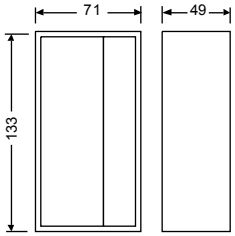
270XT Series Freeze Protection Control Selection Table

Range (° C)	Diff. (K) Fixed	Style	Cap. length (m)	Bulb size (mm)	Switch 8A	Additional features	Type-Model Number	
-10 to +12	3	9	-	3.2 x 6000	SPDT Open Low	Automatic recycle	**270XT - 95008**	
				3.2 x 3000			**270XT - 95078**	
-24 to +18	4	1	2	9.5 x 80			**270XT - 95068**	
-10 to +12	-	9	-	3.2 x 6000		Manual reset	**270XTAN - 95008**	
				3.2 x 3000			**270XTAN - 95088**	
-24 to +18	-	1(bulb)	2	9.5 x 80			**270XTAN - 95048**	

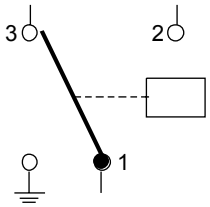
T22 and T25 One and Two-stage Room Thermostat, Line Voltage , IP20

One and Two-stage Room Temperature Controls

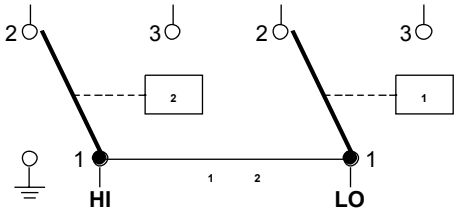
T22 and T25, one and two-stage thermostats



Dimensions



Wiring T22



Wiring T25

Description

These thermostats with a sturdy steel cover are provided with a liquid filled sensing element. This element is formed to achieve maximum sensitivity to surrounding air temperature changes. Coupled with a highly efficient diaphragm and leverage mechanism, the element operates a totally enclosed Penn switch contact with a close differential switching action without the use of “heat or cool” anticipators.

Features

- Liquid filled elements.
- Dust tight Penn switch.
- Small differential.
- Two Stage Thermostats with dead band and automatic change-over.

Application

These room thermostats are designed to control heating and/or cooling equipment, in commercial industrial or residential installations. Typical uses are for unit heaters, fan coils, cooling rooms etc. Type T22SRX can be used for either heating or cooling. Type T25B (2 stages) can be used for:

- two stages heating
- two stages cooling
- heating/cooling with dead band and automatic change over

T22 One-stage Room Thermostat Selection Table

Range (° C)	Diff. (K) Fixed	Adjustment	Thermometer	Switch 3A	Additional features	Type-Model Number	
5 to 32	1	Knob	Yes	SPDT Open High	Automatic recycle	**T22SRX-9100**	
			-			**T22SRX-9101**	
		Concealed	-			**T22SRX-9104**	

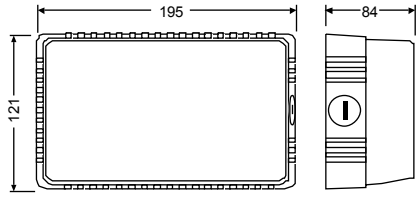
T25 Two-stage Room Thermostat

Range (° C)	Diff. (K)		Adjustment	Thermometer	Switch 3A	Additional features Automatic recycle	Type-Model Number	
	Stage	Betw.						
5 to 32	1	1 to 3	Knob	-	SPDT Open High		**T25B-9101**	
			-	-		Concealed scale, screwdriver adjustment	**T25B-9102**	
			Knob	-		With 220 V ac signal lamp to be wired separately	**T25B-9103**	

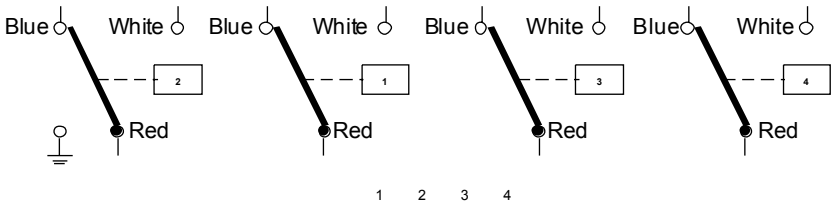
T36 3- and 4-stage Room Thermostat, Line Voltage , IP20

3- and 4-stage Room Temperature Controls

T36 3- and 4-stage Room Thermostat



Dimensions



Wiring

Description

The differentials on each stage and the sequencing between stages are factory set and are not field adjustable. A single adjustment moves the entire staging band up or down within the range of the control. The sensing element is a liquid filled, coiled copper tube and each stage of control provides single pole, double throw switching.

Features

- Concealed adjustment. Enclosure can be locked.
- Dust-tight Penn switch.
- Multi-stage heating and/or cooling with one model.

Application

These room or space thermostats are designed to control heating and/or cooling equipment in stages. They can be used for either heating only or cooling only or for various combinations of heating and cooling stages with a neutral zone. These controls are designed for wall mounting but can be mounted in any position.

T36 3- and 4-stage Room Thermostat Selection Table

Range (° C)	Number of stages	Dead band	Switch 3A	Additional features	Type-Model Number	
0 to 43	3	2 ° C	SPDT contacts, close differential	Standard setting, appr. 1 °C BSD all stages	**T36AAB-9250**	
0 to 43	4				**T36ABB-9250**	

Accessories

Accessories for Temperature Controls

Selection Table

Description	Primary usage	Inner Ø x Tube length Bulb well (mm)	Inside & outside connector (NPT)	Material Connector Pocket	Type-Model number	
Closed tank connector style 1b elements, Max. 10 bar, 120°c, Min. -40°c	A19/28/36				**FTG13A-600R**	
Capillary brackets (6 pieces)	270XT				**KIT012N600**	
Base and cover	T36				**KIT009N600**	
Fey for Thermostat guard	T36				**KEY003N001**	

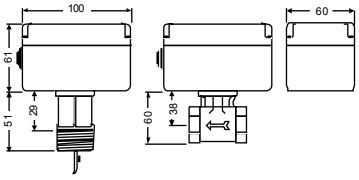
Bulb well, Max. pressure 70 bar, Temp. 370°C		9.8 x 125	1/2 - 14	Stainless steel	**WEL003N602R**	
Bulb well, Max. pressure 20 bar, Temp. 120°C, USA item	A19	7.3 x 60	1/2 - 14	Brass/Copper	**WEL11A601R**	
Bulb well, Max. pressure 69 bar, Temp. 370°C, USA item	A19/28/36	11.2 X 120	1/2 - 14	Monel/Monel	**WEL14A600R**	
Bulb well, Max. pressure 20 bar, Temp. 120°C, USA item	A19/28/36	9.8 x 125	1/2 - 14	Brass/Copper	**WEL14A602R**	
Bulb well, Max. pressure 20 bar, Temp. 120°C, USA item	A19/28/36	9.8 x 147	1/2 - 14	Brass/Copper	**WEL14A603R**	
Bulb well, Max. pressure 20 bar, Temp. 120°C, USA item	A19/28/36	9.5 x 71	1/2 - 14	Brass/Copper	**WEL16A601R**	

*Quantity orders only

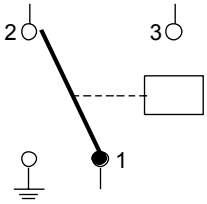
F61 Flow Switches for Liquid

Flow and Float Controls

F61 Flow Switches



Dimensions



Wiring

Description

The F61 liquid flow switches can be used in liquid lines carrying water, sea water, swimming pool water, ethylene glycol or other liquids not harmful to the specified materials. The switches have SPDT contacts and can be wired to energise one device and de-energise another when liquid flow either exceeds or drops below the set flow rate. Pipe insert models and the T-body types for low-flow applications are available. The IP43 versions can be used for liquid temperatures above dewpoint (for use in other environments see the Product Data Sheet). Typical applications are to shut down the compressor on liquid chiller systems, to prove flow on electric immersion heaters and to give a signal or alarm when the pump on condenser cooling system shuts down.

Features

- T-body and Pipe-insert types available
- Polycarbonate IP43 enclosure
- Vapour tight IP 67 enclosure
- Stainless steel Pipe-insert type
- Large wiring space
- Range screw easy accessible.

F61 Flow Switches, IP43, Selection Table

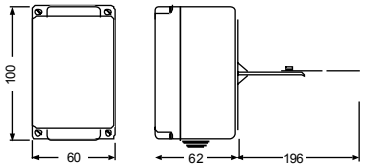
Range	Connection		Switch Action	Additional features	Type-Model Number	
0,15 dm³/s - 46 dm³/s	R1" DIN2999	(ISO R7)	SPDT Contacts,15 (8) amp 220 V~	3 paddles 1", 2", 3" phosphor bronze	**F61SB-9100**	
	R1" DIN2999	(ISO R7)		4 paddles, 1", 2", 3" phosphor bronze and 6" St.St. AISI 301	**F61SB-9103**	
	R1" DIN2999	(ISO R7)		1 paddle, 1", phosphor bronze	**F61SB-9107**	
0,04 dm3/s – 0,07 dm^3/s	½-14 NPTF	T-body		Dryseal	**F61SD-9150**	
	$^3/_4$-14 NPTF				**F61SD-9175**	
F61 Flow Switches, IP67, Selection Table						
0,15 dm^3/s – 46 dm^3/s	1-11½ NPT			4 paddles, 1", 2", 3" phosphor bronze and 6" St.St. AISI 301	**F61TB-9100**	
	R1" DIN2999	(ISO R7)		stainless steel body,bellow,rod, 3 St.St. AISI 304 paddles 1",2",3"	**F61TB-9200**	

* Quantity orders only

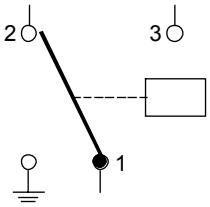
F62 Air Flow Switches

Flow and Float Controls

F62 Air Flow Switches



Dimensions



Wiring

Description

The F62 airflow switch detects air flow or the absence of air flow by responding only to the velocity of air movement within a duct. The control can be wired to open one circuit and close a second circuit (SPDT) for either signaling or interlock purposes. Failure of air flow during normal operation of air handling systems may cause over-heating, coil icing and other conditions that may be detrimental to the equipment.

Typical applications include make-up air systems, air cooling or heating processes and exhaust systems.

Features

- Polycarbonate IP43 enclosure
- Large wiring space
- Range screw easily accessible.

F62 Air Flow Switches, IP43, Selection Table

Max. air velocity	Switch Action	Enclosure	Additional features	Type-Model Number	
10 m/sec	SPDT Contacts 15(8) A, 220V~	Plastic enclosure IP 43	With 55 mm paddle mounted, 80 mm separate	**F62SA –9100**	

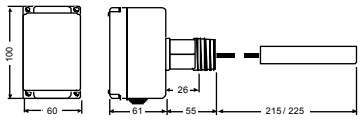
* Quantity orders only

For accessories, see Section Accessories

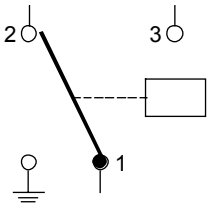
F63 Liquid Level Float Switches

Flow and Float Controls

F63 Level Switches



Dimensions



Wiring

Description

The F63 is a liquid level float switch for use in open or closed tanks where a desired liquid level has to be maintained and installations handling water, swimming pool water, sea water, brine, ethylene glycol or other liquids not harmful to the specified materials. The switches have SPDT contacts and can be wired to close one circuit and open a second circuit when the liquid level rises above or falls below the required level. The switch maintains the liquid level within (approx.) 13 mm.

There are three different types available. The phosphor bronze bellows version for use in applications where the liquid is not corrosive to phosphor bronze. The stainless steel bellows version for use in environments like cooling towers (water with high calcium content) and a complete stainless steel AISI 316L version. These float switches should not be used for liquids lighter than water (density less than 0.95 kg/dm^3).

Features

- Solid polycarbonate float
- Vapour tight IP 67 enclosure
- Convenient wiring terminals

F63 Level Switches, Selection Table

Connection	Switch Action	Enclosure	Additional features	Type-Model Number	
1-11½ NPT	SPDT Contacts 15(8) A, 220V~	Plastic enclosure IP 67	Plastic float, Brass body, Phosphor bronze bellows	**F63BT-9101**	
			Plastic float, Stainless steel bellows	**F63BT-9102**	
1 ‘R (ISO R228)			Plastic float, Stainless steel 316 L body, rod, bellow	**F63BT-9200**	

For accessories, see Section Accessories

Accessories for Flow and Level Float Switches

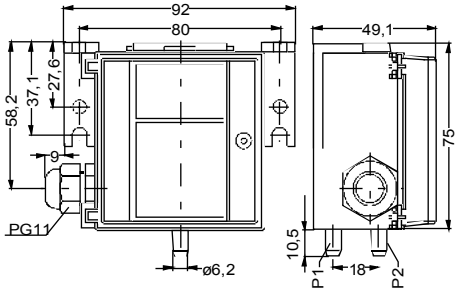
Flow and Float Controls

Description	Type-Model Number	
F61 - 6" Stainless steel AISI 301 paddle	**PLT69-11R**	
F61 - 3 paddles 1", 2", 3" phosphor bronze	**KIT21A600**	
F61 - paddle 6" phosphor bronze	**KIT21A601**	
F61 - 4 paddles 1", 2", 3" and 6" St.St. AISI 301	**KIT21A602**	
F62 Airflow plate 154 mm	**PLT112-1R**	
F62 Airflow plate 80 mm	**PLT112-2R**	
F63 - float	**FLT001N001R**	

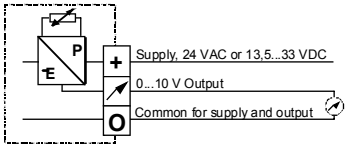
PT-5215-7300 Low Differential Air Pressure Transmitter

Pressure Sensors and Transducers

PT-5215-7300



Dimensions



Wiring

Description

The PT-5215 Differential Air Pressure Transmitter accurately measures low differential pressure and converts the measurement into a standard proportional 0...10 V signal. (for -50...+50 Pa operating range optional 4-20 mA). The PT-5215 is especially adapted to measure static, velocity and differential pressures.

Features

- Low zero drift/time
- Low sensibility to ambient temperature change
- Low hysteresis
- High accuracy
- Good overrangeability
- Splash proof dust tight case
- Compact enclosure, light weight, simple and quick installation

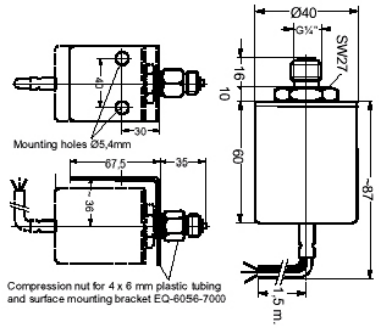
PT-5215-7300 Low Differential Air Pressure Transmitter Selection Table

Operating Range	Maximum overload pressure	Output Signal	Enclosure	Supply Voltage	Type-Model Number	
-50…+50 Pa	5 kPa	4..20 mA	IP54	24 VAC ±15%, 50/60Hz or 11…33VDC, max. 10 mA	**PT-5215-7307**	
0…100 Pa	10 kPa	0…10 V		24 VAC ±15%, 50/60Hz or 13,5…33VDC, max. 10 mA	**PT-5215-7308**	
0…250 Pa	5 kPa				**PT-5215-7309**	
	20 kPa				**PT-5215-7310**	

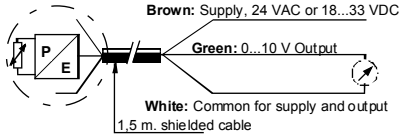
PT-5217 Liquid or Air Pressure Transmitter

Pressure Sensors and Transducers

PT-5217 Pressure Transmitter



Dimensions



Wiring

Description

The PT-5217 Pressure Transmitter accurately measures pressure and converts the measurement into a standard proportional 0...10 V signal. The PT-5215 is especially adapted to measure air, water and inert gases pressure.

The PT-5217 can also be used in pneumatic control systems to convert pneumatic into electric standard signals.

Features

- Low zero drift/time
- Low sensibility to ambient temperature change
- Low hysteresis
- High accuracy
- Direct mounting, 1,5 m cable included
- Splash proof enclosure

PT-5217 Liquid or Air Pressure Transmitter Selection Table

Operating Range	Maximum overload pressure	Enclosure	Supply Voltage	Type-Model Number	
0…100 kPa	200 kPa	IP65	24 VAC ±15%/-10%, 50/60Hz or 13,5…33VDC, max. 5 mA	**PT-5217-7011**	
0…1000 kPa	2000 kPa			**PT-5217-7101**	

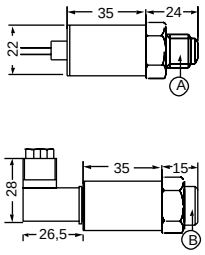
Accessories (order separately)

Description	Type-Model Number	
Mounting kit for plastic hose 4 x 6 mm	**EQ-6056-7000**	
Mounting kit for DIN rail	**EQ-0100-7001**	

P299 Pressure Transducer

Pressure Sensors and Transducers

P299 Pressure Transducer



Dimensions

Wire colour / terminal identification

DIN 43650 connector	Cable	P299xVx P299xRx	P299xAx
1	Brown	Vdc (+)	Vdc (+)
2	Green	Common (-)	Common (-)
3	White	Sensor output	
Earth		Not connected	Not connected

Wiring

Description

The P299 Series Electronic Pressure Transmitter is a compact, economical, rugged pressure transmitter designed to produce a linear analogue signal based on the sensed pressure. They are designed for use in commercial and industrial refrigeration and air-conditioning applications.

The P299 transmitter features a welded stainless steel construction with environmentally sealed electronics. It is resistant to the effects of wide temperature swings, high humidity, condensation, and icing. It is suitable for use with all non-corrosive refrigerants as well as ammonia.

P299 Transmitters are available in several pressure ranges (up to 50 bar), covering most common refrigeration and air conditioning applications.

Features

- Rugged Stainless Steel Construction
- Environmentally Sealed Electronics
- Reliable, Repeatable Performance and Long Operating Life
- Available in Several Pressure Ranges (up to 50 bar)
- Sensor contains a minimum of components.
- All functions, including sensor conditioning and signal processing are included in one chip

P299 Pressure Transducer Selection Table

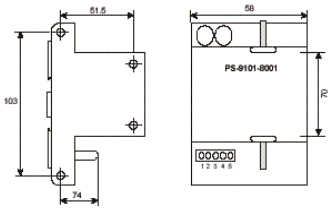
Range (bar)	Output	Connection Style	Electrical Connection	Additional features	Type-Model Number	
-1 to +8	4 to 20 mA	male	2m shielded cable	Continuous overpressure: Range -1 to +8 bar: 12 bar Range 0 to 30 bar: 45 bar Range 0 to 50 bar: 75 bar Can be used with all media which are compatible with stainless steel 17-4PH Accuracy: 1% full scale for hysteresis, offset repeatibility 1% full scale for temperature effects	**P299DAB-1C**	
	4 to 20 mA	female			**P299DAC-1C**	
0 to 30	4 to 20 mA	male			**P299EAB-1C**	
	4 to 20 mA	female			**P299EAC-1C**	
0 to 50	4 to 20 mA	male			**P299FAB-1C**	
	4 to 20 mA	female			**P299FAC-1C**	
-1 to +8	0 to 10 Vdc	male			**P299DVB-1C**	
	0 to 10 Vdc	female			**P299DVC-1C**	
0 to 30	0 to 10 Vdc	male			**P299EVB-1C**	
	0 to 10 Vdc	female			**P299EVC-1C**	
0 to 50	0 to 10 Vdc	male			**P299FVB-1C**	
	0 to 10 Vdc	female			**P299FVC-1C**	
-1 to +8	0,5 to 4,5V	female		Ratiometric model, output signal is proportional to excitation voltage	**P299DRC-1C**	
0 to 30	0,5 to 4,5V	female			**P299ERC-1C**	
0 to 50	0,5 to 4,5V	female			**P299FRC-1C**	
-1 to +8	0 to 10 Vdc	male	DIN 43650 connector	Female part of connector DIN43650 is included	**P299DVB-2C**	
0 to 30	0 to 10 Vdc	male			**P299EVB-2C**	
-1 to +8	4 to 20 mA	male			**P299DAB-2C**	
0 to 30	4 to 20 mA	male			**P299EAB-2C**	
-1 to +8	4 to 20 mA	female			**P299DAC-2C**	
0 to 30	4 to 20 mA	female			**P299EAC-2C**	
-1 to 15	4 to 20 mA	female			**P299HAC-2C**	
	0 to 10 V	female			**P299HVC-2C**	
-1 to 8	0 to 10 V	female			**P299DVC-2C**	
0 to 30	0 to 10 V	female			**P299EVC-2C**	

* Quantity orders only

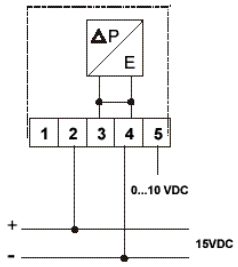
PS-9101 Differential pressure transmitter

Pressure Sensors and Transducers

PS-9101-800x (IP20)

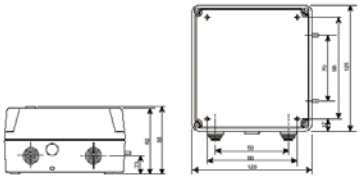


Dimensions

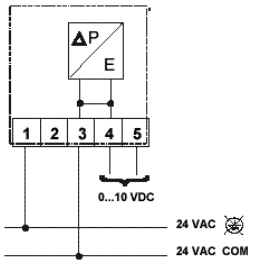


Wiring with 15 VDC supply

PS-9101-850x (IP54)



Dimensions



Wiring with 24 VAC supply

Description

The PS-9101 Differential pressure is designed to measure the difference between two sensed pressures to produce 0…10 V DC proportional output.

The differential pressure, as sensed by the sensing ports, is applied to both sides of a mass air flow sensor, directed across the surface of the sensing element.

The output voltage varies in proportion to the differential temperature of sensing elements, as a consequence of increasing/decreasing the mass air flow through the inlet and outlet ports caused by sensed differential pressure.

Features

- Model available in 3 differential pressure ranges
- Models for Din Rail mounting
- Models with splash proof dust tight case
- Fast response (< 50 ms)
- MTBF of sensor 20 years

PS-9101 Differential pressure transmitter Selection Table

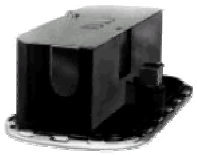
Operating Range	Maximum overload pressure	Enclosure	Supply voltage	Type-Model Number	
0…750 Pa	34.5 kPa	IP20	15 VDC +/- 10 % 24 VAC +10 % ; -15 %	**PS-9101-8001**	
0…330 Pa		IP20		**PS-9101-8002**	
0…130 Pa		IP20		**PS-9101-8003**	
0…750 Pa		IP54		**PS-9101-8501**	
0…330 Pa		IP54		**PS-9101-8502**	
0…130 Pa		IP54		**PS-9101-8503**	

Accessories (order separately)

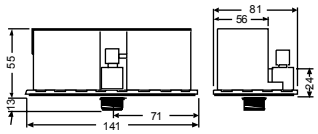
Description	Type-Model Number	
Inline Air Filter (required for all models)	**A-4000-8001**	
Romote probe kit	**FT-G18A-8001**	
DIN rail mounting kit	**PS-9101-8900**	

P32 Sensitive Differential Pressure Control for Air Proving

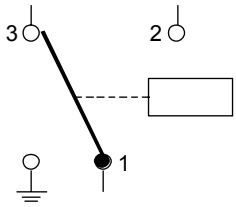
Differential Pressure Controls



P32 Sensitive Differential Pressure Control



Dimensions



Wiring

Description

This switch senses a change in the differential pressure (either velocity pressure or pressure drop across a restriction) as the air flow changes. The pressure, as sensed by two sensing ports, is applied to the two sides of a diaphragm in the control. The spring loaded diaphragm moves and actuates the switch. The series P32 can also be used to detect small positive gauge pressure by using only the high pressure connection and leaving the low pressure connector open, or to detect a vacuum by using only the low pressure connection and leaving the high pressure connector open to ambient pressure.

Features

- Easy to read set point scale.
- Wiode range (1 to 125 mm W.C.)
- Small differential (1 mm W.C. at bottom of range.
- Large wiring space
- Versatile mounting options

Application

This (differential) pressure switch is used to sense flow of air, single or differential air pressure.

Typical applications include:

- Clogged filter detection.
- Detection of frost on air conditioning coils and initiation of defrost cycle.
- Air proving in heating or ventilation ducts.
- Maximum air flow controller for variable air volume system.

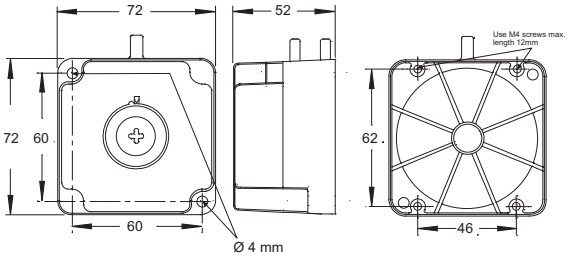
P32 Sensitive Differential Pressure Controls Selection Table

Range (mbar)	Differential (mbar)	Calibration position diaphragm	Additional Features	Type-Model Number	
0.1 to 12.5	0.23	vertical	Mounting bracket "U" type included	**P32AJ -1C**	
0.1 to 12.5	0.23	vertical	Mounting bracket "L" type included	**P32AJ -2C**	

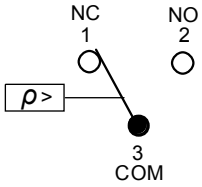
P233 Sensitive Differential Pressure Control

Differential Pressure Controls

P233 Sensitive Differential Pressure Control



Dimensions



Wiring

Description

This switch senses a change in the (differential) pressure as the airflow changes. The (differential) pressure is applied to the two sides of a diaphragm in the control. The spring-loaded diaphragm moves and actuates the switch. The series P233A/F can also be used to detect small positive gauge pressure or to detect a vacuum.

Features

- One switch to measure relative pressure, vacuum or differential pressure
- Various accessories available
- Compact and durable construction
- Easy mounting and wiring, various mounting possibilities
- Standard PG 11 nipple and optional DIN 43650 connector
- Accurate and stable switch point
- SPDT contact standard

Application

This (differential) pressure switch is used to sense flow of air, single or differential air pressure.
Typical applications include:
- Detect clogged filter
- Detect frost or ice build-up on air conditioning coils
- Air proving in heating or ventilation ducts.
- Maximum airflow controller for variable air volume system.
- Detect blocked flue or vent
- Monitor fan operation

P233 Sensitive Differential Pressure Controls Selection Table

Switch point Range (mbar)	Switching Differential (mbar) **	Contacts	Pack	Additional Features	Type-Model Number	
0,3 fixed	< 0.3	SPDT contacts, Contact rating 5(2) A 250 V ac	bulk		**P233F-P3-AAD***	
0,5 to 4			ind.		**P233A-4-AAC**	
			bulk		**P233A-4-AAD***	
			ind.	GMT008N600R + BKT024N001R	**P233A-4-AHC**	
50 to 400Pa			bulk	Scale in Pa	**P233A-4-PAD***	
			ind.		**P233A-4-PAC**	
				Scale in Pa, GMT008N600R + BKT024N001R	**P233A-4-PHC**	
				FTG015N602R (2x) + 2m tube 4/7mm	**P233A-4-PKC**	
0,5 to 4					**P233A-4-AKC**	
0,5 to 6			bilk		**P233A-6-AAD***	
1,4 to 10	< 0.5		ind.		**P233A-10-AAC**	
				GMT008N600R + BKT024N001R	**P233A-10-AHC**	
140 to 1000 Pa					**P233A-10-PAC**	
				Scale in Pa, FTG015N602R (2x) + 2m tube 4/7mm	**P233A-10-PKC**	
			bulk		**P233A-10-PAD***	
1,4 to 10				GMT008N600R + BKT024N001R	**P233A-10-AAD***	
			Ind.	FTG015N602R (2x) + 2m tube 4/7mm	**P233 -10-AKC**	
6 to 50	< 1				**P233A-50-AAC**	

* Quantity orders only

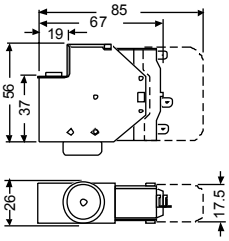
** Switching differential is maximum value mid-range

For accessories, see Section Accessories

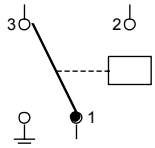
P20 for Refrigeration, Air-conditioning and Heat pump Applications

Pressure Controls

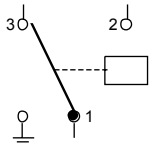
P20, style 45A



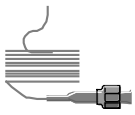
Dimensions



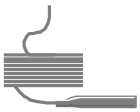
Wiring LP



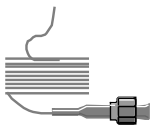
Wiring HP



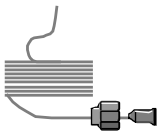
Style 13



Style 34



Style 45A



Style 50

Description

The P20 series high and low limit (cut-out) controls for all non-corrosive refrigerants are compact pressure controls ideally suited for commercial or residential packaged air conditioning units, heat pumps, small water chillers, ice cube machines and other applications where a semi fixed setting is acceptable or required and where mounting space is limited. The P20 series includes auto reset as well as manual reset models and is factory set. A special setting tool is available while also field (screwdriver) adjustable models can be chosen.

Features

- Field proven reliability.
- Reset tab must be released before restart.
- (Trip free manual reset).
- Compact design.
- Enclosed dust-tight switch.
- SPDT contact with special terminals.
- Test pressure 53 bar.
- Designed for at least 300000 cycles.

E

P20 Low Pressure Control Selection Table

Range (bar)	Differential fixed	Set at (bar)	Style	Capillary Length	Switch Action	PED approval	Type-Model Number	
0.5 to 10	1.5	1.5	45A	90 cm	SPDT, 8 A, Open Low, Auto reset	No	**P20EA -9120C**	
		4					**P20EA -9120H**	
		4.5					**P20EA-9120K**	
	1.6	6					**P20EA -9120N**	
	2.0	1.5					**P20EA -9130C**	
	0.9	2.5	50				**P20EA-9510E**	
		0.5	13				**P20EA -9610A**	
		1					**P20EA -9610B**	
		1.5					**P20EA -9610C**	
		2					**P20EA -9610D**	
		2.5					**P20EA -9610E**	
		3					**P20EA -9610F**	
		0.5		120 cm			**P20EA -9611A**	
		1.5					**P20EA -9611C**	
		2					**P20EA -9611D**	
		3					**P20EA -9611F**	
	1.5	1.5		90 cm			**P20EA -9620C**	
		2					**P20EA -9620D**	
		2.5					**P20EA -9620E**	
		3					**P20EA -9620F**	
		2		120 cm			**P20EA -9621D**	
		3					**P20EA -9621F**	
	2.0	1.5		90 cm			**P20EA -9630C**	
	2.7	1.5					**P20EA -9640C**	
		2					**P20EA -9640D**	
	0.9	3	34				**P20EA -9910F**	
	1.0	7					**P20EA -9910Q**	
		8					**P20EA -9910S**	
	1.5	3					**P20EA -9920F**	
	2.1	3					**P20EA -9930F**	

Quantity orders only
For accessories, see Section Accessories

P20 for Refrigeration, Air-conditioning and Heat pump Applications (cont.)

Pressure Controls

P20 High Pressure Control Selection Table

Range (bar)	Differential fixed	Set at (bar)	Style	Capillary Length	Switch Action	PED approval	Type-Model Number	
7 to 29	3.1	17	45A	90 cm	SPDT, 8 A, Open High, Auto reset	Yes	**P20EA -9160L**	
	4.2	11					**P20EA -9170D**	
	4.3	12					**P20EA -9170E**	
	4.6	18					**P20EA -9170M**	
	4.8	21					**P20EA -9170Q**	
	5.2	28					**P20EA -9170X**	
	1.2	16	50				**P20EA -9550K**	
	1.3	18					**P20EA -9550M**	
	2.8	11					**P20EA -9560D**	
	3.5	29					**P20EA -9560Y**	
	1.2	16					**P20EA -9561K**	
	3.4	25					**P20EA -9561U**	
	5.2	28					**P20EA -9570X**	
	7.3	26					**P20EA -9583V**	
	1.1	11	13				**P20EA -9650D**	
	1.2	14					**P20EA -9650G**	
	1.3	18					**P20EA -9650M**	
	2.8	11					**P20EA -9660D**	
	2.9	13					**P20EA -9660F**	
	3.1	17					**P20EA -9660L**	
	3.1	18					**P20EA -9660M**	
	4.5	16					**P20EA -9670K**	
	4.6	17					**P20EA -9670L**	
	4.6	18					**P20EA -9670M**	
	4.7	19					**P20EA -9670N**	
	4.9	23					**P20EA -9670S**	
	5.1	26					**P20EA -9670V**	
	5.2	28					**P20EA -9670X**	
	6.5	18					**P20EA -9680M**	
	7.0	23					**P20EA -9680S**	
	7.3	26					**P20EA -9680V**	
	7.5	28					**P20EA -9680X**	
	6.5	17		120 cm			**P20EA -9681L**	
	6.6	19					**P20EA -9681N**	

Quantity orders only

For accessories, see Section Accessories

P20 for Refrigeration, Air-conditioning and Heat pump Applications (cont.)

Pressure Controls

P20 High Pressure Control Selection Table

Range (bar)	Differential fixed	Set at (bar)	Style	Capillary Length	Switch Action	PED approval	Type-Model Number	
7 to 29	6.7	20	13	120 cm	SPDT, 8 A, Open High, Auto reset	Yes	**P20EA -9681P**	
	7.1	24					**P20EA -9681T**	
	1.1	9	34	90 cm			**P20EA -9950B**	
	1.1	10					**P20EA -9950C**	
	1.1	11					**P20EA -9950D**	
	1.2	13					**P20EA -9950F**	
	1.2	16					**P20EA -9950K**	
	1.3	18					**P20EA -9950M**	
	1.3	20					**P20EA -9950P**	
	1.0	8					**P20EA -9951A**	
	2.8	10					**P20EA -9960C**	
	3.1	16					**P20EA -9960K**	
	3.2	20					**P20EA -9960P**	
	3.3	23					**P20EA -9960S**	
	3.3	24					**P20EA -9960T**	
	3.4	25					**P20EA -9960U**	
	3.5	29					**P20EA -9960Y**	

Quantity orders only

P20 Low and High Pressure Control Universal Replacements Selection Table

Range (bar)	Differential fixed	Set at (bar)	Capillary Length	Style	Switch Action	Additional Features	PED approval	Type-Model Number	
0.5 to 10	2.1	3	90 cm	50	SPDT, 8 A, Auto reset	Open Low, Universal replacement, individual pack	No	**P20EA -9530FC**	
	2.1	3		13				**P20EA -9630FC**	
	1.0	9				Open Low, Bulkpack		**P20EB -9611***	
7 to 29	5.2	28		50		Open High, Universal replacement, individual pack	Yes	**P20EA -9570X**	
	5.2	28		13				**P20EA -9670X**	

* Quantity orders only

For accessories, see Section Accessories

P20 for Refrigeration, Air-conditioning and Heat pump Applications (cont.)

Pressure Controls

P20 Low and High Pressure Control Universal ReplacementsSelection Table

Range (bar)	Set at (bar)	Style	Capillary Length	Switch Action SPDT, 8A Manual Reset	Additional Features	PED approval	Type-Model Number	
0.5 to 10	1	13	90 cm	Open Low	Wrench adjustment	No	**P20FA -9610B***	
	2						**P20FA -9610D***	
	3						**P20FA -9610F***	
	0.5		120 cm				**P20FA -9611A***	
	3	50	90 cm		Universal Replacement		**P20FA -9510FC**	
	3	13					**P20FA -9610FC**	
7 to 29	28	45A		Open High		Yes	**P20GA -9150X***	
	16	50					**P20GA -9550K***	
	25						**P20GA -9550U***	
	28						**P20GA -9550X***	
	15	13					**P20GA -9650H***	
	18						**P20GA -9650M***	
	19						**P20GA -9650N***	
	20						**P20GA -9650P***	
	22						**P20GA -9650R***	
	24						**P20GA -9650T***	
	25						**P20GA -9650U***	
	28						**P20GA -9650X***	
	19		120 cm		Wrench adjustment		**P20GA -9651N***	
	21						**P20GA -9651Q***	
	25						**P20GA -9651U***	
	28						**P20GA -9651X***	
	29		90 cm				**P20GA -9651Y***	
	16	34					**P20GA -9950K***	
	24						**P20GA -9950T***	
	25						**P20GA -9950U***	
	28						**P20GA -9950X***	
	29						**P20GA -9950Y***	
	24						**P20GA -9951T***	
14 to 41	31						**P20GA -953ZA***	
7 to 29	28	50			Screwdriver adjustment, Universal replacement		**P20GA -9550X**	
	28	13					**P20GA -9650X**	
	26	13				No	**P20GB -9651V***	

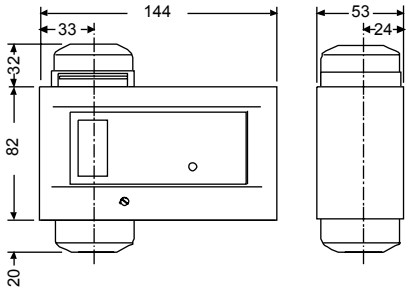
* Quantity orders only

For accessories, see Section Accessories

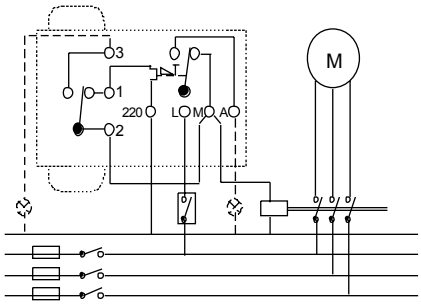
P28 Oil Protection Controls

Differential Pressure Controls

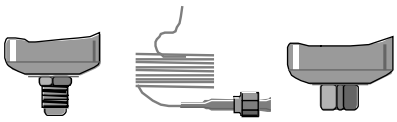
P28 Series



Dimensions



Wiring (3 - wires)



Style 5 **Style 13** **Style 15**

Description

These controls measure the pressure differential between the pressure generated by the oil pump and the refrigerant pressure at the crankcase. A built-in time delay switch allows for pressure-pick up on start and avoids nuisance shutdowns on pressure drops of short duration during the running cycle.

When the compressor is started, the time delay switch is energised. If the net oil pressure does not build up within the required time limit, the time delay switch trips to stop the compressor. If the net oil pressure rises within the required time after the compressor starts, the time delay switch is automatically de-energised and the compressor continues to operate normally. If the net oil pressure should drop below setting (scale pointer) during the running cycle, the time delay switch is energised and, unless the net oil pressure returns to cut-in point within the time delay period, the compressor will be shut down, and have to be manual reset. The compressor can never run longer than the predetermined time on low oil pressure.

Controls are available only for manual reset after cut-out.

Features

- Heavy duty pressure elements
- Safety lock-out with trip-free manual reset
- Ambient compensated timing
- Dust-tight Penn switch

Application

These oil protection controls are designed to give protection against low net lube oil pressure on pressure lubricated refrigeration compressors.

P28 Oil Protection Controls Selection Table

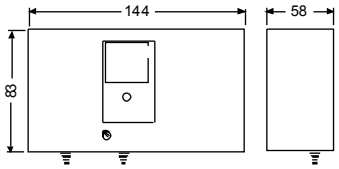
Range (bar)	Style	Time Delay (s)	Voltage	Switch Action	Refrigerant	Additional Features	Type-Model Number	
0.6 to 4.8	5	50	115/230	15(8) A, 230 Vac, Open Low, Alarm and Safe Light Contacts	non-corr.	Incl. plastic PG nipple 13.5 + 2 flare nuts	**P28DA -9341**	
	13	90					**P28DA -9660**	
	15	50			NH3	Concealed adjustment, set 1,5 bar	**P28DA -9750**	
	5	--	230		non-corr.	IP 66 enclosure,	**P28DJ -9300**	
	5	90					**P28DJ -9360**	
	5	120				IP 66 enclosure, Without time relay	**P28DJ -9380**	
	15	90			NH3	IP 66 enclosure, Incl. 2 connectors CNR003N001	**P28DJ -9861**	
	5	--			non-corr.	Without time delay	**P28DP -9300**	
	5	50					**P28DP -9340**	
	5	90					**P28DP -9360**	
	5	120					**P28DP -9380**	
	5	120				Concealed adjustment, set 0.65 bar	**P28DP -9381**	
	13	50					**P28DP -9640**	
	13	90					**P28DP -9660**	
	13	120					**P28DP -9680**	
	15	50			NH3		**P28DP -9840**	
	15	90					**P28DP -9860**	
	15	50	115/230			Concealed adjustment, set 1,5 bar	**P28DN -9750**	

For accessories, see Section Accessories

P45 Oil Protection Controls

Differential Pressure Controls

P45 Oil Protection Controls



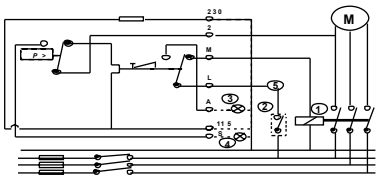
Dimensions

Description

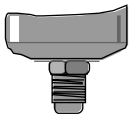
The series P45 controls are designed to give protection against low lube-oil pressure on pressure lubricated refrigeration compressors. The controls measure the pressure differential (net oil pressure) between the pressure generated by the oil pump and the refrigerant pressure at the crankcase. A built-in time delay switch allows pressure build-up during start and avoids nuisance shut-down on pressure drops of short duration during the running cycle.

Features

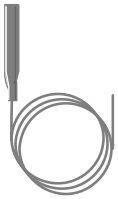
- Several million in use today.
- Heavy duty pressure elements.
- Key specifications match/exceed other brands.
- Accurate 0.2 bar switch differential standard.
- Adjustable or fixed setpoint.
- Safelight output standard.
- Trip-free manual reset.
- High current rated output.
- Ambient compensated timing.



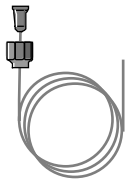
Wiring (3 - wires)



Style 5



Style 13



Style 51

P45 Oil Protection Controls Control Selection Table

Range (bar)	Setting (bar)	Time Delay (s)	Style	Voltage	Switch Action ~15(8)A 230 V Open Low	Type-Model Number	
0.5 to 4	0.6	50	5	230	Alarm contact	**P45NBB -9341B**	
	0.6	90			Alarm/Safelight Contacts	**P45NBB -9361B**	
	0.7	90				**P45NBB -9361C**	
	0.6	120				**P45NBB -9381B**	
	0.65	90				**P45NBB -9461X***	
	0.6	90	51			**P45NBB -9560C**	
	0.5	50	13			**P45NBB -9640A**	
	0.7	50				**P45NBB -9640C**	
	1.8	50				**P45NBB -9640Q**	
	0.7	90				**P45NBB -9660C**	
	0.8	90				**P45NBB -9660D**	
	1.8	90				**P45NBB -9660Q**	
	0.5	120				**P45NBB -9680A**	
	0.7	120				**P45NBB -9680C**	
	0.45	50	13	115/230		**P45NCA -9056**	
	0.7	120				**P45NCA -9104**	
	0.45	50			Alarm contact	**P45NCA -9641**	

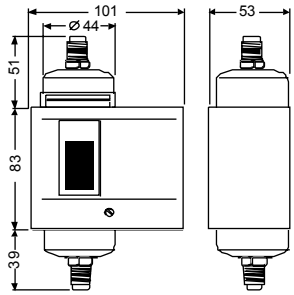
* Bulk pack

For accessories, see Section Accessories

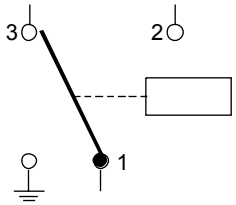
P74 Differential Pressure Control

Differential Pressure Controls

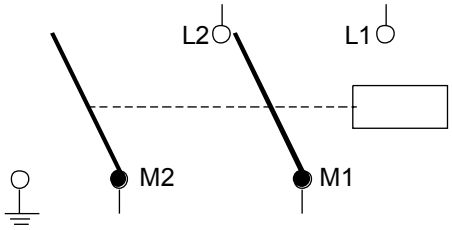
P74 Differential Pressure Control



Dimensions



Wiring P74EA/FA



Wiring P74DA

Description

The P74 series of differential pressure switches incorporate two opposing pressure elements and an adjustable range setpoint spring with a calibrated scale. The control switches at the indicated setpoint on an increase in differential pressure and switches back to the normal position when the different pressure decreases to the setpoint less the mechanical switching differential.

Features

- Heavy duty pressure elements.
- These controls may be used in combination with series P28 lube oil protection control on two compressor, single motor units.

Application

These controls are designed to sense pressure differences between two points and may be used as operating or limit controls. Typical applications are to detect flow across a chiller or water cooled condenser, to detect flow in a heating system and sensing lube oil pressure differential on refrigeration compressors.

P74 Differential Pressure Controls Selection Table

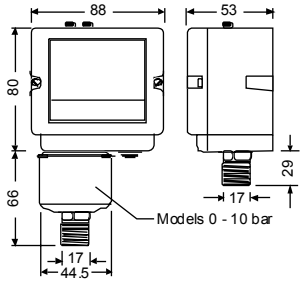
Range (bar)	Mech. Differential (bar)	Style	Switch Action	Additional Features	Type-Model Number	
0.6 to 4.8	0.7 to 2 adj.	5	DPST, 10A, contacts Open Low		**P74DA –9300**	
0.6 to 4.8	0.7 to 2 adj.	13			**P74DA –9600**	
0.6 to 4.8	0.3 fix.	5	SPDT, 5 A, contact Open High		**P74EA –9300**	
0.6 to 4.8	0.3 fix.	13			**P74EA –9600**	
0.6 to 4.8	0.3 fix.	15		for NH3	**P74EA –9700**	
0.6 to 4.8	0.3 fix.			Set 1 bar, concealed adjustment, for NH3	**P74EA –9701**	
0 to 1	0.1 fix.		SPDT, 3 A, contact Open High	for water	**P74FA –9700**	
2 to 8	0.7 fix.			For NH3	**P74FA –9701**	

* Quantity orders only

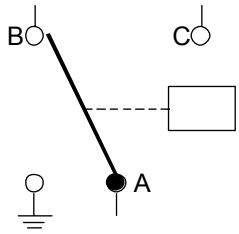
For accessories, see Section Accessories

Pressure Controls

P48 Steam Pressure Controls



Dimensions



Wiring

Description

The P48 series have been developed for special applications where pressure must be controlled. All models have an adjustable differential depending on the range (see type number selection table).The P48AAA-9110 and P48AAA-9120 has the power element outside the case.

All the models have phosphor bronze bellows and brass pressure connections except the P48AAA-9150. This model has a stainless steel bellows and pressure connection and is provided with a brass adapter ¼"-18 NPT female to R3/8 male.

Features

- Generous wiring space provided
- Splash-proof enclosure (IP54)
- SPDT contacts are provided as standard on single pressure control
- Trip-free manual reset

Application

The series P48 pressure controls are designed as operating or high/low cut-out control on steam, air or (hot) water applications. Also for non-combustible gases which are not harmful to the materials in contact with these mediums. On steam applications a steam trap is recommended (see Accessories).

P48 Steam Pressure Controls Selection Table

Range (bar)	Differential (bar)	Pressure Connection	Style	Switch Action	Aditional Features	Approved Acc. To PED 97/23EC Cat IV	Type-Model Number	
0 to 1	0.16 to 0.55	G 3/8" male	29a	~16(10)A 400 V ... 220 V DC, 12 W (pilot duty only) SPDT, Open High	automatic reset	NO	**P48AAA –9110**	
0.2 to 4	0.25 to 0.8						**P48AAA –9120**	
-0.2 to 10	1 to 4.5					YES	**P48AAA –9130**	
1 to 16	1.3 to 2.5						**P48AAA –9140**	
3 to 30	3 to 12				automatic reset , stainless steel bellows	NO	**P48AAA –9150**	
0,2 to 4	-				manual reset	YES	**P48BEA –9120**	
4 to 16	-						**P48BEA -9140***	
-0.2 to 10	1 to 4.5	G ¼" fem. special			automatic reset	NO	**P48AAA –9230***	

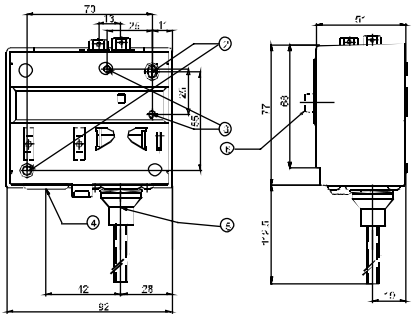
* Quantity orders only

For accessories, see Section Accessories

P735 Single Pressure Controls for Refrigeration, Air-conditioning and Heatpump Applications

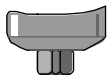
Pressure Controls

P735 Single Pressure Switch



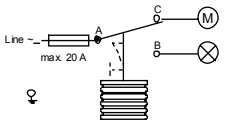
Dimensions

Style 5

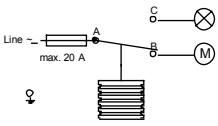


Style 15

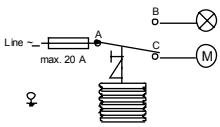
Style 30



Wiring Diagram 1



Wiring Diagram 2



Wiring Diagram 3

Description

The P735 series pressure controls may be used for control functions or limit functions, depending on model number. All models are provided with alarm contacts. All standard models have phosphor bronze bellows and brass pressure connections. Models for use with ammonia are provided with stainless steel bellows and connectors.

Features

- Generous wiring space
- SPDT contacts are provided as standard on single pressure controls.
- Trip-free manual reset

Application

These pressure controls are designed for use in a variety of applications involving refrigeration high or low pressure. Models supplied have a “whole range” design, enabling them to be used with all non-corrosive refrigerants which are within the operating range of the control. They may also be used for other high or low pressure applications such as air, water etc. Models which can be used with ammonia are included in the program.

P735 Pressure controls for Water Selection Table

Range (bar)	Differential (bar)	Switch Action (wire diag.)	Max. Bellows Pressure	Family Code	Special Pressue Connection G¼”female			PED approval	
					Ind. Pack.				
-0,2 to 10	1 to 4,5	1	15	**P735AAA**	**-9200**			NO	
-0,5 to 7	0,5 to 3	1	22		**-9201**				

P735 Pressure controls for Non-corrosive refrigerants Selection Table

Range (bar)	Differential (bar)	Switch Action (wire diag.)	Max. Bellows Pressure	Family Code	Style 5		Style 30	PED approval	
					Ind. Pack.	Bulkpack	Ind. Pack.		
-0.5 to 7	0.5 to 3	1	22	**P735AAA**	**-9300**	**-9320**	**-9400**	NO	
-0.2 to10	1 to 4.5	1	15		**-9301**				
3 to 30	3 to 12	2	33		**-9350**	**-9370**	**-9450**		
3.5 to 21	2.1 to 5.5	2	30		**-9351**	**-9371**	**-9451**		
-0.5 to 7	Man. res.**	1	22	**P735BCA**	**-9300**	**-9320**	**-9400**		
3 to 30	Man. res.*	3	33	**P735BEA**	**-9350**	**-9370**	**-9450**		

** Resetable at 0.5 bar above cut-out point

* Resetable at 3 bar below cut-out point

P735 Pressure controls for NH3 Selection Table

Range (bar)	Differential (bar)	Switch Action (wire diag.)	Max. Bellows Pressure	Family Code	Style 15		PED approval	
					Ind. Pack.	Bulkpack		
-0.5 to 7	0.5 to 3	1	20	**P735AAA**	**-9700**		NO	
3 to 30	3.5 to 12	2	33		**-9750**	**-9770**		
-0.5 to 7	Man. res.**	1	20	**P735BCA**	**-9700**			
3 to 30	Man. res.*	3	33	**P735BEA**	**-9750**			

** Resetable at 0.5 bar above cut-out point

* Resetable at 3 bar below cut-out point

Note: 100 kPa = 1 bar ≈ 14.5 psi

P735 Single Pressure Controls for Refrigeration, Air-conditioning and Heatpump Applications (continued)

Pressure Controls

P735 Pressure controls for Non-corrosive refrigerants Selection Table

Range (bar)	Differential (bar)	Switch Action (wire diag.)	Max. Bellows Pressure	Family Code	Style 5		Style 28	PED approval	
					Ind. Pack.	Bulkpack	Ind. Pack.		
-0.5 to 7	0.6 to 3	1	20	**P735AAW**	**-9300**		**-9800**	No	
3 to 30	3,5 to 12	2	33		**-9350**	**-9370**	**-9850**	Yes	
-0,5 to 7	Man. res.**	1	20	**P735BCB**	**-9300**			No	
3 to 30	Man. res.*	3	33	**P735BEB**	**-9350**	**-9370**	**-9850**	Yes	
3 to 30	Man. res.*	3	33	**P735BES**	**-9350**	**-9370**		Yes	

** Resetable at 0.5 bar above cut-out point

* Resetable at 3 bar below cut-out point

P735 Pressure controls for NH3 Selection Table

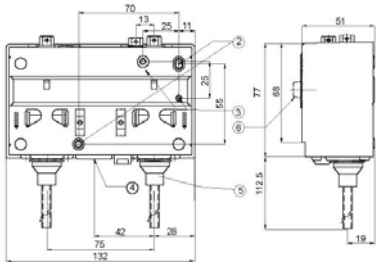
Range (bar)	Differential (bar)	Switch Action (wire diag.)	Max. Bellows Pressure	Family Code	Style 15		PED approval	
					Ind. Pack.	Bulkpack		
3 to 30	3.5 to 12	2	33	**P735AAW**	**-9750**		Yes	
3 to 30	Man. res.*	3	33	**P735BEB**	**-9750**		Yes	

* Resetable at 3 bar below cut-out point

P736 Dual Pressure Controls for Refrigeration, Air-conditioning and Heatpump Applications

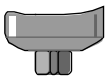
Pressure Controls

P736 Dual Pressure Switch

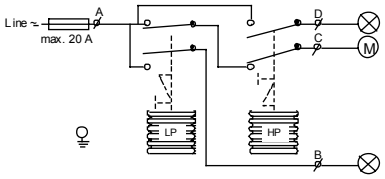


Dimensions

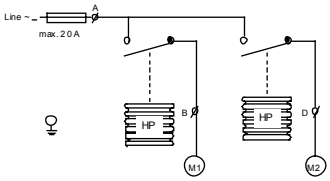
Style 5



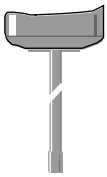
Style 15



Wiring Diagram



Wiring Diagram P736ALA



Style 30

Description

The P736 series pressure controls may be used for control functions or limit functions, depending on model number. All models are provided with alarm contacts (except P736ALA). All standard models have phosphor bronze bellows and brass pressure connections. Models for use with ammonia are provided with stainless steel bellows and connectors.

Features

- Generous wiring space
- Trip-free manual reset
- Separate alarm contacts for both low pressure and high pressure cut-out (except P736ALA)

Application

These dual pressure controls are designed for use in a variety of applications involving refrigeration high or low pressure. Models supplied have a "whole range" design, enabling them to be used all non-corrosive refrigerants which are within the operating range of the control. They may also be used for other high or low pressure applications such as air, water etc. Models which can be used with ammonia are included in the program.

P736 Dual pressure controls for Non-corrosive refrigerants Selection Table

Left Side		Right Side		Contruction LP/HP	Family Code	Style 5		Style 30	PED approvals	
Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)	(max. press.)		Ind. Pack.	Bulkpack	Ind. Pack.		
-0.5 to 7	0.5 to 3	3 to 30	3 (fixed)	LP: 22bar HP: 33 bar	P736LCA	-9300	-9320	-9400	NO	
-0.5 to 7	0.5 to 3	3 to 30	Man. res.**		P736MCA	-9300	-9320	-9400		
-0.5 to 7	Man. res.*	3 to 30	Auto reset		P736NGA	-9300	****			
-0.5 to 7	Man. res.*	3 to 30	Man. res.**		P736PGA	-9300	-9320	-9400		

** Resetable at 3 bar below cut-out point
* Resetable at 0.5 bar above cut-out point

P736 Dual pressure controls for Ammonia and Non-corrosive refrigerants Selection Table

Left Side		Right Side		Contruction LP/HP	Family Code	Style 15		PED approvals	
Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)	(max. press.)		Ind. Pack.	Bulkpack		
-0.5 to 7	0.5 to 3	3 to 30	3 (fixed)	LP: 22bar HP: 33 bar	P736LCA	-9700	****	NO	
-0.5 to 7	0.5 to 3	3 to 30	Man. res.**		P736MCA	-9700	****		
-0.5 to 7	Man. res.*	3 to 30	Man. res.**		P736PGA	-9700	****		

**** Can be set-up for quantity orders
** Resetable at 3 bar below cut-out point
* Resetable at 0.5 bar above cut-out point

P736 Dual pressure Fan cycling controls for Air-cooled condensers (Non-corrosive refrigerants)Selection Table

Left Side		Right Side		Contruction HP/HP	Family Code	Style 5		Style 30	PED approvals	
Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)	(max. press.)		Ind. Pack.	Bulkpack	Ind. Pack.		
3.5 to 21	1.8 (fixed)	3.5 to 21	1.8 (fixed)	30 bar	P736ALA	-9351	****	-9451	NO	

**** Can be set-up for quantity orders

Note: 100 kPa = 1 bar ≈ 14.5 psi

P736 Dual Pressure Controls for Refrigeration, Air-conditioning and Heatpump Applications (continued)

Pressure Controls

P736 Dual pressure controls for Non-corrosive refrigerants Selection Table

Left Side		Right Side		Contruction LP/HP (max. press.)	Family Code	Style 5		Style 28	PED approvals	
Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)			Ind. Pack.	Bulkpack	Ind. Pack.		
-0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	LP: 22bar HP: 33 bar	**P736LCW**	**-9300**	**-9320**	**-9800**	Yes	
-0.5 to 7	0.6 to 3	3 to 30	Man. res.**		**P736MCB**	**-9300**	****	**-9800**		
-0.5 to 7	0,6 to 3	3 to 30	Man. res.**		**P736MCS**	**-9300**	****			
-0.5 to 7	Man. res.*	3 to 30	Man. res.**		**P736PGB**	**-9300**	****	**-9800**		

P736 Dual pressure Manual reset HP/HP, TÜV-Begrenzer + Sicherheitsbegrenzer Selection Table

Left Side		Right Side		Contruction HP/HP (max. press.)	Family Code	Style 5		Style 30	PED approvals	
Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)			Ind. Pack.	Bulkpack	Ind. Pack.		
3 to 30	Man. res.**	3 to 30	Man. res.**	30 bar	**P736PLM**		**-9370**		Yes	

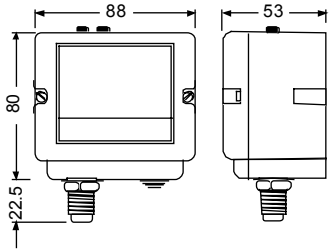
**** Can be set-up for quantity orders
** Resetable at 3 bar below cut-out point
* Resetable at 0.5 bar above cut-out point

Note: 100 kPa = 1 bar ≈ 14.5 psi

P77 Single Pressure Controls for IP54 Applications

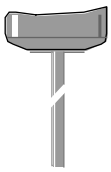
Pressure Controls

P77 Single Pressure Switch

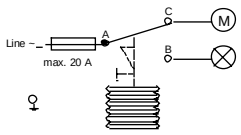


Dimensions

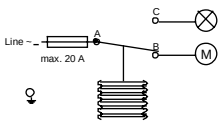
Style 5



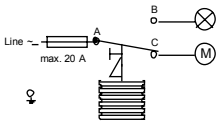
Style 28



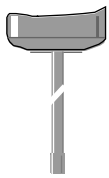
Wiring Diagram 1 Open Low



Wiring Diagram 2 Open High



Wiring Diagram 3 Open High



Style 30

Description

The P77 series pressure controls may be used for control functions or limit functions, depending on model number. All models are provided with alarm contacts. All standard models have phosphor bronze bellows and brass pressure connections. Models for use with ammonia are provided with stainless steel bellows and connectors. Devices conforming to DIN 32733 have a double bellows on the high pressure versions. Their IP54 classification means that these pressure controls are suitable for almost all applications.

Features

- Generous wiring space
- Splash-proof enclosure (IP54)
- SPDT contacts are provided as standard on single pressure controls.
- Trip-free manual reset

Application

These pressure controls are designed for use in a variety of applications involving refrigeration high or low pressure. Models supplied have a "whole range" design, enabling them to be used with refrigerants R22, R134A, R404A and all other non-corrosive refrigerants which are within the operating range of the control. They may also be used for other high or low pressure applications such as air, water etc. Models which can be used with ammonia as well as controls tested, conforming to DIN 32733, and approved by TÜV are included in the program.

P77 Pressure Controls Selection Table

Range (bar)	Differential (bar)	Wiring/ Action	Style	Pack.	Refr.	Additional Features	W-sale Code	Type-Model number	PED approval	
-0.5 to +7	0.5 to 3	1	5	ind.	non-corr.		P77L	**P77AAA-9300**	No	
-0.2 to 10	1 to 4.5							**P77AAA-9301**		
-0.3 to +2	0.4 to 1.5							**P77AAA-9302**		
-0.5 to +7	0.5 to 3			bulk		ls P77AAA-9300 bulk pack		**P77AAA-9320***		
-0.2 to 10	1 to 4.5					ls P77AAA-9301 bulk pack		**P77AAA-9321***		
-0.3 to +2	0.4 to 1.5					ls P77AAA-9302 bulk pack		**P77AAA-9322***		
3 to 30	3 to 12	2		ind.			P77H	**P77AAA-9350**		
3.5 to 21	2 to 5.5						P77A	**P77AAA-9351**		
3 to 30	3 to 12			bulk		ls P77AAA-9350 bulk pack		**P77AAA-9370***		
3.5 to 21	2 to 5.5					ls P77AAA-9351 bulk pack		**P77AAA-9371***		
3 to 30	3 to 12					Factory setting 10 bar, differential 3,5 bar		**P77AAA-9379***		
-0.5 to 7	0.5 to 3	1	30	ind.		P77AAA-9300 with solder connection ¼ "ODF		**P77AAA-9400**		
3 to 30	3 to 12	2				P77AAA-9350 solder connection ¼ "ODF		**P77AAA-9450**		
3.5 to 21	2 to 5.5					P77AAA-9351 solder connection ¼ "ODF		**P77AAA-9451**		
-0.5 to +7	0.5 to 3	1	15		NH3			**P77AAA-9700**		
3 to 30	3 to 12	2						**P77AAA-9750**		
3 to 30	3 to 12			bulk		P77AAA-9750 bulk pack		**P77AAA-9770***		
-0.5 to +7	0.5 to 3	1	28	ind.	non-corr.	P77AAA-9300 solder connection 6 mm ODM		**P77AAA-9800**		
3 to 30	3 to 12	2				P77AAA-9350 solder connection 6 mm ODM		**P77AAA-9850**		

* Quantity orders only

For accessories, see Section Accessories

Pressure Controls

P77 Pressure Controls Automatic Recycle,TÜV-Wächter Selection Table

Range (bar)	Diff. (bar)	Wiring/ Action	Style	Pack.	Refr.	Additional Features	W-sale Code	Type-Model number	PED approval	
-0.5 to +7	0.5 to 3	1		ind.	non-corr.			**P77AAW-9300**	No	
-0.5 to +7	0.5 to 3					Gold plated contacts; Fixed setting: Open:0,5 bar; Close: 1,25 bar		**P77AAW-9301***		
-0.5 to +7	0.5 to 3			bulk		P77AAW-9300 in bulk pack		**P77AAW-9320***		
3 to 30	3.5 to 12	2		ind.			P77W	**P77AAW-9350**	Yes	
3 to 30	3.5 to 12					Gold plated contacts; Fixed setting: Open:7 bar; Close: 11 bar		**P77AAW-9353***		
3 to 30	3.5 to 12					Gold plated contacts; Fixed setting: Open:22,5 bar; Close: 16 bar		**P77AAW-9354***		
3 to 30	3.5 to 12			bulk		P77AAW-9350 in bulk pack		**P77AAW-9370***		
-0.5 to +7	0.5 to 3	1	15	ind.	NH3			**P77AAW-9700**	No	
3 to 30	3.5 to 12	2						**P77AAW-9750**	Yes	
-0.5 to +7	0.5 to 3	1	28	ind.	non-corr.	P77AAW-9300 with solder connection 6 mm ODM		**P77AAW-9800**	No	
3 to 30	3.5 to 12	2				P77AAW-9350 with solder connection 6 mm ODM		**P77AAW-9850**	Yes	
3 to 30	3.5 to 12					Gold plated contacts; Fixed setting: Open:7 bar; Close: 11 bar, with solder connection 6 mm ODM		**P77AAW-9851***		

P77 Pressure Controls Manual Reset LP Selection Table

-0.5 to +7	-	1	5	ind.	non-corr.			**P77BCA-9300**	No	
				bulk		P77BCA-9300 in bulk pack		**P77BCA-9320***		
			30	ind.		P77BCA-9300 with solder connection ¼ "ODF		**P77BCA-9400**		
			15	ind.	NH3			**P77BCA-9700**		
			5		non-corr.			**P77BCB-9300**		
				bulk		P77BCB -9300in bulk pack		**P77BCB-9320***		
			15	ind.	NH3			**P77BCB-9700**		
			28		non-corr.	P77BCB -9300 with solder connection 6mm ODM		**P77BCB-9800**		

P77 Pressure Controls Manual Reset HP Selection Table

3 to 30	-	3	5	ind.	non-corr.		P77HR	**P77BEA-9350**	No	
				bulk		P77BEA-9350 in bulk pack		**P77BEA-9370***		
			30	ind.		P77BEA-9350 with solder connection ¼ "ODF		**P77BEA-9450**		
			15		NH3			**P77BEA-9750**		

P77 Pressure Controls, TÜV-Begrenzer Selection Table

3 to 30	-	3	5	ind.	non-corr.		P77B	**P77BEB-9350**	Yes	
				bulk		P77BEB-9350 in bulk pack		**P77BEB-9370***		
			15	ind.	NH3			**P77BEB-9750**		
			28		non-corr.	P77BEB-9350 with solder connection 6mm ODM		**P77BEB-9850**		

P77 Pressure Controls, TÜV-Sicherheitsdruckbegrenzer Selection Table

3 to 30	-	3	5	ind.	non-corr.		P77B	**P77BES-9350**	Yes	
				bulk		P77BES-9350 in bulk pack		**P77BES-9370***		
			15	ind.	NH3			**P77BES-9750**		
			28	ind.	non-corr.	P77BES-9350 with solder connection 6mm ODM		**P77BES-9850**		

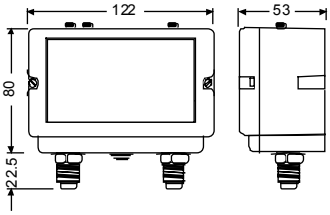
* Quantity orders only

For accessories, see Section Accessories

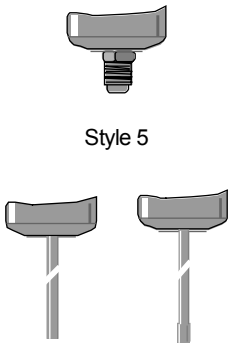
P78 Dual Pressure Controls for IP54 Applications

Pressure Controls

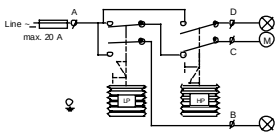
P78 Dual Pressure Switch



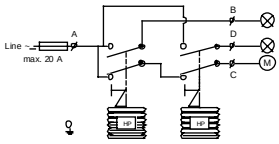
Dimensions



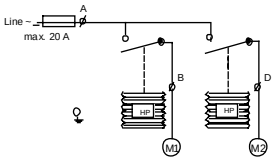
Style 5 **Style 28** **Style 30**



Wiring Diagram 1
LP Open Low/HP Open High



Wiring Diagram 2
Open High both sides



Wiring Diagram 3
Open Low both sides

Description

The P78 series pressure controls may be used for control functions or limit functions, depending on model number. All models are provided with alarm contacts (except P78ALA). All standard models have phosphor bronze bellows and brass pressure connections. Models for use with ammonia are provided with stainless steel bellows and connectors. Devices conforming to DIN 32733 have a double bellows on the high pressure versions. Their IP54 classification means that these pressure controls are suitable for almost all applications.

Features

- Generous wiring space
- Splash-proof enclosure (IP54)
- Trip-free manual reset
- Patented separate alarm contacts for both low pressure and high pressure cut-out (except P78ALA)

Application

These dual pressure controls are designed for use in a variety of applications involving refrigeration high or low pressure. Models supplied have a “whole range” design, enabling them to be used with refrigerants R22, R134A, R404A and all other non-corrosive refrigerants which are within the operating range of the control. They may also be used for other high or low pressure applications such as air, water etc. Models which can be used with ammonia as well as controls tested, conforming to DIN 32733, and approved by TÜV are included in the program.

P78 Pressure Controls Automatic Recycle Selection Table

Range (bar)		Diff. (bar)	Wiring/ Action	Style	Pack.	Refr.	Additional Features	W-sale Code	Type-Model number	PED approval	
LP	HP	LP									
-0.5 to +7	3 to 30	0.5 to 3	1	5	ind.	non-corr.		P78L	**P78LCA-9300**	No	
					bulk		P78LCA-9300 bulk pack		**P78LCA-9320***		
				30	ind.		P78LCA-9300 solder connection ¼ “ODF		**P78LCA-9400**		
				special			P78LCA-9300 with 90 cm capillary pressure connection		**P78LCA-9500**		
				15		NH3			**P78LCA-9700**		

P78 Pressure Controls Automatic Recycle, TÜV-Wächter Selection Table

-0.5 to +7	3 to 30	0.5 to 3	1	5	ind.	non-corr.		P78W	**P78LCW –9300**	Yes	
					bulk		Gold plated contacts		**P78LCW-9302***		
							P78LCW-9300 bulk pack		**P78LCW-9320***		
							P78LCW-9300 but set at 0 to 3 bar LP, 20 bar HP		**P78LCW-9321***		
				28	ind.		P78LCW-9300 solder connection 6 mm ODM		**P78LCW - 9800**		
							P78LCW-9800 gold plated contacts, fixed settings LP 0,3 bar;HP22,5 bar		**P78LCW – 9801***		

P78 Pressure Controls, Manual reset HP, Selection Table

-0.5 to +7	3 to 30	0.5 to 3	1	5	ind.	non-corr.		P78M	**P78MCA -9300**	No	
				5	bulk		P78MCA-9300 bulk pack		**P78MCA-9320***		
				30	ind.		P78MCA-9300 solder connection ¼ “ODF		**P78MCA -9400**		
				15	ind.	NH3			**P78MCA -9700**		

* Quantity orders only
For accessories, see Section Accessories

P78 Dual Pressure Controls for IP54 Applications (cont.)

Pressure Controls

P78 Pressure Controls, Manual reset LP/Auto. Reset HP Selection Table

Range (bar)		Diff. (bar)	Wiring/ Action	Style	Pack.	Refr.	Additional Features	W-sale Code	Type-Model number	PED approval	
LP	HP	LP									
-0.5 to +7	3 to 30	-	1	5	ind.	non-corr.		P78P	**P78PGA -9300**	No	
					bulk		P78PGA-9300 bulk pack		**P78PGA –9320***		
				30	Ind.		P78PGA-9300 solder connection ¼ "ODF		**P78PGA -9400**		
				15		NH3			**P78PGA -9700**		

P78 Pressure Controls, Manual reset LP/HP Selection Table

-0.5 to +7	3 to 30	-	1	5	ind.	non-corr.			**P78PGB -9300**	Yes	
		-		28	ind		P78PGB-9300 solder connection 6 mm ODM		**P78PGB -9800**		

P78 Pressure Controls, Manual reset HP, TÜV-Begrenzer Selection Table

-0.5 to +7	3 to 30	0.5 to 3	1	5	ind.	non-corr.		P78B	**P78MCB -9300**	Yes	
							P78MCB-9300 HP factory set at 29 bar		**P78MCB -9303**		
					bulk		P78MCB-9300 bulk pack		**P78MCB-9320***		
				28	ind.		P78MCB-9300 solder connection 6 mm ODM		**P78MCB -9800**		

P78 Pressure Controls, Manual reset HP, TÜV-Sicherheitsbegrenzer Selection Table

-0.5 to +7	3 to 30	0.5 to 3	1	5	ind.	non-corr.		P78S	**P78MCS -9300**	Yes	
				28			P78MCS-9300 solder connection 6 mm ODM		**P78MCS -9800**		

P78 Pressure Controls, Manual reset HP/HP, TÜV-Begrenzer + Sicherheitsbegrenzer Selection Table

Range (bar)			Wiring/ Action	Style	Pack.	Refr.	Additional Features	W-sale Code	Type-Model number	PED approval	
HP	HP										
3 to 30	3 to 30	-	2	5	ind.	non-corr.		P78BS	**P78PLM -9350**	Yes	
				28			ls P78PLM-9350 solder connection 6 mm ODM		**P78PLM -9850**		

P78 Dual Fan Cycling Controls Selection Table

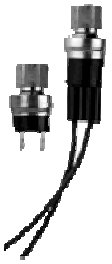
Range (bar)			Wiring/ Action	Style	Pack.	Refr.	Additional Features	W-sale Code	Type-Model number	PED approval	
HP	HP										
3.5 to 21	3.5 to 21	-	3	5	ind.	non-corr.		P78A	**P78ALA -9351**	No	
				30			ls P78ALA-9351 solder connection ¼ "ODF		**P78ALA -9451**		

* Quantity orders only

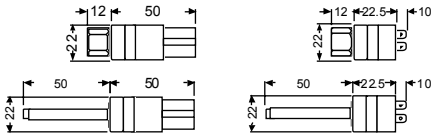
For accessories, see Section Accessories

P100 Direct Mount Pressure Switches

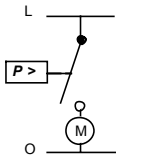
Pressure Controls



P100 Pressure Controls



Dimensions



SPST-NO
LP protection +
fan-cycle

Wiring

Description

The P100 Series are encapsulated, non-adjustable, direct mount pressure controls typically used for low and high-pressure cut-outs for OEM applications.

The P100 series are produced according to switchpoint requirements of customers.

The small dimensions, weight and protection class makes the P100 series applicable for use without the need of additional mounting brackets.

The P100 Series can be used for all non-corrosive refrigerants like R134a; R22; R404, R410A and others.

Features

- Compact size and light weight
- Encapsulated, dust tight switch IP67
- Broad variety of electrical and pressure connections.

Application

- Computer room air conditioning
- Refrigeration/ Air conditioning condensers
- Commercial refrigeration
- Ice machines
- Food service equipment

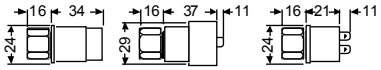
P100 Pressure Controls Selection Table

Application	Refrigerant	P(bar)		P open ± (bar) tolerance	P close ± (bar) tolerance	Connection		Electr.Termination	Switch	Type-Model Number	
		Open	Close			"1/4""SAE Fem Flare"	50 mm straight, 6mm dia. X 7 mm reduced end, copper clad brazing tube (TIF5)				
Low Pressure Auto Reset Normally Open	R134A	2,5	4	0,5	0,5	X		2 Mt.	SPST	**P100AP-300D**	
	R134A	2,5	4	0,5	0,5		X	2 Mt.	SPST	**P100AP-301D**	
	R407C	4	6	0,5	0,5	X		2 Mt.	SPST	**P100AP-302D**	
	R407C	4	6	0,5	0,5		X	2 Mt.	SPST	**P100AP-303D**	
	R404A	0,5	3	0,4	0,4	X		2 Mt.	SPST	**P100AP-304D**	
	R404A	0,5	3	0,4	0,4		X	2 Mt.	SPST	**P100AP-305D**	
	R404A	0,3	2,8	0,4	0,4	X		2 Mt.	SPST	**P100AP-306D**	
	R404A	0,3	2,8	0,4	0,4		X	2 Mt.	SPST	**P100AP-307D**	
		0,5	1,5	0,3	0,3	X		FAST ON	SPST	**P100AP-308D**	
		0,7	2,2	0,3	0,3	X		1,2 Mt.	SPST	**P100AP-309D**	
		0,7	2,2	0,3	0,3	X		3 Mt.	SPST	**P100AP-310D**	
High Pressure Auto Reset Normally Closed	R134A	16	11	0,7	1,4	X		2 Mt.	SPST	**P100CP-102D**	
	R134A	16	11	0,7	1,4		X	2 Mt.	SPST	**P100CP-103D**	
	R407C	24	18	0,7	1,4	X		2 Mt.	SPST	**P100CP-104D**	
	R407C	24	18	0,7	1,4		X	2 Mt.	SPST	**P100CP-105D**	
	R404A	28	23	0,7	0,7	X		2 Mt.	SPST	**P100CP-106D**	
	R404A	28	23	0,7	0,7		X	2 Mt.	SPST	**P100CP-107D**	
	R410A	38	28	0,7	0,7	X		2 Mt.	SPST	**P100CP-108D**	
	R410A	38	28	0,7	0,7		X	2 Mt.	SPST	**P100CP-109D**	
		27,6	20,7	0,7	0,7	X		FAST ON	SPST	**P100CP-110D**	
		26	20	0,7	0,7	X		2 Mt.	SPST	**P100CP-111D**	
		26	20	0,7	0,7		X	2 Mt.	SPST	**P100CP-112D**	

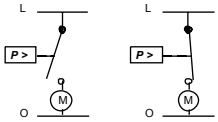
P100 Direct Mount Pressure Switches (continued)

Pressure Controls

P100 Pressure Controls



Dimensions



SPST-NO / SPST-NC
LP protection + fan-cycle
HP protection

Wiring

Description

The P100 Series are encapsulated, non-adjustable, direct mount pressure controls typically used for low and high-pressure cut-outs for OEM applications.

The P100 series are produced according to switchpoint requirements of customers.

The small dimensions, weight and protection class makes the P100 series applicable for use without the need of additional mounting brackets.

The P100 Series can be used for all non-corrosive refrigerants like R134a; R22; R404, R410A and others.

Features

- Compact size and light weight
- Encapsulated, dust tight switch IP67
- Manual reset models have a trip-free design
- Models with gold-plated contacts available.
- Broad variety of electrical and pressure connections.

Application

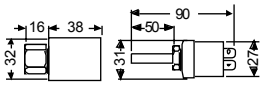
- Computer room air conditioning
- Refrigeration/ Air conditioning condensers
- Commercial refrigeration
- Ice machines
- Food service equipment

P100 Pressure Controls Selection Table

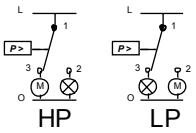
Application	Refrigerant	P(bar)		P open ± (bar) tolerance	P close ± (bar) tolerance	Connection		Electr.Termination	Switch	Type-Model Number	
		Open	Close			"1/4""SAE Fem Flare"	50 mm straight, 6mm dia. X 7 mm reduced end, copper clad brazing tube (TIF5)				
High Pressure Manual Reset	R134A	16		0,7	-	X		2 Mt.	SPST	**P100DA-66D**	
	R134A	16		0,7	-		X	2 Mt.	SPST	**P100DA-67D**	
	R407C	26		0,7	-	X		3 Mt.	SPST	**P100DA-68D**	
	R407C	26		0,7	-		X	3 Mt.	SPST	**P100DA-69D**	
	R404A	28		0,7	-	X		3 Mt.	SPST	**P100DA-70D**	
	R404A	28		0,7	-		X	3 Mt.	SPST	**P100DA-71D**	
	R410A	38		1,0	-	X		2 Mt.	SPST	**P100DA-72D**	
	R410A	38		1,0	-		X	2 Mt.	SPST	**P100DA-73D**	
	R407C	26		0,7	-	X		1,2 Mt.	SPST	**P100DA-74D**	
	R410A	42		0,7	-	X		2 Mt.	SPST	**P100DA-75D**	
	R410A	42		0,7	-		X	2 Mt.	SPST	**P100DA-76D**	

P100 Direct Mount Pressure Switches* (continued)

Pressure Controls



Dimensions



Wiring

P100 Heavy Duty Pressure Controls Selection Table

Application	Refrigerant	P(bar)		P open ± (bar) tolerance	P close ± (bar) tolerance	Connection		Electr.Termination	Switch	Type-Model Number	
		Open	Close			"1/4""SAE Fem Flare"	50 mm straight, 6mm dia. X 7 mm reduced end, copper clad brazing tube (TIF5)				
High Pressure Auto Reset Normally Closed	R134A	16	11	0,7	0,7	X		2 Mt.	SPDT	**P100EE-56D**	
	R134A	16	11	0,7	0,7		X	2 Mt.	SPDT	**P100EE-57D**	
	R407C	24	18	0,7	0,7	X		2 Mt.	SPDT	**P100EE-58D**	
	R407C	24	18	0,7	0,7		X	2 Mt.	SPDT	**P100EE-59D**	
	R404A	28	21	0,7	0,7	X		2 Mt.	SPDT	**P100EE-60D**	
	R404A	28	21	0,7	0,7		X	2 Mt.	SPDT	**P100EE-61D**	
	R410A	38	28	0,7	0,7	X		2 Mt.	SPDT	**P100EE-62D**	
	R410A	38	28	0,7	0,7		X	2 Mt.	SPDT	**P100EE-63D**	

Accessories for Pressure Switches

Pressure Controls

Accessories for Pressure Switches Selection Table

Description	Minimum order qty.	Type-Model number	
Mounting bracket + screws for P35AC transducer	1	**BKT034N602R**	
Mounting bracket dual for P20	1	**BKT275-1**	
Mounting bracket for P20/P35 (single)	1	**210-25R**	
Wrench P20/P21	1	**WRN12-1**	
Terminal cover P20/P21	50	**210-604R**	
Bracket for P32 L type, USA item	1	**BKT182-2**	
Mounting bracket for P33 L type	1	**BKT024N001R**	
Test fitting for P33G	1	**FTG013N001R**	
Duct mounting kit "staight"	1	**FTG015N602R**	
Duct mounting kit "bent"	1	**FTG015N603R**	
Duct kit for P33, self locking grommet and tubing	1	**GMT008N600R**	
Connector 6 mm for P77/P78	1	**CNR003N001R**	
Connector 8 mm for P77/P78	1	**CNR003N002R**	
Adapter R3/8 female to 1/4-18 NPT male for P48	1	**CNR012N001R**	
Adapter R 3/8 female to 1/4-18 NPT female for P48	1	**CNR013N001R**	
Steam trap assembly P48	1	**TBG16A-600**	
Locking kit for P48, P77/P78 - for field installation	1	**KIT023N600**	
Valve depressors for conversion style 13-style 45a	100 (1 box)	**KIT031N600**	
Seal rings for style 50/51	250 1 box)	**KIT034N600**	
Mounting bracket for P28, P45, P48, P74, P77/P78	50	**271-51L**	
Flare nut	500	**NUT003N001R**	
Capillary kit, 90 cm, 2x style 13	100	**SEC002N600**	
Capillary kit, 90 cm, style 13 - style 45a	100	**SEC002N602**	
Capillary kit, 300 cm, 2x style 13	100	**SEC002N603**	
Capillary kit, 300 cm, style 13 - style 45a	100	**SEC002N604**	
Capillary kit, 200 cm, style 13 - style 45a	75	**SEC002N606**	
Capillary kit, 200 cm, 2x style 13	75	**SEC002N607**	
Capillary kit, 400 cm, style 13 - style 45a	100	**SEC002N608**	
Capillary kit, 500 cm, style 13 - style 45a	100	**SEC002N609**	
Capillary kit, 400 cm, 2x style 13	100	**SEC002N610**	
Capillary kit, 500 cm, 2x style 13	100	**SEC002N611**	
Capillary kit, 600 cm, 2x style 13	100	**SEC002N612**	
Capillary kit, 90 cm, style 34 - style 45a	100	**SEC002N613**	
Capillary kit, 90 cm, style 13 - style 34	100	**SEC002N615**	
Capillary kit, 90 cm, style 13 - cap.	150	**SEC002N616**	
Capillary kit, 100 cm, style 13 - style 13	100	**SEC002N617**	
Capillary kit, 100 cm, style 13 - style 34	100	**SEC002N618**	
Capillary kit, 200 cm, style 13 - style 34	100	**SEC002N619**	
Capillary kit, 200 cm, style 34 - style 34	100	**SEC002N620**	
Capillary kit, 90 cm, style 34 - style 34	100	**SEC002N621**	
Capillary kit, 90 cm, style 50 - style 50	100	**SEC002N622**	
Capillary kit, 90 cm, style 51 - cap.	100	**SEC002N623**	
Capillary kit, 200 cm, style 50 - style 50	75	**SEC002N624**	
Capillary kit, 300 cm, style 50 - style 50	50	**SEC002N625**	
Capillary kit, 90 cm, style 50 - style 51	100	**SEC002N626**	
Capillary kit, 200 cm, style 50 - style 51	100	**SEC002N627**	
Capillary kit, 300 cm, style 50 - style 51	75	**SEC002N628**	
Capillary kit, 400 cm, style 50 - style 51	50	**SEC002N629**	
Capillary kit, 500 cm, style 50 - style 51	50	**SEC002N630**	
Capillary kit, 50 cm, style 13 style 34	100	**SEC002N631**	

Accessories for Pressure Switches

Pressure Controls

Replacement - Time relays P28 - P29

Timing (s)	Voltage	Switch action	Type-Model number	
90	120/240	Manual reset, dual voltage (AC)	**RLY13A603R**	
120			**RLY13A620R**	
50			**RLY13A998R**	
90	12	Manual reset, 12V (AC/DC)	**RLY13A626R**	
120	24	Manual reset, 24V (AC/DC)	**RLY13A627R**	
90			**RLY13A635R**	
50			**RLY13A644R**	

H735 Synthetic Flexible Hose

Accessories for Pressure Switches

H735 Synthetic Flexible Hose

Description

The synthetic hoses consist of a seamless PA compound inner layer reinforced with a braided layer of high performance synthetic fibre.

This reinforcement is protected by an oil, weather and abrasion resistant Polyester Elastomer Compound. The standard assembly length is 0,9 meter with one straight and one elbow 90 degree hose fitting. The fitting connection is 1/4" metal tube with 7/16"-20 UNF swivel nut connection suitable for 1/4" SAE male flare. Other lengths and/or fitting connections configurations (Style 50, 51 straight or elbow) are available on request (quantity orders only).

Features

- Very flexible
- Low minimum bend radius (30 mm)
- One straight and one 90° elbow pressure connection
- Polyester Elastomer Compound construction
- High pressure safety ratio
- Low effusion

Application

These synthetic hoses are designed for pressure measuring connections.

They provide, for example, a very flexible connection between a refrigerant compressor and pressure controls. The hoses can be used for all non-corrosive refrigerants including R134a, R22, R404a, R407c and R410A with pressures within the maximum pressure range of the hose.

Hoses are tested with common compressor oils in combination with above mentioned refrigerants.

H735 Synthetic Flexible Hose Selection Table

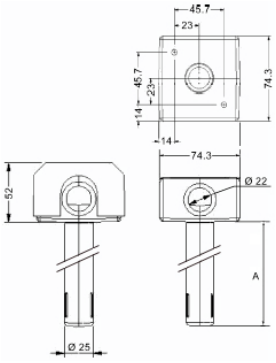
Pressure Connection	Fitting connection	Length (cm)	Aditional Features	Type-Model Number	
Straight x 90° elbow	1/4" metal tube with 7/16"-20 UNF swivel nut connection suitable for 1/4" SAE male flare.	30	Ind. Packed (2 pieces)	H735AA-30C	
		40	Ind. Packed (2 pieces)	H735AA-40C	
		50	Ind. Packed (2 pieces)	H735AA-50C	
		70	Ind. Packed (2 pieces)	H735AA-70C	
		90	Bulk packed	H735AA-90D	
		100	Ind. Packed (2 pieces)	H735AA-100C	
		150	Ind. Packed (2 pieces)	H735AA-150C	
		200	Ind. Packed (2 pieces)	H735AA-200C	

Minimum shipping quantity 100 pieces

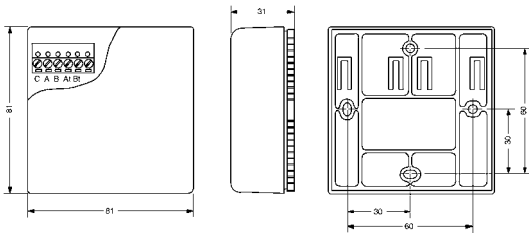
Series HT-9000 Electronic Humidity Transmitter

Humidity Sensors and Transducers

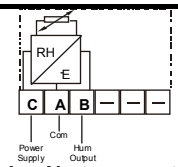
Series HT-9000



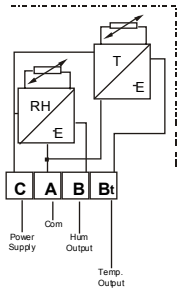
Dimensions Duct Sensor
A=153 mm for HT-90xx-UD1
A=230 mm for HT-90xx-UD2



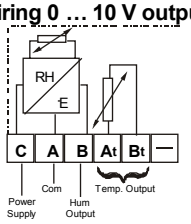
Dimensions Room Sensor HT-90xx-URW



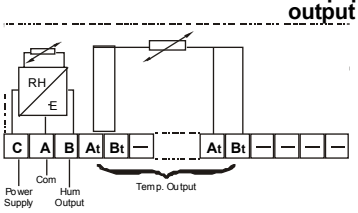
Wiring No temp. output



Wiring 0 … 10 V output



Wiring NTC K2, A99, Pt1000 temp. passive output



Wiring Pt100 output

Description

The Johnson Controls humidity transmitter is based on a new "state of the art" humidity sensing element. It measures humidity over the entire range of 0 to 100% RH (non condensing) and has a wide operating temperature range.

Its fast response, reliable long-term performance makes this transmitter well suited for refrigeration and HVAC installations.

This range also includes models with an integrated temperature sensing element.

It is recommended to use the humidity transmitter with Johnson Controls controllers such as the TC/SC/DC/DX-9100 series and System 27 Nova/MS series or with other systems having compatible input and output voltages.

The basic principle of this humidity transmitter is a polymer capacitance type element in which capacitance changes proportionally to a change in humidity.

The sensing element incorporates a protective coating which resists the effects of surface contamination.

Features

- All models with electronic board for universal supply voltage
- Duct models with longer rod and with flange for duct insertion adjustment
- Senses over the entire range of 0 to 100%RH (non condensing)
- Transmitter can resist many hostile environments
- Temperature measurement option
- Polymer humidity sensing element is integrated onto a chip
- Duct and room enclosures are available

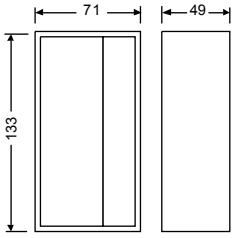
Series HT-9000 Electronic Humidity Transmitter Selection Table

Humidity range	Temperature range	Enclosure IP30	Humidity Output	Temperature Output	Supply Voltage	Type-Model Number	
0 to 100% RH	-	Room	0 to 10 VDC	-	12 to 30 VDC 24 VAC ± 15 %	**HT-9000-URW**	
	0…40°C			0…10 VDC		**HT-9001-URW**	
	0…60°C			0…10 VDC		**HT-9002-URW**	
	0…40°C			NTC K2		**HT-9003-URW**	
	0…60°C			Pt100		**HT-9005-URW**	
	0…60°C			Pt1000		**HT-9006-URW**	
	0…60°C			A99		**HT-9009-URW**	
	-	Duct Probe lenght 153 mm		-		**HT-9000-UD1**	
	0…40°C			0…10 VDC		**HT-9001-UD1**	
	0…60°C			0…10 VDC		**HT-9002-UD1**	
	0…40°C			NTC K2		**HT-9003-UD1**	
	0…60°C			Pt100		**HT-9005-UD1**	
	0…60°C			Pt1000		**HT-9006-UD1**	
	0…60°C			A99		**HT-9009-UD1**	
	-	Duct Probe lenght 230 mm		-		**HT-9000-UD2**	
	0…40°C			0…10 VDC		**HT-9001-UD2**	
	0…60°C			0…10 VDC		**HT-9002-UD2**	
	0…40°C			NTC K2		**HT-9003-UD2**	
	0…60°C			Pt100		**HT-9005-UD2**	
	0…60°C			Pt1000		**HT-9006-UD2**	
	0…60°C			A99		**HT-9009-UD2**	

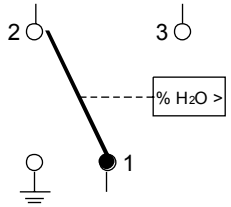
W43 Humidity Controls

Humidity Controls

W43 Humidity Control



Dimensions



Wiring

Description

The sensing element consists of carefully selected and processed human hair, proven to be the most sensitive and stable material known for this application. Under normal conditions these controls retain their sensitivity and accuracy for many years.

Features

- Wide range 0 to 90% R.H.
- Dust tight Penn switch.
- SPDT Contacts.
- Use of human hair.
- Field adjustable high and low limit stops.
- Separate mounting plate.

Application

These room humidistats are designed to control humidification or dehumidification equipment. It provides SPDT control.

G

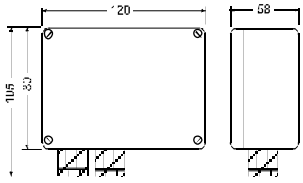
W43 Humidity Controls Selection Table

Range (%RH)	Differential (%RH)	Aditional Features	Type-Model Number	
0…90	5	Knob adjustment	**W43C -9100**	

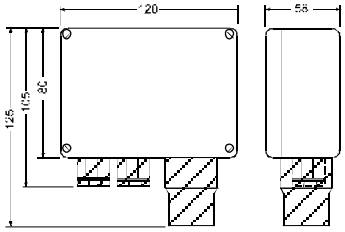
Detectors and Monitoring Units for detection and alarm signaling of refrigerant leakage.

Refrigerant Leak Detectors

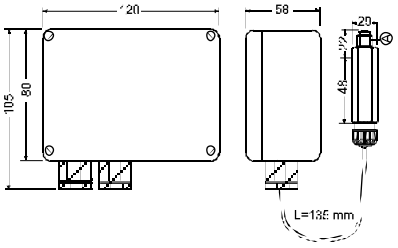
Leak Detection System



Dimensions GD



Dimensions GS



Dimensions GR

Description
This range of refrigerant leak detecting systems is designed for permanent installation. They monitor refrigerant leakage on a continuous basis. It provides a valuable warning before refrigerant leaks impair system efficiency and running costs and, over time, prevents major refrigerant loss. Refrigerant wastage and replenishment are both economical and environmentally unacceptable.

The refrigerant leak detecting system consists of:

A refrigerant detector.
This detector senses refrigerant leakage and can be used as a standalone device or can be connected to a monitoring unit. Various detectors for different refrigerants are available.

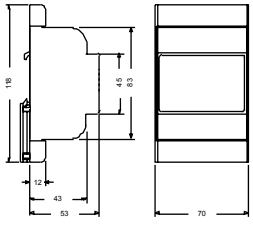
A monitoring unit.
The monitoring unit shows the status of one or more remote detectors. A wall mount or a DIN rail mount model is available.

Features
- Two alarm thresholds
- No on-site calibration necessary
- Semi-conductive sensing element
- Alarm memory on detector
- Selectable auto reset or manual reset mode on monitoring unit
- Up to 10 detectors can be connected to one monitoring unit

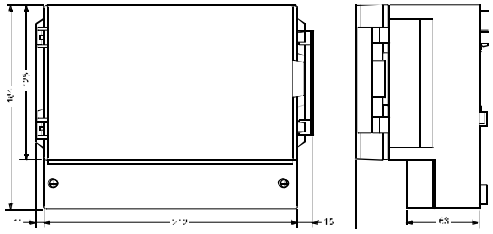
H

Leah Detectors Selection Table

Supply voltage	Output relays	Enclosure	Refrigerant	Type-Model Number	
12 VAC/DC	24 V	Room	CFC/HCFC universal	**GD2.0-CFC**	
			HFC universal	**GD2.0-HFC**	
			Ammonia	**GD2.0NH3**	
		Splashproof	CFC/HCFC universal	**GS2.0-CFC**	
			HFC universal	**GS2.0-HFC**	
			Ammonia	**GS2.0NH3**	
		Savety Valves	CFC/HCFC universal	**GR2.0-CFC**	
			HFC universal	**GR2.0-HFC**	
			Ammonia	**GR2.0NH3**	



Dimensions G27C



Dimensions G230C

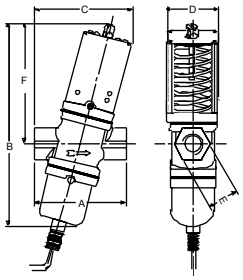
Monitors Selection Table

Supply voltage	Output relays	Enclosure	Refrigerant	Type-Model Number	
12 V ac/dc	24 V	DIN-Rail mount		**G27C**	
230 V ac or 12 V dc	230 V	Wall mount		**G230C**	

V46 Two-way Pressure Actuated Water Valves, Angled

Modulating Water Valves

V46 Angled



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F
3/8 "	69	153	66	43	18	89
1/2 "	80	170	86	51	27	100
3/4 "	91	183	95	55	36	110

Description

These pressure actuated modulating valves control the quantity of water to a condenser by directly sensing pressure changes in a refrigerant circuit. The valves can be used in non-corrosive refrigerant systems. Ammonia power elements and valves designed for salt-water applications are available. The valves have a quick opening characteristic and open on pressure increase (direct acting). Reverse acting (close on pressure increase) is possible

Features

- Pressure balanced valve design
- High refrigerant pressure resistant bellows
- Pressure actuated
- 3/8, 1/2, 3/4" are angled body type valves with high Kv value
- 3/8" up to 2" pressure valves "all range" types
- Quick opening valve characteristics
- No close fitting or sliding parts in water passages
- Easy to disassemble. All parts can be replaced
- Special bronze bodies and monel parts
- Power elements with stainless steel bellows available
- Wide range of pressure connection styles
- Nickel plated seats available for 3/8, 1/2, and 3/4" valves
- Direct/reverse action

I

V64 Pressure Actuated Water Valve Selection Table

Range (bar)	Body Style	Size thread according to ISO 228	Style	Capillary Length	Additional Features It is possible to change Style13 into Style 45A by ordering KIT031N600	Type-Model number	
5…18	Angled	3/8	13	75		**V46AA -9600**	
					With special washer to prevent waterhammer at low flow capacity	**V46AA -9608***	
					With special washer to prevent waterhammer at low flow capacity/nickel plated seat	**V46AA –9610**	
					bulkpack version V46AA-9600	**V46AA -9620***	
			13	100	Nickel plated seat/longer capillary	**V46AA -9602***	
			34	75	Nickel plated seat/ solder connection	**V46AA –9950**	
					.040" i.d.cap./solder connection	**V46AA -9951***	
		1/2	13	75		**V46AB –9600**	
			34		solder connection/ "062" id.cap	**V46AB –9950**	
		3/4	13	75		**V46AC –9600**	
				120	longer capillary	**V46AC –9606**	
			34	75	solder connection	**V46AC –9951**	
5…23	Angled	3/8	5	-		**V46AA –9300**	
					Nickel plated seat, high range. With washer to prevent waterhammer at low flow capacity	**V46AA –9301***	
			13	75	Nickel plated seat, high range	**V46AA –9606**	
					Nickel plated seat, high range. With washer to prevent waterhammer at low flow capacity	**V46AA -9609***	
			50		High range	**V46AA –9510**	
			51	120	Nickel plated seat, high range. With washer to prevent waterhammer at low flow capacity	**V46AA –9511***	
		1/2	5	-		**V46AB –9300**	
			13	75	nickel plated seat, high range	**V46AB –9605**	
			34		solder connection,high range	**V46AB -9951**	
			50		High range	**V46AB -9510**	
		3/4	5	-		**V46AC -9300**	
			13	75	nickel plated seat, high range	**V46AC -9605**	
			50	140	longer cap.	**V46AC -9502**	
				75	High range	**V46AC -9510**	

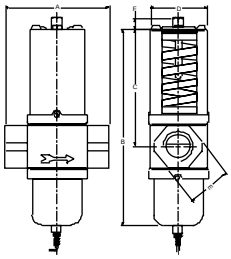
For replacement parts, see Section Replacement Parts

* Quantity orders only

V46 Two-way Pressure Actuated Water Valves

Modulating Water Valves

V46 Straight



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F
1 “	124	233	139	72	50	13
$1^1/_4$ “	125	243	145	72	58	13

V46 Pressure Actuated Water Valve Selection Table

Range (bar)	Body Style	Size Thread acc. to ISO 7-Rc on in- and outlet	Style	Capillary Length	Additional Features It is possible to change Style13 into Style 45A by ordering KIT031N600	Type-Model number	
5…18	Straight	1”	5	-		**V46AD -9300**	
			50	75		**V46AD -9510**	
			13			**V46AD -9600**	
		$1\ ^1/_4$	5	-		**V46AE -9300**	
			50	75		**V46AE -9510**	
			13	75		**V46AE -9600**	
			34	130		**V46AE -9950**	
7…14			15	-	For ammonia applications	**V46AE -9700**	
10…23		1	50	75	High range	**V46AD -9511**	
		$1\ ^1/_4$				**V46AE -9512**	
				150	Longer capillary	**V46AE -9513**	

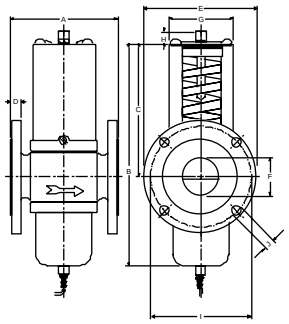
For replacement parts, see Section Replacement Parts

* Quantity orders only

V46 Two-way Pressure Actuated Water Valves, Flanged

Modulating Water Valves

V46 Flanged



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F	G	H	I	J
$1^1/_2$ "	137	244	144	18	150	47	67	13	110	18
2 "	168	304	164	20	165	57	90	18	125	18
$2^1/_2$ "	172	304	164	20	185	70	90	18	145	18

V46 Pressure Actuated Water Valve Selection Table

Range (bar)	Body Style	Size DIN 2533 flange connections	Style	Capillary Length	Additional Features It is possible to change Style13 into Style 45A by ordering KIT031N600	Type-Model number	
5…18	Straight	$1^1/_2$	5	-		**V46AR -9300**	
			13	75		**V46AR -9600**	
7…14			15	-	For ammonia applications	**V46AR -9700**	
5…11.5		2	5	-		**V46AS -9300**	
11…18				-		**V46AS -9301**	
7…14			15	-	For ammonia applications	**V46AS -9700**	
5…11.5		$2^1/_2$	5	-		**V46AT -9300**	
11…18				-		**V46AT -9301**	
7…14			15	-	For ammonia applications	**V46AT -9700**	

For replacement parts, see Section Replacement Parts

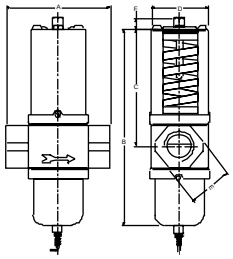
* Quantity orders only

I

V46 Two-way Pressure Actuated Water Valves, Maritime

Modulating Water Valves

V46 Straight



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F
3/8 "	68	161	80	42	32	10
1/2 "	79	165	86	52	29	10
3/4 "	86	175	96	55	35	10
1 "	124	246	139	71	39	13
1 1/4 "	124	254	144	71	48	13

V46 Pressure Actuated Water Valve Selection Table

Range (bar)	Body Style	Size acc. to ISO 228-G	Style	Capillary Length	Additional Features It is possible to change Style13 into Style 45A by ordering KIT031N600	Type-Model number	
5…18	Straight	3/8	13	75		**V46BA -9600**	
		1/2				**V46BB -9600**	
		3/4				**V46BC -9600**	
				120	Longer capillary	**V46BC -9601**	
		1		75		**V46BD -9600**	
				120	Longer capillary	**V46BD -9601**	
		1 1/4	50	75		**V46BE -9510**	
			13			**V46BE -9600**	
				120	Longer capillary	**V46BE -9601**	
5 …23		3/8	50	75		**V46BA -9510**	
		1/2				**V46BB -9510**	
		3/4				**V46BC -9510**	
				140	Longer capillary	**V46BC -9511**	
10…23		1		75		**V46BD -9510**	
		1 1/4		150	Longer capillary	**V46BE -9511**	

For replacement parts, see Section Replacement Parts

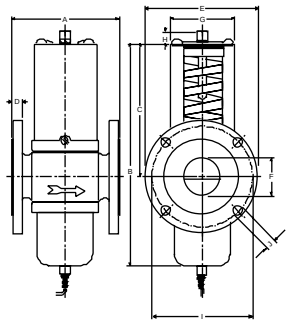
* Quantity orders only

I

V46 Two-way Pressure Actuated Water Valves, Flanged Maritime

Modulating Water Valves

V46 Flanged



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F	G	H	I	J
$1^1/_2$ "	135	244	144	14	150	47	67	13	110	18
2 "	162	304	164	16	165	57	90	18	125	18
$2^1/_2$ "	172	304	164	16	185	70	90	18	145	18

V46 Pressure Actuated Water Valve Selection Table

Range (bar)	Body Style	Size DIN 86021 flange connections	Style	Capillary Length	Additional Features It is possible to change Style13 into Style 45A by ordering KIT031N600	Type-Model number	
5…18	Straight	$1^1/_2$	50	75		**V46BR -9510**	
			13			**V46BR -9600**	
5…11.5		2	5	-		**V46BS -9300**	
11…18						**V46BS -9301**	
5…11.5		$2^1/_2$				**V46BT -9300**	
11…18						**V46BT -9301**	
7…14			15		Ammonia	**V46BT -9700**	

For replacement parts, see Section Replacement Parts

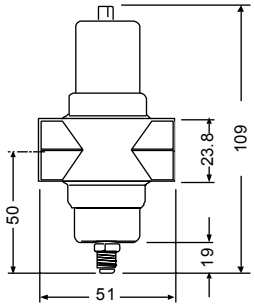
* Quantity orders only

I

V46SA Two-way Pressure Actuated Water Valves, Low Flow

Modulating Water Valves

V46SA Low Flow



Dimensions

Description

The V46SA is a direct acting, “all range”, pressure actuated modulating valve, used to control the waterflow to a condenser by directly sensing pressure changes in a non-corrosive refrigerant circuit. The V46SA is specially designed for use on equipment requiring a low condenser waterflow such as icemakers, small heatpumps and watercoolers.

The springhousing and power element are rolled to the valve body.

Rubber diaphragms seal the water away from the range spring and bellows part so these are not submerged in water where they would be subject to sedimentation and corrosion.

The valve can be ordered style 5 (without capillary), style 13, style 34 and style 50 (incl. 75 cm capillary).

The capillary part will be delivered separated from the valve.

Features

- Valve designed for low flow.
- “All range” power element and spring housing.
- Small dimensions.
- Pressure actuated
- Various pressure connection style
- High refrigerant pressure resistant bellows.

I

V46SA Pressure Actuated Water Valve Selection Table

Range (bar)	Body Style	Size Thread acc. to ISO 228-G on in- and outlet	Style	Capillary Length	Additional Features It is possible to change Style13 into Style 45A by ordering KIT031N600	Type-Model number	
5…23	Straight	3/8	45A	75	Capillary soldered to power element	**V46SA -9101**	
			50		Capillary separate	**V46SA -9110**	
					Capillary separate, nickel plated seat	**V46SA -9111**	
			5	-		**V46SA -9300**	
			13	75	Capillary separate	**V46SA -9600**	
			34			**V46SA -9950**	
					Capillary soldered to power element	**V46SA -9951**	

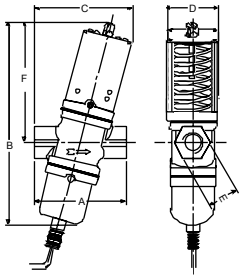
For replacement parts, see Section Replacement Parts

* Quantity orders only

V47 Two-way Temperature Actuated Water Valves, Angled

Modulating Water Valves

V47 Angled



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F
3/8 "	69	153	66	43	18	89
1/2 "	80	170	86	51	27	100
3/4 "	91	183	95	55	36	110

Description

These modulating water valves can be used for heating applications. It does have an heating element which means that the bulb temperature always must be higher than the valve body (power element). The valve opens at increasing bulb temperature. The bulb must be mounted pointing downwards up to horizontal.

Features

- Pressure balanced valve design
- 3/8, 1/2, 3/4" are angled body type valves with high Kv value
- Quick opening valve characteristics
- No close fitting or sliding parts in water passages
- Easy to disassemble. All parts can be replaced
- Special bronze bodies

I

V47 Temperature Actuated Water Valve Selection Table

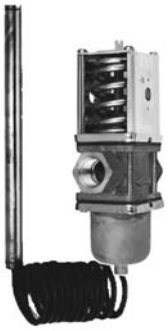
Range °C	Body Style	Size according to ISO 228-G	Capillary Length	Bulb Style 4 Length mm	Additional Features	Type-Model number	
24…57	angled	3/8	1.8 m plain	82		**V47AA -9160**	
46…82						**V47AA -9161**	
24…57		1/2				**V47AB -9160**	
		3/4				**V47AC -9160**	
46…82		1/2				**V47AB -9161**	
		3/4				**V47AC -9161**	

For replacement parts, see Section Replacement Parts

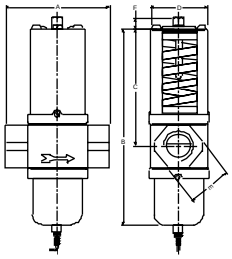
* Quantity orders only

V47 Two-way Temperature Actuated Water Valves

Modulating Water Valves



V47 Straight



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F
1 “	124	233	139	72	50	13
$1^1/_4$ “	125	243	145	72	58	13

V47 Temperature Actuated Water Valve Selection Table

Range °C	Body Style	Size acc. to ISO 7-Rc	Capillary Length	Bulb Style 4 Length mm	Additional Features	Type-Model number	
24…57	straight	1	1.8 m arm.	152		**V47AD -9160**	
46…82						**V47AD -9161**	
24…57		$1^1/_4$				**V47AE -9160**	
46…82						**V47AE -9161**	

For replacement parts, see Section Replacement Parts

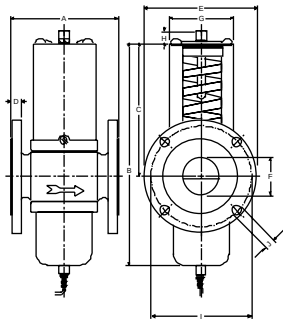
* Quantity orders only

I

V47 Two-way Temperature Actuated Water Valves, Flanged

Modulating Water Valves

V47 Flanged



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F	G	H	I	J
$1^1/_2$ "	137	244	144	18	150	47	67	13	110	18
2 "	168	304	164	20	165	57	90	18	125	18
$2^1/_2$ "	172	304	164	20	185	70	90	18	145	18

V47 Temperature Actuated Water Valve Selection Table

Range °C	Body Style	Size DIN 2533 flange connections	Capillary Length	Bulb Style 4 Length mm	Additional Features	Type-Model number	
24…57	straight	$1^1/_2$	1.8 m arm.	152		**V47AR -9160**	
46…82						**V47AR -9161**	
24…46		2		254		**V47AS -9160**	
46…71						**V47AS -9161**	
24…46		$2^1/_2$				**V47AT -9160**	
46…71						**V47AT -9161**	

For replacement parts, see Section Replacement Parts

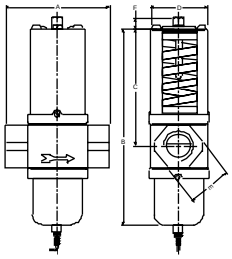
* Quantity orders only

I

V47 Two-way Temperature Actuated Water Valves, Maritime

Modulating Water Valves

V47 Straight



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F
1/2 "	79	165	86	52	29	10
3/4 "	86	175	96	55	35	10
1 "	124	246	139	71	52	13
1 1/4 "	124	254	144	71	62	13

V47 Temperature Actuated Water Valve Selection Table

Range °C	Body Style	Size acc. to ISO 228-G	Capillary Length	Bulb Style 4 Length mm	Additional Features	Type-Model number	
46…82	straight	1/2	1.8 m	152		**V47BB -9161**	
24…57		3/4		82		**V47BC -9160**	
46…82						**V47BC -9161**	
24…57		1	1.8 m arm.	152		**V47BD -9160**	
46…82						**V47BD -9161**	
24…57		1 1/4				**V47BE -9160**	

For replacement parts, see Section Replacement Parts

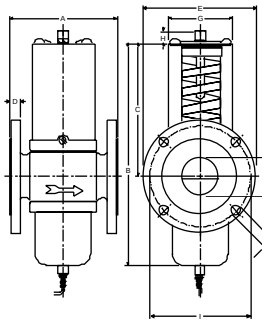
* Quantity orders only

I

V47 Two-way Temperature Actuated Water Valves, Flanged Maritime

Modulating Water Valves

V47 Flanged



Dimensions

Valve size	Dimensions in mm A	B	C	D	E	F	G	H	I	J
$1^1/_2$ "	135	244	144	14	150	47	67	13	110	18
2 "	162	304	164	16	165	57	90	18	125	18

V47 Temperature Actuated Water Valve Selection Table

Range °C	Body Style	Size DIN 86021 flange connections	Capillary Length	Bulb Style 4 Length mm	Additional Features	Type-Model number	
24…57	straight	$1^1/_2$	2.0 m arm.	410	Cross-ambient element/longer capillary	**V47BR -9150**	
24…57			1.8 m arm.	152		**V47BR -9160**	
46…71		2		254		**V47BS -9161**	

For replacement parts, see Section Replacement Parts

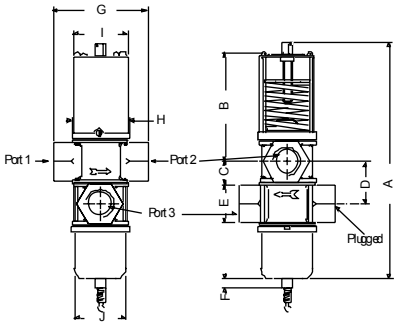
* Quantity orders only

I

V48 Three-way Pressure Actuated Water Valves

Modulating Water Valves

V48



Dimensions

Commercial Type
Valve Dimensions in mm

size	A	B	C	D	E	F	G	H	I	J
1/2 "	192	91	19	41	30	8	82	52	48	52
3/4 "	208	100	23	45	36	8	88	56	52	56
1 "	287	142	25	51	50	8	124	71	67	72
1 1/4 "	296	141	31	61	58	8	127	71	67	71
Sea-water Type										
3/4 "	203	97	22	45	35	9	95	55	52	55

Description

These watervalves are especially designed for condensing units cooled either by atmospheric or forced draft cooling towers. They may be used on single, or multiple condenser hook-ups to the tower. The type V48 valve senses the compressor head pressure and allows cooling water to flow to the condenser, to by-pass the condenser, or to allow waterflow to both condenser and by-pass line in order to maintain correct refrigerant head pressure. A further advantage of this system is that the 3-way valve permits a continuous water flow to the tower so the tower can operate efficiently with a minimum of maintenance on nozzles and wetting surfaces. The valves can be used in non-corrosive refrigerant systems. Ammonia power elements and valves designed for salt-water applications are available. The valves have a quick opening characteristic.

Features

- Pressure balanced design
- Free movement of all parts
- Easy manual flushing
- High K_V values
- Pressure actuated
- Can be used as mixing or diverting valve

I

V48 Pressure Actuated Water Valve Selection Table

Range (bar)	Body Style	Size acc. to ISO 228-G	Style	Capillary Length	Additional Features It is possible to change Style13 into Style 45A by ordering KIT031N600	Type-Model number	
4…20	straight	1/2	50	75		**V48AB -9510**	
4…16			13			**V48AB -9600**	
1.5…7.5						**V48AB -9601**	
4…20		3/4	50			**V48AC -9510**	
4…16			13			**V48AC -9600**	
1.5…7.5						**V48AC -9601**	
		acc. to ISO 7-Rc					
6…20	straight	1	50	75		**V48AD -9510**	
4…16			13			**V48AD -9600**	
1.5…7.5						**V48AD -9601**	
4…16					bodies in line (port 3 below port 2)	**V48AD -9602**	
6…20		1 1/4	50			**V48AE -9510**	
4…16			13			**V48AE -9600**	
1.5…7.5						**V48AE -9601**	
Maritime types		acc. to ISO 228-G					
4…16	straight	3/4	13	75	Seawater resistant	**V48BC -9600**	

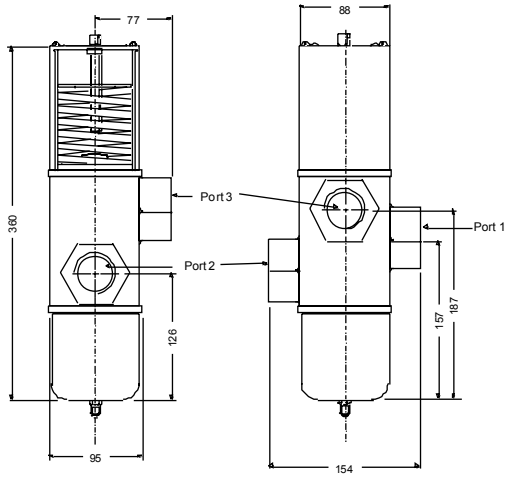
For replacement parts, see Section Replacement Parts

* Quantity orders only

V48 Three-way Pressure Actuated Water Valves

Modulating Water Valves

V48



Dimensions

I

V48 Pressure Actuated Water Valve Selection Table

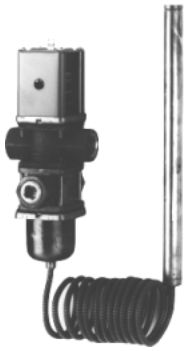
Range (bar)	Body Style	Size acc. to ISO 7-Rc	Style	Capillary Length	Additional Features It is possible to change Style13 into Style 45A by ordering KIT031N600	Type-Model number	
6…14	straight	$1^1/_2$	5	-		**V48AF -9300**	
1.5…9						**V48AF -9301**	

For replacement parts, see Section Replacement Parts

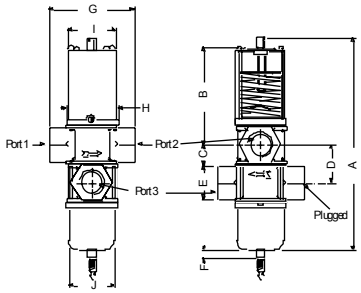
* Quantity orders only

V49 Three-way Temperature Actuated Water Valves

Modulating Water Valves



V49



Dimensions

Description

These modulating water valves can be used for heating applications. It does have an heating element which means that the bulb temperature always must be higher than the valve body (power element). The valve opens at increasing bulb temperature. The bulb must be mounted pointing downwards up to horizontal.

Features

- Pressure balanced design
- Free movement of all parts
- Easy manual flushing
- High K_V values
- Can be used as mixing or diverting valve

Valve size	Dimensions in mm A	B	C	D	E	F	G	H	I	J
$^1/_2$ "	192	91	19	41	30	8	82	52	48	52
$^3/_4$ "	208	100	23	45	36	8	88	56	52	56
$1^1/_4$ "	296	141	31	61	58	8	121	71	67	71

I

V49 Temperature Actuated Water Valve Selection Table

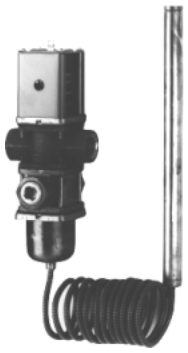
Range °C	Body Style	Size ISO 228-G Thread	Capillary Length	Bulb Style 4 Length mm	Additional Features	Type-Model number	
24…57	straight	$^1/_2$	1.8 m plain	82		**V49AB -9160**	
5…30						**V49AB -9163**	
-6…+18		$^3/_4$				**V49AC -9162**	
		ISO 7-Rc Thread					
24…57	straight	$1^1/_4$	1.8 m arm.	152		**V49AE -9160**	
5…30						**V49AE -9163**	

For replacement parts, see Section Replacement Parts

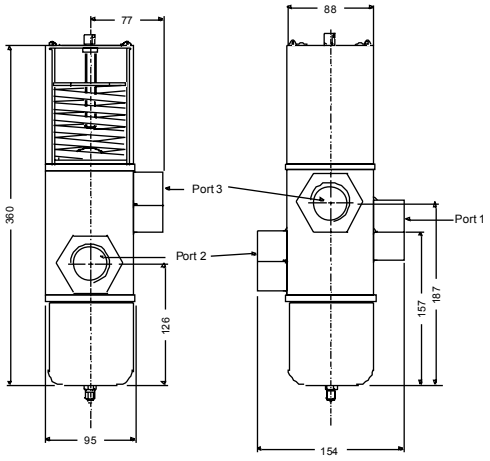
* Quantity orders only

V49 Three-way Temperature Actuated Water Valves

Modulating Water Valves



V49



Dimensions

V49 Temperature Actuated Water Valve Selection Table

Range °C	Body Style	Size ISO 7-Rc Thread	Capillary Length	Bulb Style 4 Length mm	Additional Features	Type-Model number	
24…46	straight	1 1/2	1.8 m arm.	254		**V49AF -9160**	
5…30						**V49AF -9163**	

For replacement parts, see Section Replacement Parts

* Quantity orders only

Accessories

Modulating Water Valves

Bulb Wells for water valves

Description	Primary usage	Inner diam Tube/Bulb well length (mm)	Inside & outside connector (NPT)	Material Connector Pocket	Finish	Type-Model number	
Max. press. 17 bar, Temp.120°C, USA item (element ø17,5x152 mm)	V47/V49	19.4 x 214	1/2 - 14	Steel/Copper	Tin	**WEL17A-601**	
Max. press. 17 bar, Temp.120°C, USA item (element ø17,5x254 mm)		19.4 x 265				**WEL17A-600**	
Max. press. 69 bar, Temp. 370°C USA item (element ø17,5x254 mm)		19.1 x 255		Monel/Monel		**WEL17A-603**	
Max. press. 69 bar, Temp. 370°C USA item (element ø17,5x82 mm)		19.6 x 89				**WEL18A-601**	
Max. press. 10 bar, Temp. 120°C USA item (element ø17,5x82 mm)		19.6 X 89		Steel/Brass	Tin	**WEL18A-602**	

For replacement parts, see Section Replacement Parts

* Quantity orders only

Accessories (continued)

Modulating Water Valves

Replacement parts - Watervalves/Renewal kits for watervalves

Description	Type-Model number	
For V46AA - V47AA	**STT002N600R**	
For V46AB - V47AB	**STT003N600R**	
For V46AC - V47AC	**STT004N600R**	
For V46AD - V47AD	**STT17A609R**	
For V46AE - V47AE - V46AR - V47AR	**STT17A610R**	
For V46AS - V47AS	**STT18A600R**	
For V46AT - V47AT	**STT18A601R**	
For V46BA	**STT14A601R**	
For V46BB - V47BB	**STT15A603R**	
For V46BC - V47BC	**STT17A613R**	
For V46BD - V47BD	**STT17A611R**	
For V46BE - V47BE - V46BR - V47BR	**STT17A612R**	
For V46BS - V47BS - V46BT - V47BT	**STT18A602R**	
For V48AB - V49AB	**STT15A605R**	
For V48AC - V49AC	**STT16A604R**	
For V48AD	**STT17A616R**	
For V48AE - V49AE	**STT17A617R**	
For V48AF - V49AF	**STT17A604R**	
For V48BC	**STT16A605R**	

Replacement parts - Watervalves / Diaphragm kits for watervalves

100 pcs for V46AA/V47AA and V46BA	**KIT016N600**	
100 pcs for V46AB/V47AB/V48AB/V49AB and V46BB/V47BB	**KIT016N601**	
100 pcs for V46AC/V47AC/V48AC/V49AC and V46BC/V47BC/V48BC	**KIT016N602**	
50 pcs for V46AD/V47AD/V48AD, V46AE/V47AE/V48AE/V49AE, V46AR/V47AR, V46BD/V47BD, V46BE/V47BE and V46BR/V47BR	**KIT016N603**	
25 pcs for V46AS/V47AS, V48AF/V49AF, V46AT/V47AT, V46BS/V47BS and V46BT/V47BT	**KIT016N604**	

I

Accessories (continued)

Modulating Water Valves

Replacement - Powerelements watervalves V46/V48

Description			Type-Model number	
For	V46AA-9300	Style 5	**246-672R**	
For	V46AB-9300	Style 5	**246-673R**	
For	V46AC-9300	Style 5	**246-674R**	
For	V46AD-9300	Style 5	**246-675R**	
For	V46AA-9600/9606	Style 13 - 0,75 m capillary	**246-821R**	
For	V46AB-9600/9605/9606	Style 13 - 0,75 m capillary	**246-824R**	
	V48AB-9600/9601	Style 13 - 0,75 m capillary		
For	V46AC-9600/9605	Style 13 - 0,75 m capillary	**246-825R**	
	V48AC-9600/9601	Style 13 - 0,75 m capillary		
For	V46AD-9600	Style 13 - 0,75 m capillary	**246-925R**	
	V46AE-9600	Style 13 - 0,75 m capillary		
	V46AR-9600	Style 13 - 0,75 capillary		
	V48AD-9600/9601	Style 13 - 0,75 m capillary		
	V48AE-9600/9601	Style 13 - 0,75 m capillary		
For	V46AS-9300	Style 5 - range 5/11,5 bar	**246-671R**	
For	V46AS-9301	Style 5 - range 11/18 bar	**246-758R**	
	V46AT-9301	Style 5 - range 11/18 bar		
For	V46BA-9600	Style 13 - 0,75 m capillary	**246-821R**	
For	V46BB-9600	Style 13 - 0,75 m capillary	**246-824R**	
For	V46BC-9600	Style 13 - 0,75 m capillary	**246-825R**	
	V48BC-9600	Style 13 - 0,75 m capillary		
For	V46BD-9600	Style 13 - 0,75 m capillary	**246-925R**	
	V46BE-9600	Style 13 - 0,75 m capillary		
	V46BR-9600	Style 13 - 0,75 m capillary		
For	V48AD-9101	Style 46A - special Liebert	**SEP025N601R**	
	V48AE-9101	Style 46A - special Liebert		
For	V48AC-9101	Style 46A - special Liebert	**SEP026N601R**	

Replacement - Power elements watervalves V47/V49

For	V47AA-9160	**SET98A632R**	
For	V47AA-9161	**SET98A636R**	
For	V47AB-9160/V49AB-9160/V49AB-9163	**SET98A617R**	
For	V47AB-9161/V47BB-9161	**SET98A640R**	
For	V47AC-9160/V47BC-9160/V49AC-9162	**SET98A624R**	
For	V47AC-9161/V47BC-9161	**SET98A641R**	
For	V47AD-9160/V47AE-9160/V47AR-9160/V49AE-9160	**SET29A648R**	
	V47BD-9160/V47BE-9160/V47BR-9160		
For	V47AD-9161/V47AE-9161/V47AR-9161/V49AE-9161	**SET29A629R**	
	V47BD-9161		
For	V47AS-9160/V47AT-9160/V49AF-9160/V49AF-9163	**SET29A662R**	
	V47BS-9160/V47BT-9160		
For	V47AS-9161/V47AT-9161	**SET29A632R**	
	V47BS-9161		
For	V47BR-9150	**SET29A605R**	

Replacement - Ammonia power elements V46/V48, style 15

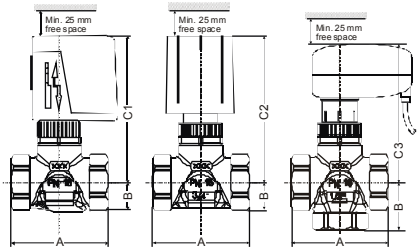
For	V46AD/AE/AR/BD/BE/BR, V48AD/AE	**246-667R**	
For	V46AS/AT/BS/BT, V48AF	**246-781R**	

I

VG4000 Series High Capacity / High Close-off Zone Valves

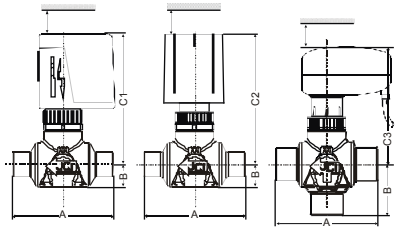
Electric Valves and Actuators

VG4000 Series Electric Zone Valves



VA-7010 **VA-7040** **VA-7450**

Dimensions



Sweat Connection

Description

VG4000 Series High Capacity / High Close-off Zone Valves are primarily designed to regulate the flow of water in response to the demand of a controller in zone, fan coil, and Variable Air Volume (VAV) reheat coil applications. The valves can be used in combination with VA-7010 electric on/off actuators, VA-7040 thermal actuators and VA-7450 incremental or proportional actuators.
VG4000 Series Valves are available in Normally Open (N.O.), Normally Closed (N.C.), or three-way mixing configurations.

Features

- Cast Bronze Body and Stainless Steel Stem and Spring
- EPT Rubber Plug for Bubble-Tight Shutoff
- Easy, Field-Replaceable Packing
- Actuator Can Be Field Installed After Piping
- Built-In Return Spring for VA-7010 Actuators
- Selectable flow characteristic in combination with VA-7452 actuators

J

VG4000 Series High Capacity / High Close-off Zone Valves Selection Table

Threaded Female Connection

Body Type	Body Size	Connection Size	Kvs	Close-Off Pressure (kPa)	Dimensions (mm)					Type-Model Number	
					A	B	C1 (VA-7010)	C2 (VA-7040)	C3 (VA-7450)		
2-way PDTC (NO)	DN15	½"	2.5	340	66	19	111	110	105	**VG42y0FC**	
	DN20	¾"	3.0							**VG42y0GC**	
2-way PDTO (NC)	DN15	½"	2.5							**VG44y0FC**	
	DN20	¾"	3.0							**VG44y0GC**	
3-way Mixing	DN15	½"	2.5	340 (200 kPa in NO Port)		32				**VG48y0FC**	
	DN20	¾"	3.0							**VG48y0GC**	

Threads

BSP parallel y = 0:
BSP taper y = 2:
NPT y = 4:

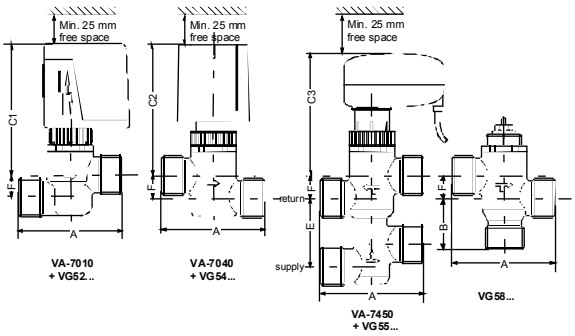
Sweat Connection

2-way PDTC (NO)	DN15	½"	2.4	340	78	15	111	99	94	**VG4270FC**	
	DN20	¾"	2.8			19		102	97	**VG4270GC**	
2-way PDTO (NC)	DN15	½"	2.4			15		99	94	**VG4470FC**	
	DN20	¾"	2.8			19		102	97	**VG4470GC**	
3-way Mixing	DN15	½"	2.4	340 (200 kPa in NO Port)		29		99	94	**VG4870FC**	
	DN20	¾"	2.8			39		102	97	**VG4870GC**	

VG5000 Forged Brass 2-Way and Mixing Valves for Hot and Cold Water for HVAC Systems

Electric Valves and Actuators

VG5000 3-way mixing with VA-7450 (left) VG5000 2-way valve with VA-7010 (right)



Dimensions
Male threaded connection

Description

The VG5000 forged brass valve series is primarily designed to regulate the flow of water in response to the demand of a controller in zone and terminal unit applications.

They can be used in combination with VA-7010 electric ON/OFF actuator , VA-7040 thermal actuator and or VA-7450 floating or proportional actuator.

The valves are available in 2-way PDTC (Normally Open), 2-way PDTO (Normally Closed), 3-way mixing and 3-way mixing with built-in Normally Open bypass configurations.

Features

- 2-way PDTO (NC), PDTC (NO) and 3-way configurations
- 3-way with built-in bypass configuration
- Selectable flow characteristic in combination with VA-7452 actuator series
- Forged brass body, stainless steel stem and spring
- Rubber compound plug for bubble-tight shut-off
- Field adjustable Kv_s for select body styles
- Actuator can be field installed after piping
- Built-in return spring

J

VG5000 Male Thread Connection Valve Selection Table

Body Type	Connection Size	Factory Set Kv_s and alternative adjustable Kv_s			Close-Off Pressure (kPa)	Dimensions (mm)							Type-Model Number	
						A	B	C1	C2	C3	E	F		
		1	2	3		z = 1 z = 9	z = 1 z = 9	(VA-7010)	(VA-7040)	(VA-7450)				
2-way PDTC (NO)	½"	0.4	0.25	-	200	68	-	96	95	90	-	11	**VG52z0AC**	
	½"	0.4	0.25	-	200	68	-	96	95	90	-	11	**VG52z0BC**	
	½"	1	0.63	-	200	68	-	96	95	90	-	11	**VG52z0CC**	
	½"	1	0.63	-	200	68	-	96	95	90	-	11	**VG52z0DC**	
	½"	1.6	-	-	100	72	-	98	97	92	-	13.5	**VG52z0EC**	
	¾"	2.5	-	-	140	74		98	97	92	-	15	**VG52z0JC**	
	¾"	3.5	-	-	100	74		98	97	92	-	15	**VG52z0KC**	
2-way PDTO (NC)	½"	0.4	0.25	-	200	68	-	96	95	90	-	11	**VG54z0AC**	
	½"	0.4	0.25	-	200	68	-	96	95	90	-	11	**VG54z0BC**	
	½"	1	0.63	-	200	68	-	96	95	90	-	11	**VG54z0CC**	
	½"	1	0.63	-	200	68	-	96	95	90	-	11	**VG54z0DC**	
	½"	1.6	1	0.63	100	72	-	98	97	92	-	13.5	**VG54z0EC**	
	¾"	3.5	2.5	1.6	100	74		98	97	92	-	15	**VG54z0JC**	
	¾"	3.5	2.5	1.6	100	74		98	97	92	-	15	**VG54z0KC**	
3-way Mixing	½"	0.25			200	68	26.5	96	95	90	-	11	**VG58z0AC**	
	½"	0.4			200	68	26.5	96	95	90	-	11	**VG58z0BC**	
	½"	0.63			200	68	26.5	96	95	90	-	11	**VG58z0CC**	
	½"	1			200	68	26.5	96	95	90	-	11	**VG58z0DC**	
	½"	1.6			100	72	34.5	98	97	92	-	13.5	**VG58z0EC**	
	¾"	2.5			100	74	36	98	97	92	-	15	**VG58z0JC**	
	¾"	3.5			100	74	36	98	97	92	-	15	**VG58z0KC**	

Threads

BSP parallel	**z = 1**
Compression fitting (only for Bodies with connection size ½")	**z = 9**

VG5000 Forged Brass 2-Way and Mixing Valves for Hot and Cold Water for HVAC Systems (continued)

Electric Valves and Actuators

VG5000 Male Thread Connection Valve Selection Table (continued)

Body Type	Connection size	Factory Set Kv_s (Kv on bypass port of 3-way mixing + built-in bypass valves)	Close -Off Pressure (kPa)	Dimensions *(mm)*							Type-Model Number	
				A	B	C1 (VA-7010)	C2 (VA-7040)	C3 (VA-7450)	E	F		
3-way + built-in NO bypass	½"	0.25 (0.25)	200	68	-	96	95	90	40	11	**VG55z0AC**	
	½"	0.4 (0.25)	200	68	-	96	95	90	40	11	**VG55z0PC**	
	½"	0.4 (0.4)	200	68	-	96	95	90	40	11	**VG55z0BC**	
	½"	0.63 (0.4)	200	68	-	96	95	90	40	11	**VG55z0QC**	
	½"	0.63 (0.63)	200	68	-	96	95	90	40	11	**VG55z0CC**	
	½"	1 (0.63)	200	68	-	96	95	90	40	11	**VG55z0RC**	
	½"	1.0 (1.0)	200	68	-	96	95	90	40	11	**VG55z0DC**	
	½"	1.6 (1.0)	100	72	-	96	95	90	40	13.5	**VG55z0SC**	
	½"	1.6 (1.6)	100	72	-	96	95	90	40	13.5	**VG55z0EC**	
	¾"	2.5 (1.6)	100	74	-	98	97	92	40	15	**VG55z0TC**	
	¾"	2.5 (2.5)	100	74	-	98	97	92	40	15	**VG55z0JC**	
	¾"	3.0 (2.5)	100	74	-	98	97	92	40	15	**VG55z0UC**	
	¾"	3.0 (3.0)	100	74	-	98	97	92	40	15	**VG55z0KC**	

Threads

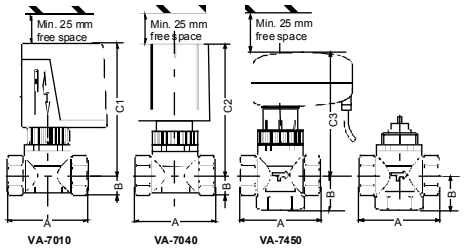
BSP parallel	**z = 1**
Compression fitting (only for Bodies with connection size ½")	**z = 9**

J

VG5000 Forged Brass 2-Way and Mixing Valves for Hot and Cold Water for HVAC Systems (continued)

Electric Valves and Actuators

VG5000 Threaded Female Connection Valve Selection Table



Body Type	Connection Size	Factory Set Kv_s and alternative adjustable Kv_s			Close-Off Pressure (kPa)	Dimensions *(mm)*					Type-Model Number	
		1	2	3		A	B	C1 (VA-7010)	C2 (VA-7040)	C3 (VA-7450)		
2-way PDTC (NO)	½"	0.25	0.4		200	55	15	100	99	94	**VG52y0AC**	
	½"	0.25	0.4		200	55	15	100	99	94	**VG52y0BC**	
	½"	1.6	1	0.63	200	55	15	100	99	94	**VG52y0CC**	
	½"	1.6	1	0.63	200	55	15	100	99	94	**VG52y0DC**	
	½"	1.6	1	0.63	200	55	15	100	99	94	**VG52y0EC**	
	¾"	2.5	-	-	140	66	19	103	102	97	**VG52y0JC**	
	¾"	3.5	-	-	100	66	19	103	102	97	**VG52y0KC**	
	1"	5.5	-	-	62	90	24	106	105	100	**VG52y0MC**	
2-way PDTO (NC)	½"	0.25	0.4		200	55	15	100	99	94	**VG54y0AC**	
	½"	0.25	0.4		200	55	15	100	99	94	**VG54y0BC**	
	½"	1.6	1	0.63	200	55	15	100	99	94	**VG54y0CC**	
	½"	1.6	1	0.63	200	55	15	100	99	94	**VG54y0DC**	
	½"	1.6	1	0.63	200	55	15	100	99	94	**VG54y0EC**	
	¾"	3.5	2.5	1.6	100	66	19	103	102	97	**VG54y0JC**	
	¾"	3.5	2.5	1.6	100	66	19	103	102	97	**VG54y0KC**	
	1"	5.5	4	2.5	62	90	24	106	105	100	**VG54y0MC**	
3-way Mixing	½"	0.63			200	55	29	100	99	94	**VG58y0CC**	
	½"	1			200	55	29	100	99	94	**VG58y0DC**	
	½"	1.6			200	55	29	100	99	94	**VG58y0EC**	
	¾"	2.5			100	66	33.5	103	102	97	**VG58y0JC**	
	¾"	3.5			100	66	33.5	103	102	97	**VG58y0KC**	
	1"	5.5			62	90	37.5	106	105	100	**VG58y0MC**	

Threads

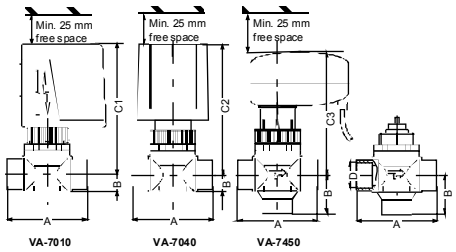
BSP parallel	**y = 0:**
BSP taper	**y = 2:**
NPT	**y = 4:**

J

VG5000 Forged Brass 2-Way and Mixing Valves for Hot and Cold Water for HVAC Systems (continued)

Electric Valves and Actuators

VG5000 Sweat Connection Valve Selection Table



Sweat Connection

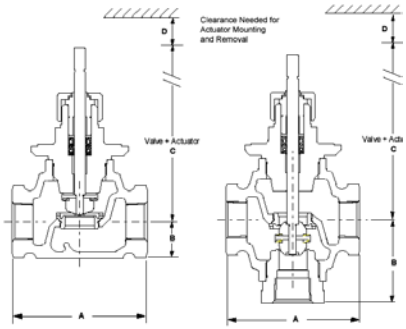
Body Type	Connection Size	Factory Set Kv_s and alternative adjustable Kv_s			Close-Off Pressure (kPa)	Dimensions *(mm)*						Type-Model Number	
						A	B	C1	C2	C3	D		
		1	2	3				(VA-7010)	(VA-7040)	(VA-7450)			
2-way PDTC (NO)	½"	0.25	0.4		200	61	13	100	99	94	15.98	**VG5270AC**	
	½"	0.25	0.4		200	61	13	100	99	94	15.98	**VG5270BC**	
	½"	1	0.63	0.4	300	61	13	100	99	94	15.98	**VG5270CC**	
	½"	1	0.63	0.4	300	61	13	100	99	94	15.98	**VG5270DC**	
	½"	1.6	1	0.63	200	61	13	100	99	94	15.98	**VG5270EC**	
	¾"	2.5	-	-	140	78	16.5	103	102	97	22.3	**VG5270JC**	
	¾"	3.5	-	-	100	78	16.5	103	102	97	22.3	**VG5270KC**	
	1"	4	-	-	85	95	17	106	105	100	28.7	**VG5270LC**	
	1"	5.5	-	-	62	95	17	106	105	100	28.7	**VG5270MC**	
2-way PDTO (NC)	½"	0.25	0.4		200	61	13	100	99	94	15.98	**VG5470AC**	
	½"	0.25	0.4		200	61	13	100	99	94	15.98	**VG5470BC**	
	½"	1.45	1	0.63	200	61	13	100	99	94	15.98	**VG5470CC**	
	½"	1.45	1	0.63	200	61	13	100	99	94	15.98	**VG5470DC**	
	½"	1.45	1	0.63	200	61	13	100	99	94	15.98	**VG5470EC**	
	¾"	3.2	2.5	1.6	100	78	16.5	103	102	97	22.3	**VG5470JC**	
	¾"	3.2	2.5	1.6	100	78	16.5	103	102	97	22.3	**VG5470KC**	
	1"	5	4	2.5	62	95	17	106	105	100	28.7	**VG5470MC**	
3-way Mixing	½"	1.45			200	61	30.5	100	99	94	15.98	**VG5870EC**	
	¾"	3.2			100	78	39	103	102	98	22.3	**VG5870KC**	
	1"	5			62	95	47.5	106	105	100	28.7	**VG5870MC**	

J

VG7000 Series Female Threaded Bronze 2-Way and Mixing Valves for water or low pressure steam, fluid temp. limits: 2 … 140 °C with brass trim, 2 … 170 °C with stainless steel trim.

Electric Valves and Actuators

VG7000 2-way valve with VA-7200



Dimensions

Description

The VG7000 Series electrically and pneumatically operated bronze valves with female threaded connection are designed primarily to regulate the flow of water and steam in response to the demand of a controller, in heating, ventilating, and air conditioning systems. These valves are available in normally open (N.O.) “push down to close”, (N.C.) “push down to open”, and three way mixing configurations. Both electric and pneumatic actuators are available.

Features

- Complete family of DN15 through DN50 Bronze Valves, in two-way N.O., N.C. and three-way mixing configurations
- Electric and pneumatic actuators available for all valves
- Every valve tested for tight shutoff
- Uses Standard Johnson Controls Ring Pack Packings
- Flexible features and options ordering template
- Standard Bonnet and stem design

J

Valve Size DN	A	B		
		2-way PDTC	2-way PDTO	3-Way
DN15	76	21	39	46
DN20	81	24	41	54
DN25	104	29	44	65
DN32	119	34	51	70
DN40	130	55	70	85
DN50	150	53	72	95

Dimensions in mm

VG7000 Series 2-way PDTC (normally open) Valves Selection Table

DN (connection size)	Kvs	Valve Stroke	Closing pressure kPa						Type-Model Number *		
			VA-731x* 150 N		VA-715x/VA-77xx 500 N		VA-720x 1000 N				
			Brass Trim	St. Steel Trim	Brass Trim	St. Steel Trim	Brass Trim	St. Steel Trim		X=1	X=3
15	0.25	8 mm	1600	-	1600	1600	-	1600	VG72yxAT		
	0.4								VG72yxBT		
	0.63		700						VG72yxCT		
	1.0								VG72yxDT		
	1.6								VG72yxET		
	2.5		400		1490	930			VG72yxFT		
	4.0								VG72yxGT		
20	6.3		250		950	595		1220	VG72yxLT		
25	10	13 mm	-		595	370	1235	770	VG72yxNT		
32	16				360	230	750	470	VG72yxPT		
40	25	19 mm			235	145	480	300	VG72yxRT		
50	40				145	90	310	190	VG72yxST		

Threads			Trim % equal
BSP parallel	y = 0:	x = 1	Brass
BSP taper	y = 2:	x = 3	St. Steel
NPT	y = 4:		

* When T (threaded stem) is replaced by S the valve is supplied with a slotted stem and small bonnet for VA-7310 electric, Fluid temp. limit in conjunction with VA-7310 = 120 °C

VG7000 Series Female Threaded Bronze 2-Way and Mixing Valves for water or low pressure steam, fluid temp. limits: 2 … 140 °C with brass trim, 2 … 170 °C with stainless steel trim. (continued)

Electric Valves and Actuators

VG7000 Series 2-way PDTO (normally closed) Valves Selection Table

DN (connection size)	Kvs	Valve Stroke	Closing pressure kPa						Type-Model Number *		
			VA-731x 150 N		VA-715x/VA-77xx 500 N		VA-720x 1000 N				
			Brass Trim	St. Steel Trim	Brass Trim	St. Steel Trim	Brass Trim	St. Steel Trim		X = 1	X = 3
15	0.25	8 mm	1600	-	1600	1600	-	1600 1220	VG74yxAT		
	0.4								VG74yxBT		
	0.63		700						VG74yxCT		
	1.0								VG74yxDT		
	1.6								VG74yxET		
	2.5		400		1490	930			VG74yxFT		
	4.0								VG74yxGT		
20	6.3		250		950	595			VG74yxLT		
25	10	13 mm	-		595	370	1235	770	VG74yxNT		
32	16				360	230	750	470	VG74yxPT		
40	25	19 mm			235	145	480	300	VG74yxRT		
50	40				145	90	310	190	VG74yxST		

J

Threads		Trim % equal	
BSP parallel	y = 0:	x = 1	Brass
BSP taper	y = 2:	x = 3	St. Steel
NPT	y = 4:		

* When T (threaded stem) is replaced by S the valve is supplied with a slotted stem and small bonnet for VA-7310 electric, Fluid temp. limit in conjunction with VA-7310 = 120 °C

VG7000 Series 3-way Mixing Valves Selection Table

DN (connection size)	Kvs	Valve Stroke	Closing pressure kPa						Type-Model Number *		
			VA-731x 150 N		VA-715x/VA-77xx 500 N		VA-720x 1000 N				
			Brass Trim	St. Steel Trim	Brass Trim	St. Steel Trim	Brass Trim	St. Steel Trim		X=2	X=4
15	0.25	8 mm	1600	-	1600	1600	-	1600 1220	VG78yxAT		
	0.4								VG78yxBT		
	0.63		700						VG78yxCT		
	1.0								VG78yxDT		
	1.6								VG78yxET		
	2.5		400		1490	930			VG78yxFT		
	4.0								VG78yxGT		
20	6.3		250		950	595			VG78yxLT		
25	10	13 mm	-		595	370	1235	770	VG78yxNT		
32	16				360	230	750	470	VG78yxPT		
40	25	19 mm			235	145	480	300	VG78yxRT		
50	40				145	90	310	190	VG78yxST		

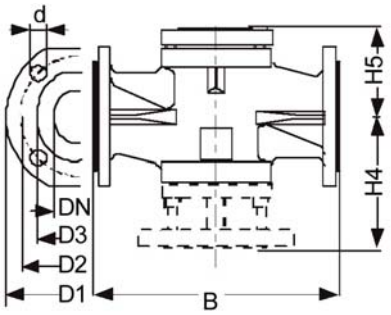
Threads		Trim linear both ports	
BSP parallel	y = 0:	x = 2	Brass
BSP taper	y = 2:	x = 4	St. Steel
NPT	y = 4:		

* When T (threaded stem) is replaced by S the valve is supplied with a slotted stem and small bonnet for VA-7310 electric, Fluid temp. limit in conjunction with VA-7310 = 120 °C

VG8000H Flanged 2 and 3-way DN 15 – DN 150. Nodular Iron PN25 Valve for water, glycol solutions (max 50%) or steam. Fluid temp. limits +2 … 200 °C (-20 °C when optional glycerine cup is used. 280 °C when cooling fin is used)**

Electric Valves and Actuators

VG8000H Series Valves with Pneumatic and Electric Actuators



Dimensions

Description

The VG8000H series PN 25 nodular iron valves are designed primarily to regulate the flow of water and steam in response to the demand of a controller, in heating, ventilating and air conditioning systems. Two-way, three-way mixing and diverting valve configurations can be ordered.

A variety of electric and pneumatic actuators are available.

Features

- Valves in two-way, three-way mixing and diverting configurations.
- PN 25 rated valves available.
- Wide fluid temperature. range
- Nodular iron valve bodies.
- Stainless steel stem-plug-seat combination.
- Use of standard Johnson Controls spring loaded, self-adjusting Teflon-Viton-Teflon
- V-ring packing.
- Low leakage rate for two- and three-way valves.
- Electric and pneumatic actuators available, either factory mounted or for in-situ installation, for all valve configurations.
- Slotted stem with coupler for simple actuator attachment.
- Valves are silicon free

J

Valve Body Dimensions

DN	B	H4	H5
15	130	100	76
20	150	106	76
25	160	106	76
32	180	123	81
40	200	140	79
50	230	145	101
65	290	156	102
80	310	180	108
100	350	225	136
125	400	255	155
150	480	290	175

Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes	DN	D1	D2	D3	d	Bolts	Holes
15	95	65	45	13.5	M12 x 45	4	65	185	145	122	17.5	M16 x 60	8
20	105	75	58	13.5	M12 x 50	4	80	200	160	138	17.5	M16 x 65	8
25	115	85	68	13.5	M12 x 50	4	100	235	190	162	22	M20 x 70	8
32	140	100	78	17.5	M16 x 55	4	125	270	220	188	26	M24 x 75	8
40	150	110	88	17.5	M16 x 55	4	150	300	250	218	26	M24 x 75	8
50	165	125	102	17.5	M16 x 60	4							

DN 15-150 VG8000H Series Flanged 2-way PDTC Valves Selection Table

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa									Type-Model * Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	RA-3100-8126 1200 N	FA-2000-711x 2000 N	FA-2000-751x 2400 N	FA-2000-741x 2200 N	FA-3300-741x 6000 N		
15	0.4	13 mm	2500	2500	-	-	2500	2500	-	-	-	**VG82A6S1H**	
	0.63											**VG82A5S1H**	
	1.0											**VG82A4S1H**	
	1.6											**VG82A3S1H**	
	2.5											**VG82A2S1H**	
	4.0											**VG82A1S1H**	
20	4.0		2030									**VG82B2S1H**	
	6.3											**VG82B1S1H**	
25	6.3		1360									**VG82C2S1H**	
	10											**VG82C1S1H**	
32	10		660	1930			1300	2400				**VG82D2S1H**	
	16											**VG82D1S1H**	
40	16		370	1180			770	1480				**VG82E2S1H**	
	25											**VG82E1S1H**	

DN 15-150 VG8000H Series Flanged 2-way PDTC Valves Selection Table (continued)

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa									Type-Model * Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	RA-3100-8226 1700 N	FA-2000-711x 2000 N	FA-2000-751x 2400 N	FA-2000-741x 2200 N	FA-3300-741x 6000 N		
50	40	25	-	-	650	1300	600	-	920	-	-	VG82F1S1H	
65	63				500	1010	450		710			VG82G1S1H	
80	100				220	480	200		330			VG82H1S1H	
100	160	42			-	290	100		-	180	720	VG82J1S1H	
125	250					170	-			100	450	VG82K1S1H	
150	350					100				50	270	VG82L1S1H	

- Glycerine cup available only by special order.

DN 15-150 VG8000H Series Flanged 3-way Mixing Valves Selection Table

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa									Type-Model * Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	RA-3100-8126 1200 N	FA-2000-711x 2000 N	FA-2000-751x 2400 N	FA-2000-741x 2200 N	FA-3300-741x 6000 N		
15	0.4	13 mm	2500	2500	-	-	2500	2500	-	-	-	VG88A6S1H	
	0.63											VG88A5S1H	
	1.0											VG88A4S1H	
	1.6											VG88A3S1H	
	2.5											VG88A2S1H	
	4.0											VG88A1S1H	
20	4.0		2030									VG88B2S1H	
	6.3											VG88B1S1H	
25	6.3		1360									VG88C2S1H	
	10											VG88C1S1H	
32	10		660	1930			1300	2400				VG88D2S1H	
	16											VG88D1S1H	
40	16		370	1180			770	1480				VG88E2S1H	
	25											VG88E1S1H	
50	40	25	-	-	650	1300	600	-	920	-	-	VG88F1S1H	
65	63				500	1010	450		710			VG88G1S1H	
80	100				220	480	200		330			VG88H1S1H	
100	160	42			-	290	100		-	180	720	VG88J1S1H	
125	250					170	-			100	450	VG88K1S1H	
150	350					100				50	270	VG88L1S1H	

- Glycerine cup available only by special order.

DN 15-150 VG8000H Series Flanged 3-way Diverting Valves Selection Table

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa									Type-Model * Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	RA-3100-8126 1200 N	FA-2000-711x 2000 N	FA-2000-751x 2400 N	FA-2000-741x 2200 N	FA-3300-741x 6000 N		
15	0.4	13 mm	2500	2500	-	-	2500	2500	-	-	-	VG89A6S1H	
	0.63											VG89A5S1H	
	1.0											VG89A4S1H	
	1.6											VG89A3S1H	
	2.5											VG89A2S1H	
	4.0											VG89A1S1H	
20	4.0		2030									VG89B2S1H	
	6.3											VG89B1S1H	

DN 15-150 VG8000H Series Flanged 3-way Diverting Valves Selection Table (continued)

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa									Type-Model * Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	RA-3100-8126 1200 N	FA-2000-711x 2000 N	FA-2000-751x 2400 N	FA-2000-741x 2200 N	FA-3300-741x 6000 N		
25	6.3		1360									**VG89C2S1H**	
	10											**VG89C1S1H**	
32	10		660	1930			1300	2400				**VG89D2S1H**	
	16											**VG89D1S1H**	
40	16		370	1180			770	1480				**VG89E2S1H**	
	25											**VG89E1S1H**	
50	40	25	-	-	650	1300	600	-	920	-	-	**VG89F1S1H**	
65	63				500	1010	450		710			**VG89G1S1H**	
80	100				220	480	200		330			**VG89H1S1H**	
100	160	42			-	290	100		-	180	720	**VG89J1S1H**	
125	250					170	-			100	450	**VG89K1S1H**	
150	350					100				50	270	**VG89L1S1H**	

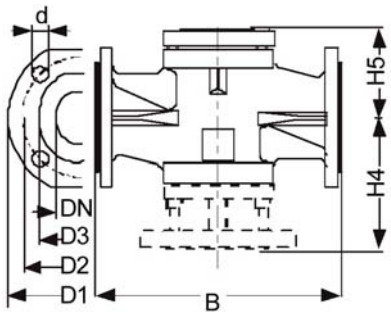
* Glycerine cup available only by special order.

J

VG8000N Flanged 2 and 3-way DN 15 – DN 150. Nodular Iron PN16 Valve for water, glycol solutions (max 50%) or steam. Fluid temp. limits +2 … 180 °C (-10 °C when optional glycerine cup is used)**

Electric Valves and Actuators

VG8000N Series Valves with Pneumatic and Electric Actuators



Dimensions

Description

The VG8000N series electrically and pneumatically operated nodular iron valves are designed primarily to regulate the flow of water and steam in response to the demand of a controller, in heating, ventilating, and air conditioning systems. Two-way, three-way mixing and diverting valve configurations can be ordered. A variety of electric and pneumatic actuators are available.

Features

- Valves in two-way, three-way mixing and diverting configurations.
- PN 16 rated nodular iron valve bodies.
- Stainless steel stem-plug-seat combination.
- Use of standard Johnson Controls spring loaded, self-adjusting Teflon- Viton-Teflon
- V-ring packing.
- Low leakage rate for two- and three-way valves.
- Electric and pneumatic actuators available, either factory mounted or for in-situ installation, for all valve configurations.
- Slotted stem with coupler for simple actuator attachment.

J

Valve Body Dimensions

DN	B	H4	H5
15	130	100	76
20	150	106	76
25	160	106	76
32	180	123	81
40	200	140	79
50	230	145	101
65	290	156	102
80	310	180	108
100	350	225	136
125	400	255	155
150	480	290	175

Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes	DN	D1	D2	D3	d	Bolts	Holes
15	95	65	45	13.5	M12 x 45	4	65	185	145	122	17.5	M16 x 60	4
20	105	75	58	13.5	M12 x 50	4	80	200	160	138	17.5	M16 x 65	8
25	115	85	68	13.5	M12 x 50	4	100	220	180	158	17.5	M16 x 70	8
32	140	100	78	17.5	M16 x 55	4	125	250	210	188	17.5	M16 x 75	8
40	150	110	88	17.5	M16 x 55	4	150	285	240	212	22	M20 x 75	8
50	165	125	102	17.5	M16 x 60	4							

DN 15-40 VG8000N Series Flanged 2-way PDTO (normally closed) Valves Selection Table

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa				Type-Model * Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	FA-1000 700 N	FA-2000-711x 2000 N		
15	0.4	13 mm	1600	1600	1600	-	VG84A6S1N	
	0.63						VG84A5S1N	
	1.0						VG84A4S1N	
	1.6						VG84A3S1N	
	2.5						VG84A2S1N	
	4.0						VG84A1S1N	
25	6.3		1570		1270	1600	VG84C2S1N	
	10						VG84C1S1N	
40	16		440	1250*	340		VG84E2S1N	
	25						VG84E1S1N	

* Glycerine cup available only by special order.

** (above 120 °C limitations in accordance with DIN 4747 and 4752)

VG8000N Flanged 2 and 3-way DN 15 – DN 150. Nodular Iron PN16 Valve for water, glycol solutions (max 50%) or steam. Fluid temp. limits +2 … 180 °C (-10 °C when optional glycerine cup is used) continued.**

Electric Valves and Actuators

DN 15-150 VG8000N Series Flanged 2-way PDTC (normally open) Valves Selection Table (cont.)

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa									Type-Model * Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	FA-1000 700 N	FA-2000-711x 2000 N	FA-2000-751x 2400 N	FA-2000-741x 2200 N	FA-3300 6000 N		
15	0.1	13 mm	1600	1600	-		1600	-	-	-	-	VG82A9S1N	
	0.16											VG82A8S1N	
	0.25											VG82A7S1N	
	0.4											VG82A6S1N	
	0.63											VG82A5S1N	
	1.0											VG82A4S1N	
	1.6											VG82A3S1N	
	2.5											VG82A2S1N	
	4.0											VG82A1S1N	
20	4.0						1270	1600				VG82B2S1N	
	6.3											VG82B1S1N	
25	6.3		1570									VG82C2S1N	
	10											VG82C1S1N	
32	10		770				610					VG82D2S1N	
	16											VG82D1S1N	
40	16		440	1250*			340					VG82E2S1N	
	25											VG82E1S1N	
50	40	25	-	-	700	1350	-	-	1030	190	740	VG82F1S1N	
65	63				540	1050			790	110	460	VG82G1S1N	
80	100				240	500			370	50	280	VG82H1S1N	
100	160	42			-	310			-			VG82J1S1N	
125	250					190						VG82K1S1N	
150	350					110						VG82L1S1N	

** (above 120 °C limitations in accordance with DIN 4747 and 4752)

* Glycerine cup available only by special order.

J

VG8000N Flanged 3-way DN 15 – DN 150. Nodular Iron PN16 Valve for water, glycol solutions (max 50%) or steam. Fluid temp. limits +2 … 180 °C (-10 °C when optional glycerine cup is used)**

Electric Valves and Actuators

DN 15-150 VG8000N Series Flanged 3-way Mixing Valves Selection Table

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa									Type-Model * Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	FA-1000 700 N	FA-2000-711x 2000 N	FA-2000-751x 2400 N	FA-2000-741x 2200 N	FA-3300 6000 N		
15	0.4	13 mm	1600	1600	-		1600	-	-	-	-	VG88A6S1N	
	0.63											VG88A5S1N	
	1.0											VG88A4S1N	
	1.6											VG88A3S1N	
	2.5											VG88A2S1N	
	4.0											VG88A1S1N	
20	4.0						1270					VG88B2S1N	
	6.3											VG88B1S1N	
25	6.3		1570					1600				VG88C2S1N	
	10											VG88C1S1N	
32	10		770				610					VG88D2S1N	
	16											VG88D1S1N	
40	16		440	1250*			340					VG88E2S1N	
	25											VG88E1S1N	
50	40	25	-	-	700	1350	-	-	1030			VG88F1S1N	
65	63				540	1050			790			VG88G1S1N	
80	100				240	500			370			VG88H1S1N	
100	160	42			-	310	-	-	-	190	740	VG88J1S1N	
125	250					190				110	460	VG88K1S1N	
150	350					110				50	280	VG88L1S1N	

DN 15-150 VG8000N Series Flanged 3-way Diverting Valves Selection Table

15	0.4	13 mm	1600	1600	-		1600	-	-	-	-	VG89A6S1N	
	0.63											VG89A5S1N	
	1.0											VG89A4S1N	
	1.6											VG89A3S1N	
	2.5											VG89A2S1N	
	4.0											VG89A1S1N	
20	4.0						1270					VG89B2S1N	
	6.3											VG89B1S1N	
25	6.3		1570					1600				VG89C2S1N	
	10											VG89C1S1N	
32	10		770				610					VG89D2S1N	
	16											VG89D1S1N	
40	16		440	1250*			340					VG89E2S1N	
	25											VG89E1S1N	
50	40	25	-	-	700	1350	-	-	1030			VG89F1S1N	
65	63				540	1050			790			VG89G1S1N	
80	100				240	500			370			VG89H1S1N	
100	160	42			-	310	-	-	-	190	740	VG89J1S1N	
125	250					190				110	460	VG89K1S1N	
150	350					110				50	280	VG89L1S1N	

** (above 120 °C limitations in accordance with DIN 4747 and 4752)

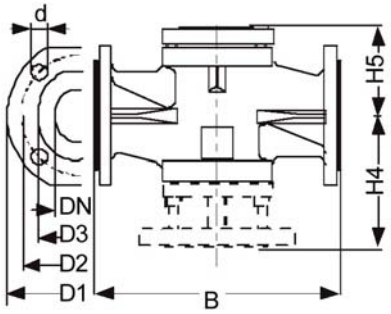
* Glycerine cup available only by special order.

J

VG8000V Series Flanged 2-Way and Mixing Valves for water and Glycol solutions (max. 50%) DN 15 - DN 150 • Nodular Iron • PN 16. Fluid temp. limit 0 … 140 °C *

Electric Valves and Actuators

VG8000V Series Valves with Pneumatic and Electric Actuators



Dimensions

Description

The VG8000V Series electrically and pneumatically operated nodular iron valves are designed primarily, to regulate the flow of water in response to the demand of a controller mainly in heating, but also in ventilating, and air conditioning systems. They are available in two-way configurations and three-way mixing configurations. A variety of electric and pneumatic actuators are available

Features

- Valves in two-way and three-way mixing configurations.
- PN 16 rated nodular iron valve bodies.
- Use of standard Johnson Controls spring loaded, self-adjusting Teflon-Viton-Teflon
- V-ring packing.
- Low leakage rate for two and three-way valves.
- Electric and Pneumatic actuators available, either factory mounted or separately for in-situ installation, for all valve configurations.
- Slotted stem with clamp-coupler system for simple actuator attachment.

J

Valve Body Dimensions

DN	B	H4	H5
15	130	100	76
20	150	106	76
25	160	106	76
32	180	123	81
40	200	140	79
50	230	145	101
65	290	156	102
80	310	180	108
100	350	225	136
125	400	255	155
150	480	290	175

Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes
15	95	65	45	13.5	M12 x 45	4
20	105	75	58	13.5	M12 x 50	4
25	115	85	68	13.5	M12 x 50	4
32	140	100	78	17.5	M16 x 55	4
40	150	110	88	17.5	M16 x 55	4
50	165	125	102	17.5	M16 x 60	4

DN	D1	D2	D3	d	Bolts	Holes
65	185	145	122	17.5	M16 x 60	4
80	200	160	138	17.5	M16 x 65	8
100	220	180	158	17.5	M16 x 70	8
125	250	210	188	17.5	M16 x 75	8
150	285	240	212	22	M20 x 75	8

DN 15-150 VG8000V Series Flanged 2-way PDTC (normally open) Valves Selection Table

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa					Type-Model Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	FA-3300-741x 6000 N		
15	2.5	13	1600	1600	-	-	-	VG82A2V1N	
	4.0							VG82A1V1N	
20	6.3							VG82B1V1N	
25	10		1570					VG82C1V1N	
32	16		770	1250				VG82D1V1N	
40	25		440					VG82E1V1N	
50	40	25	-	-	700	1350		VG82F1V1N	
65	63				540	1050		VG82G1V1N	
80	100				240	500		VG82H1V1N	
100	160	42			-	310	740	VG82J1V1N	
125	250					190	460	VG82K1V1N	
150	350					110	280	VG82L1V1N	

* (above 120 °C limitations in accordance with DIN 4747 and 4752)

VG8000V Series Flanged 2-Way and Mixing Valves for water and Glycol solutions (max. 50%) DN 15 - DN 150 • Nodular Iron • PN 16. Fluid temp. limit 0 … 140 °C * (continued)

Electric Valves and Actuators

DN 15-150 VG8000V Series Flanged 3-way Mixing Valves Selection Table

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa					Type-Model Number	
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	FA-3300 6000 N		
15	2.5	13	1600	1600	-	-	-	**VG88A2V1N**	
	4.0							**VG88A1V1N**	
20	6.3							**VG88B1V1N**	
25	10		1570					**VG88C1V1N**	
32	16		770	1250				**VG88D1V1N**	
40	25		440					**VG88E1V1N**	
50	40	25	-	-	700	1350		**VG88F1V1N**	
65	63				540	1050		**VG88G1V1N**	
80	100				240	500		**VG88H1V1N**	
100	160	42			-	310	740	**VG88J1V1N**	
125	250					190	460	**VG88K1V1N**	
150	350					110	280	**VG88L1V1N**	

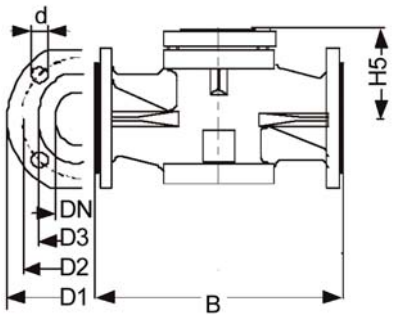
* (above 120 °C limitations in accordance with DIN 4747 and 4752)

J

VG8300N & H Series Flanged 2-Way PDTC for water and Glycol solutions (max. 50%) DN 40 - DN 150 • Balanced Pressure • Nodular Iron • PN 16 & PN 25. Fluid temp. limit 0 … 140 °C *

Electric Valves and Actuators

VG8300N and VG8300H Valves (With PA and RA Actuators)



Dimensions

Description

The VG8300N PN 16 and VG8300H PN 25 valve series are designed primarily to regulate the flow of water and steam in response to the demand of a controller, in heating, ventilating and air conditioning systems.

These two-way Push-Down-To-Close, nodular cast iron valves have a specially designed plug, which through specific balancing of pressures allows higher close-off pressures with standard actuator combinations.

The VG8300N and VG8300H valves can be used with a variety of Johnson Controls pneumatic and electric actuators.

Features

- Balanced pressure valve.
- PN 16 & PN 25 rated valves available.
- Nodular iron valve bodies.
- Stainless steel stem-plug-welded seat area combination.
- Pneumatic and electric actuators available.
- Use of standard Johnson Controls spring loaded, self-adjusting Teflon-Viton-Teflon V-ring packing.
- Low leakage rate.
- Slotted stem for Johnson Controls coupler.
- Valves are silicon free.

J

Valve Body Dimensions

DN	B	H5
15	130	76
20	150	76
25	160	76
32	180	81
40	200	79
50	230	101
65	290	102
80	310	108
100	350	136
125	400	155
150	480	175

Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes
15	95	65	45	13.5	M12 x 45	4
20	105	75	58	13.5	M12 x 50	4
25	115	85	68	13.5	M12 x 50	4
32	140	100	78	17.5	M16 x 55	4
40	150	110	88	17.5	M16 x 55	4
50	165	125	102	17.5	M16 x 60	4

DN	D1	D2	D3	d	Bolts	Holes
65	185	145	122	17.5	M16 x 60	4
80	200	160	138	17.5	M16 x 65	8
100	220	180	158	17.5	M16 x 70	8
125	250	210	188	17.5	M16 x 75	8
150	285	240	212	22	M20 x 75	8

DN 15-150 VG8000N & H Series 2-way Balanced Pressure Valve, PDTC (normally open), PN 16, Valves Selection Table

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa									Type-Model Number	
			Non Spring Return						Spring Return				
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	RA-3100-8126 1200 N	RA-3100-8226 1700 N	FA-2000-711x 2000 N	FA-2000-751x 2400 N	FA-2000-741x 2200 N		
40	25	13	1600	1600	-	-	1600	-	1600	-		**VG83E1S1N**	
50	40	25	-	-	1600	-	-	1600	-	1600		**VG83F1S1N**	
65	63											**VG83G1S1N**	
80	100											**VG83H1S1N**	
100	160	42			-	1600				-	1600	**VG83J1S1N**	
125	250											**VG83K1S1N**	
150	350											**VG83L1S1N**	

* (above 120 °C limitations in accordance with DIN 4747 and 4752)

VG8300N & H Series Flanged 2-Way PDTC for water and Glycol solutions (max. 50%) DN 40 - DN 150 • Balanced Pressure • Nodular Iron • PN 16 & PN 25. Fluid temp. limit 0 … 140 °C *

Electric Valves and Actuators

DN 15-150 (continued) **VG8000N & H Series 2-way Balanced Pressure Valve, PDTC (normally open), PN 25, Valves Selection Table**

DN (connection size)	Kvs	Nominal Stroke	Closing pressure kPa									Type-Model Number	
			Non Spring Return						Spring Return				
			VA-7200 1000 N	RA-3000-712x 1600 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N	RA-3100-8126 1200 N	RA-3100-8226 1700 N	FA-2000-711x 2000 N	FA-2000-751x 2400 N	FA-2000-741x 2200 N		
40	25	13	2500	2500	-	-	2500	-	2500	-		**VG83E1S1H**	
50	40	25	-	-	2500	-	-	2500	-	2500		**VG83F1S1H**	
65	63											**VG83G1S1H**	
80	100											**VG83H1S1H**	
100	160	42			-	2500				-	2500	**VG83J1S1H**	
125	250											**VG83K1S1H**	
150	350											**VG83L1S1H**	

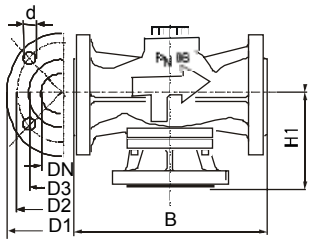
* (above 120 °C limitations in accordance with DIN 4747 and 4752)

J

VG9000 Series Flanged 2-Way and Mixing Valves for water and Glycol solutions (max. 30%), DN 20 – DN 100 • Cast Iron • PN 6 & PN 10. Fluid temp. limit 0 … 140 °C

Electric Valves and Actuators

VG9000 Series Valves with VA-7150, VA-7200 (front / right) and RA-3000 (rear) Electric Actuators



Dimensions

Description

The VG9000 Series cast iron flanged valves are designed primarily to regulate the flow of water and low pressure steam in response to the demand of a controller, in heating, ventilating, and air conditioning systems. These valves are available in two-way, Push-Down-To-Open and three way mixing configurations.

Three models of electric actuator are available as standard for this valve: The VA-7150 for DN 20…50, the VA-7200 for DN 25…65, and the RA-3000 for DN 80…100 valves. Each model can be ordered with either 3-point or 0…10 VDC proportional control.

Features

- PN 6 and PN 10 rated series from DN 20 to DN 100 in two-way PDTO and three-way mixing configurations
- Full DIN / IEC flow capacity for all valves DN 20 … DN 100
- Uses Johnson Controls dual u-cup ring packing
- Brass Plug with soft seal for tight shut-off on both control and by-pass ports
- Electric actuators available either factory mounted, or separately for in-situ installation
- Face to Face dimensions according DIN / IEC standard

Dimensions

PN6								PN10						
DN	B	D1	D2	D3	d	H1	Holes	B	D1	D2	D3	d	H1	Holes
20	140	90	65	48	11	70	4	150	105	75	56	14	75	4
25	150	100	75	58	11	75	4	160	115	85	65	14	80	4
40	180	130	100	78	14	90	4	200	150	110	84	19	100	4
50	200	140	110	88	14	100	4	230	165	125	99	19	115	4
65	240	160	130	108	14	120	4	290	185	145	118	19	145	4
80	260	190	150	124	19	130	4	310	200	160	132	19	155	8
100	300	210	170	144	19	150	4	350	220	180	156	19	175	8

DN 20-100 PG 6 VG9000 Series Flanged Valves Selection Table

DN (connect. size)	Kvs	Nominal Stroke	Closing pressure kPa				Type-Model Number	
			VA-7150-1000 VA-7700-1000 500 N	VA-7200-1000 1000 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N		
2-way PDTO								
20	0.63	8-mm	600	-	-	-	**VG94B6S1P6**	
	1.0						**VG94B5S1P6**	
	1.6						**VG94B4S1P6**	
	2.5						**VG94B3S1P6**	
	4.0						**VG94B2S1P6**	
	6.3						**VG94B1S1P6**	
25	10	13-mm	590	600			**VG94C1S1P6**	
40	16	19-mm	330				**VG94E2S1P6**	
	25		190	480			**VG94E1S1P6**	
50	40		100	290			**VG94F1S1P6**	
65	63		-	150			**VG94G1S1P6**	
80	100	25-mm		-	280	510	**VG94H1S1P6**	
100	160			-	170	320	**VG94J1S1P6**	
3-way Mixing								
20	0.63	8-mm	600	-	-	-	**VG98B6S1P6**	
	1.0						**VG98B5S1P6**	
	1.6						**VG98B4S1P6**	
	2.5						**VG98B3S1P6**	
	4.0						**VG98B2S1P6**	
	6.3						**VG98B1S1P6**	
25	10	13-mm	490	600			**VG98C1S1P6**	
40	16	19-mm	250				**VG98E2S1P6**	
	25		130	440			**VG98E1S1P6**	
50	40		60	260			**VG98F1S1P6**	
65	63		-	130			**VG98G1S1P6**	
80	100	25-mm		-	270	510	**VG98H1S1P6**	
100	160			-	160	310	**VG98J1S1P6**	

* (above 120 °C limitations in accordance with DIN 4747 and 4752)

VG9000 Series Flanged 2-Way and Mixing Valves for water and Glycol solutions (max. 30%), DN 20 – DN 100 • Cast Iron • PN 6 & PN 10. Fluid temp. limit 0 … 140 °C (continued)

Electric Valves and Actuators

DN 20-100 PN 10 VG9000 Series Flanged Valves Selection Table

DN (connect. size)	Kvs	Nominal Stroke	Closing pressure kPa				Type-Model Number	
			VA-7150-1000 VA-7700-1000 500 N	VA-7200-1000 1000 N	RA-3000-722x 1800 N	RA-3000-732x 3000 N		
2-way PDTO								
20	0.63	8-mm	1000	-	-	-	**VG94B6S1P0**	
	1.0						**VG94B5S1P0**	
	1.6						**VG94B4S1P0**	
	2.5						**VG94B3S1P0**	
	4.0						**VG94B2S1P0**	
	6.3		980				**VG94B1S1P0**	
25	10	13-mm	640	1000			**VG94C1S1P0**	
40	16	19-mm	360	820			**VG94E2S1P0**	
	25		210	510			**VG94E1S1P0**	
50	40		110	310			**VG94F1S1P0**	
65	63		-	160			**VG94G1S1P0**	
80	100	25-mm		-	280	510	**VG94H1S1P0**	
100	160			-	170	320	**VG94J1S1P0**	
3-way Mixing								
20	0.63	8-mm	1000	-	-	-	**VG98B6S1P0**	
	1.0						**VG98B5S1P0**	
	1.6						**VG98B4S1P0**	
	2.5						**VG98B3S1P0**	
	4.0						**VG98B2S1P0**	
	6.3		880				**VG98B1S1P0**	
25	10	13-mm	430	1000			**VG98C1S1P0**	
40	16	19-mm	220	720			**VG98E2S1P0**	
	25		110	420			**VG98E1S1P0**	
50	40		40	240			**VG98F1S1P0**	
65	63		-	120			**VG98G1S1P0**	
80	100	25-mm		-	260	490	**VG98H1S1P0**	
100	160			-	160	310	**VG98J1S1P0**	

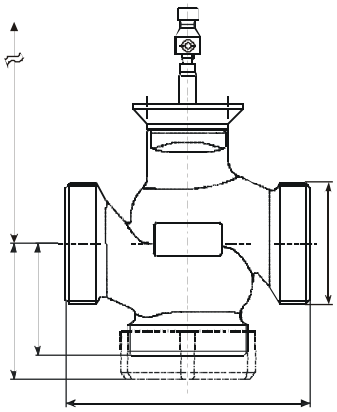
* (above 120 °C limitations in accordance with DIN 4747 and 4752)

J

VGS800W1N Series PN 16, Rp ½ to Rp 2, Male Threaded Bronze Valves

Electric Valves and Actuators

VGS800W1N Valve



Dimensions

Description

The VGS800W1N Series electrically operated Bronze valves are primarily designed to regulate the flow of water in response to the demand of a controller, in heating, ventilating, and air conditioning systems. This three-way mixing valve is also easily converted into a two-way valve using the available modkit.

Two models of electric actuator are available as standard: The VA-7150 and VA-7200 actuators can be ordered either for 3-point or for 0…10 V DC proportional control.

Features

- Male threaded fittings.
- PN 16.
- Both inlet 1 and inlet 2 are tight in accordance with DIN EN1349 IV L1
- Mixing valve easily converted to two-way valve on-site.
- Full DIN / IEC flow capacity for all valves Rp ½…Rp 2.
- Uses PTFE guided stainless steel stem with dual O-ring seal packing.
- Brass plug with soft seal for tight (no leakage) shut-off on both control and bypass ports.
- Electric actuators available either factory mounted, or separately for in-situ installation.
- Slotted stem for quick-fit coupler system.

J

Dimensions

		Rp ½	Rp ¾	Rp 1	Rp 1¼	Rp 1½	Rp 2
L		80	90	110	120	130	150
H	VA-7150	212	212	218	222	231	231
	VA-7200	226	226	232	236	245	245
H1		55	55	55	55	60	65
H2		65	65	66	67	72	77
G		1 1/8	1¼	1½	2	2¼	2¾
Weight (kg)		1.1	1.2	1.4	2.0	2.5	3.5

VGS800W1N Series PN 16, Rp ½ to Rp 2, Male Threaded Bronze Valves Selection Table

Body size	DN (mm)	Kvs	Nominal Stroke	Closing pressure kPa		Type-Model Number	
				VA-7150-820x 500 N	VA-7200-820x 1000 N		
3-way Mixing							
½	15	0.63	13 mm	958	1600	**VGS8A5W1N**	
		1.0				**VGS8A4W1N**	
		1.6				**VGS8A3W1N**	
		2.5				**VGS8A2W1N**	
		4.0				**VGS8A1W1N**	
¾	20	6.3	13 mm	605	1600	**VGS8B1W1N**	
1	25	10		280	1046	**VGS8C1W1N**	
1¼	32	16		176	744	**VGS8D1W1N**	
1½	40	25		54	369	**VGS8E1W1N**	
2	50	40		-	208	**VGS8F1W1N**	

Pipe muffles

Order code	Muffles
121 4935 151	DN15 / Rp ½
121 4935 201	DN20 / Rp ¾
121 4935 251	DN25 / Rp 1
121 4935 321	DN32 / Rp 1 ¼
121 4935 401	DN40 / Rp 1 ½
121 4935 501	DN50 / Rp 2

3 pipe muffels are needed for the mixing valves.

Modkit 3-way in 2-way

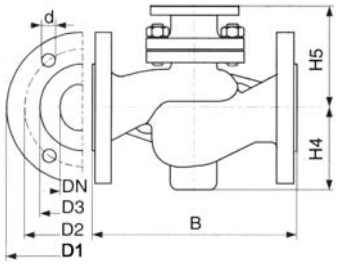
Order code	Mod kit for:
121 4930 151	DN15 / Rp ½
121 4930 201	DN20 / Rp ¾
121 4930 251	DN25 / Rp 1
121 4930 321	DN32 / Rp 1 ¼
121 4930 401	DN40 / Rp 1 ½
121 4930 501	DN50 / Rp 2

2 pipe muffles and 1 modkit are required to alter a 3-way valve into a 2-way valve

VBB Series Pressure Balanced Flanged 2-way Valves • DN 50 – DN 150 • Fluid temp. limits +2 … 200 °C* • Nodular Iron • PN 16 & 25, For water, glycol solutions (max 50%) or steam.

Electric Valves and Actuators

VBD Series Valves with Pneumatic and Electric Actuators



Dimensions

DN	PN16 D1	D2	D3	d	Bolts	Holes	DN	PN25 D1	D2	D3	d	Bolts	Holes
50	165	125	102	18	M16x60	4	50	165	125	102	18	M16x60	4
65	185	145	122	18	M16x60	4	65	185	145	122	18	M16x65	8
80	200	160	133	18	M16x65	8	80	200	160	133	18	M16x70	8
100	220	180	158	18	M16x70	8	100	235	190	158	22	M20x75	8
125	250	210	184	22	M20x75	8	125	270	220	184	26	M24x80	8
150	285	240	212	22	M20x75	8	150	300	250	212	26	M24x85	8

Description

The VBB valve series is designed primarily to regulate the flow of water and steam in response to the demand of a controller, in heating, ventilating and air conditioning systems.
They are electrically and pneumatically operated nodular cast iron PN 16 and PN 25 valves. The plug has an equalisation chamber, which through specific balancing of pressures allows the valves to withstand higher close-off pressures than normal valves.
They are available in two-way Push-Down-To-Close configuration. Both electric and pneumatic actuators are available.

Features

- Pressure balanced plug.
- PN 16 and PN 25 rated nodular iron valve
- bodies.
- Stainless steel Stem-plug-seat combination.
- Stellite trim models available.
- Use of Johnson Controls spring loaded, selfadjusting
- Viton-Teflon-Viton V-ring packing.
- Low leakage rate for two-way valves.
- Electric and pneumatic actuators available for all valves, either factory mounted or for in-situ installation.
- Slotted stem with coupler for simple actuator attachment.

VBB Series Pressure Balanced Flanged 2-way (PDTC) Valves Selection Table

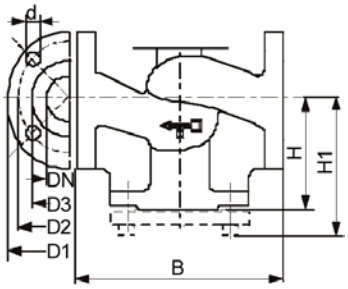
DN	Kvs	PN16 PN25	Closing pressure kPa						Type-Model Number	
			RA-3000 1800N	RA-3000 3000N	FA-2200-751x 2400N	FA-2500-751x 2400N	FA-2300-741x 2200N	FA-2600-741x 2200N		
50	40	PN16	1600	-	1600	1600	-	-	**VBB-2712-5200**	
65	63			-					**VBB-2812-5200**	
80	100		-	1600	-	-	1600	1600	**VBB-2912-5200**	
100	160			1600					**VBB-3012-5200**	
125	250			1600					**VBB-3112-5200**	
150	360			1600					**VBB-3212-5200**	
50	40	PN25	2500	-	2500	2500	-	-	**VBB-4712-5200**	
65	63			-					**VBB-4812-5200**	
80	100		-	2500	-	-	2500	2500	**VBB-4912-5200**	
100	160			2500					**VBB-5012-5200**	
125	250			2500					**VBB-5112-5200**	
150	360			2500					**VBB-5212-5200**	

* (above 120 °C limitations in accordance with DIN 4747 and 4752)

VBD Series Flanged 2and 3-way Valves • DN 15 – DN 150 • Nodular Iron • PN 25, Fluid temp. limits +2 … 200 °C (-20 °C when glycerine cup is used)*. For water, glycol solutions (max 50%) or steam.

Electric Valves and Actuators

VBD Series Valves with Pneumatic and Electric Actuators



Dimensions

Description

The VBD Series, electrically and pneumatically operated valves are designed primarily to regulate the flow of water and steam in response to the demand of a controller, in heating systems.
These nodular iron PN 25 valves are available in two-way and three-way mixing configurations.
Both electric and pneumatic actuators are available.

Features

- Valves in two-way and three-way mixing configurations.
- PN 25 rated nodular iron valve bodies.
- Stainless steel Stem-plug-seat combination.
- Use of Johnson Controls spring loaded, self-adjusting Viton-Teflon-Viton V-ring packing.
- Low leakage rate for two-way and three-way valves.
- Electric and Pneumatic actuators available for all valves, either factory mounted or for in-situ installation.
- Slotted stem with coupler for quick-fit coupler system

Flange Dimensions

DN	D1	D2	D3	d	Bolts	Holes	DN	D1	D2	D3	d	Bolts	Holes
15	95	65	45	14	M12x45	4	80	200	160	133	18	M16x70	8
25	115	85	68	14	M12x50	4	100	235	190	158	22	M20x75	8
40	150	110	88	18	M16x55	4	125	270	220	184	26	M24x80	8
50	165	125	102	18	M16x60	4	150	300	250	212	26	M24x85	8
65	185	145	122	18	M16x60	8	-	-	-	-	-	-	-

J

VBD Series Flanged 2-way Valves Selection Table

DN	Kvs	Nominal Stroke mm	Closing pressure kPa									Type-Model ** Number	
			VA-7200	RA-3000			FA-1000	FA-2000-	FA-2000-	FA-2000-	FA-3300-		
			1000N	1600N	1800N	3000N	700N	711x 2000N	741x 2200N	751x 2400N	741x 6000N		
2-way NC (PDTO)													
15	0.63	13	2500	2500	-	-	2500	-	-	-	-	**VBD-4254-5200**	
	1				-	-		-	-	-	-	**VBD-4244-5200**	
	1.6				-	-		-	-	-	-	**VBD-4234-5200**	
	2.5				-	-		-	-	-	-	**VBD-4224-5200**	
	4.0				-	-		-	-	-	-	**VBD-4214-5200**	
25	6.3		880	1970	-	-	1370	2500	-	-	-	**VBD-4424-5200**	
	10				-	-			-	-	-	**VBD-4414-5200**	
40	16		230	1100	-	-	380	1400	-	-	-	**VBD-4624-5200**	
	25				-	-	-		-	-	-	**VBD-4614-5200**	
2-way NO (PDTC)													
50	40	25	-	-	480	-	-	-	-	810	-	**VBD-4712-5200**	
65	63		-	-	220	-	-	-	-	410	-	**VBD-4812-5200**	
80	100		-	-	-	-	-	-	220	-	950	**VBD-4912-5200**	
100	160	42	-	-	-	-	-	-	110	-	570	**VBD-5012-5200**	
125	250		-	-	-	-	-	-	50	-	330	**VBD-5112-5200**	
150	360		-	-	-	-	-	-	20	-	210	**VBD-5212-5200**	

VBD Series Flanged 3-way Mixing Valves Selection Table

15	0.63	13	1700	2500	-	-	1500	-	-	-	-	**VBD-4258-5200**	
	1				-	-		-	-	-	-	**VBD-4248-5200**	
	1.6				-	-		-	-	-	-	**VBD-4238-5200**	
	2.5				-	-		-	-	-	--	**VBD-4228-5200**	
	4.0				-	-		-	-	-	-	**VBD-4218-5200**	
25	6.3		360	1000	-	-	270	2500	-	-	-	**VBD-4428-5200**	
	10				-	-			-	-	-	**VBD-4418-5200**	
40	16		-	710	-	-	-	1050	-	-	-	**VBD-4628-5200**	
	25		-		-	-	-		-	-	-	**VBD-4618-5200**	
50	40	25	-	-	480	1130	-	-	-	810	-	**VBD-4718-5200**	
65	63		-	-	220	590	-	-	-	410	-	**VBD-4818-5200**	
80	100	42	-	-	-	330	-	-	220	-	950	**VBD-4918-5200**	
100	160		-	-	-	180	-	-	110	-	570	**VBD-5018-5200**	
125	250		-	-	-	90	-	-	50	-	330	**VBD-5118-5200**	
150	360		-	-	-	40	-	-	20	-	210	**VBD-5218-5200**	

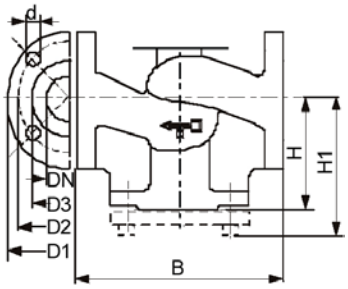
* (above 120 °C limitations in accordance with DIN 4747 and 4752)

** Soft seat, stellite trim, glycerine cup available on request.

VBF Series Flanged 2and 3-way Valves • DN 15 – DN 100 • Cast Iron • PN 6 and PN 10, Fluid temp. limits +2 to 130 °C For water, glycol solutions (max 50%).

Electric Valves and Actuators

VBF Series Valves with Electric Actuators RA-3000 and VA-7200



Dimensions

Description

The VBF Series electrically operated cast iron valves are primarily designed to regulate the flow of water in response to the demand of a controller, in heating, ventilating, and air conditioning systems. These valves are available in two-way and three-way mixing configurations.
Three models of electric actuator are available as standard: The VA-7200 for DN 15…50, the VA-7150 for DN 15…50 and the RA-3000 for DN 65…100 valves. Each model can be ordered either for 3-point or for 0…10 VDC proportional control.

Features

- PN 6 and PN 10 rated valves in 2-way and 3-way mixing configurations.
- Full DIN / IEC flow capacity for all valves DN 15…DN 100.
- Uses PTFE guided stainless steel stem with dual O-ring seal packing.
- Brass plug with soft seal for tight (no leakage) shut-off on both control and bypass ports.
- Electric actuators available either factory mounted, or separately for in-situ installation.
- Slotted stem for quick-fit coupler system
- Face to face dimensions according DIN/IEC standard.

J

Flange Dimensions PN 6

DN	B	H	Stroke	H1	D1	D2	D3	d	Holes
15	130	65	13	86	80	55	40	11	4
20	150	70	13	93	90	65	50	11	4
25	160	75	13	98	100	75	60	11	4
32	180	95	13	119	120	90	70	14	4
40	200	100	13	124	130	100	80	14	4
50	230	100	13	134	140	110	90	14	4
65	290	120	30	144	160	130	110	14	4
80	310	130	30	158	190	150	128	18	4
100	350	150	30	178	210	170	148	18	4

Flange Dimensions PN 10

DN	B	H	Stroke	H1	D1	D2	D3	d	Holes
15	130	65	13	89	95	55	44	14	4
20	150	70	13	96	105	65	57	14	4
25	160	75	13	101	115	75	67	14	4
32	180	95	13	123	140	90	77	18	4
40	200	100	13	128	150	100	87	18	4
50	230	100	13	130	165	110	101	18	4
65	290	120	30	150	185	130	121	18	4
80	310	130	30	162	200	150	137	18	8
100	350	150	30	182	220	170	157	18	8

VBF Series (PN 6) Flanged 2-way PDTC (normally closed) Valves Selection Table

DN	Kvs	Nominal Stroke	Closing pressure kPa				Type-Model Number	
			VA-7150-820x 500N	VA-7200-820x 1000N	RA-3000-722x 1800N	RA-3000-732x 3000N		
15	0.63	13 mm	600	600	-	-	**VBF-0254-5200**	
15	1.0						**VBF-0244-5200**	
15	1.6						**VBF-0234-5200**	
15	2.5						**VBF-0224-5200**	
15	4.0						**VBF-0214-5200**	
20	6.3		580				**VBF-0314-5200**	
25	10		350				**VBF-0414-5200**	
32	16		230				**VBF-0514-5200**	
40	25		90	380			**VBF-0614-5200**	
50	40	30 mm	30	220			**VBF-0714-5200**	
65	63		-	-	400	600	**VBF-0814-5200**	
80	100				250	480	**VBF-0914-5200**	
100	160				150	290	**VBF-1014-5200**	

VBF Series Flanged 2and 3-way Valves • DN 15 – DN 100 • Cast Iron • PN 6 and PN 10, Fluid temp. limits +2 to 130 °C For water, glycol solutions (max 50%). (continued)

Electric Valves and Actuators

VBF Series Flanged (PN 6) 3-way Valves Selection Table

DN	Kvs	Nominal Stroke	Closing pressure kPa				Type-Model Number	
			VA-7150-820x 500N	VA-7200-820x 1000N	RA-3000-722x 1800N	RA-3000-732x 3000N		
15	0.63	13 mm	600	600	-	-	VBF-0258-5200	
15	1.0						VBF-0248-5200	
15	1.6						VBF-0238-5200	
15	2.5						VBF-0228-5200	
15	4.0						VBF-0218-5200	
20	6.3		580				VBF-0318-5200	
25	10		270				VBF-0418-5200	
32	16		170				VBF-0518-5200	
40	25		50	350			VBF-0618-5200	
50	40		-	190			VBF-0718-5200	
65	63	30 mm	-	-	380	600	VBF-0818-5200	
80	100				230	460	VBF-0918-5200	
100	110				130	280	VBF-1018-5200	

VBF Series (PN 10) Flanged 2-way PDTO (normally closed) Valves Selection Table

DN	Kvs	Nominal Stroke	Closing pressure kPa				Type-Model Number	
			VA-7150-820x 500N	VA-7200-820x 1000N	RA-3000-722x 1800N	RA-3000-732x 3000N		
15	0.63	13 mm	1000	1000	-	-	VBF-2254-5200	
15	1.0						VBF-2244-5200	
15	1.6						VBF-2234-5200	
15	2.5						VBF-2224-5200	
15	4.0						VBF-2214-5200	
20	6.3		720				VBF-2314-5200	
25	10		380				VBF-2414-5200	
32	16		260	770			VBF-2514-5200	
40	25		100	400			VBF-2614-5200	
50	40		40	230			VBF-2714-5200	
65	63	30 mm	-	-	410	760	VBF-2814-5200	
80	100				260	490	VBF-2914-5200	
100	160				150	300	VBF-3014-5200	

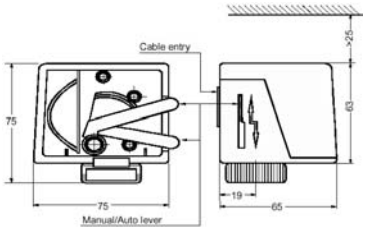
VBF Series Flanged (PN 10) 3-way Valves Selection Table

DN	Kvs	Nominal Stroke	Closing pressure kPa				Type-Model Number	
			VA-7150-820x 500N	VA-7200-820x 1000N	RA-3000-722x 1800N	RA-3000-732x 3000N		
15	0.63	13 mm	830	1000	-	-	VBF-2258-5200	
15	1.0						VBF-2248-5200	
15	1.6						VBF-2238-5200	
15	2.5						VBF-2228-5200	
15	4.0						VBF-2218-5200	
20	6.3		520				VBF-2318-5200	
25	10		230	960			VBF-2418-5200	
32	16		100	680			VBF-2518-5200	
40	25		30	330			VBF-2618-5200	
50	40		-	180			VBF-2718-5200	
65	63	30 mm	-	-	360	720	VBF-2818-5200	
80	100				220	450	VBF-2918-5200	
100	160				120	270	VBF-3018-5200	

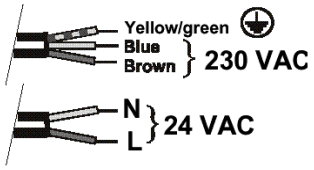
VA-7010 On/Off Zone Valve Actuator

Electric Valves and Actuators

VA-7010 Actuator with VG5000



Dimensions in mm



Wiring

Description

The VA-7010 electric on/off actuator provides a two-position (open-closed) control and can easily be mounted with a threaded coupling onto VG5000 forged brass valves and onto VG4000 cast bronze terminal unit valves (see pertinent bulletins).
A lever at the side of the actuator housing can be used to manually open a 2-way PDTO valve, or the normally closed port of a 3-way valve.

Features

- Low or Line voltage models available
- AC stall type motor
- Manual lever
- Flat profile design with small side clearance
- Actuator can be mounted after valve body is installed
- Actuator can be rotated after mounting

VA-7010 Electric On/Off Actuator Selection Table

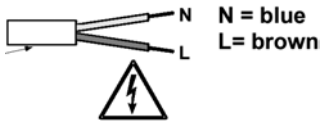
Supply Voltage (50/60Hz)	Minimum Force	Full Stroke Time	Nominal Stroke	Protection Class	Type-Model Number	
24 VAC ± 10%	90 N	"ON" 10 s	3 mm (max. 5mm)	IP 40	**VA-7010-8101**	
230 VAC ±10%		"OFF" 5 s			**VA-7010-8103**	

K

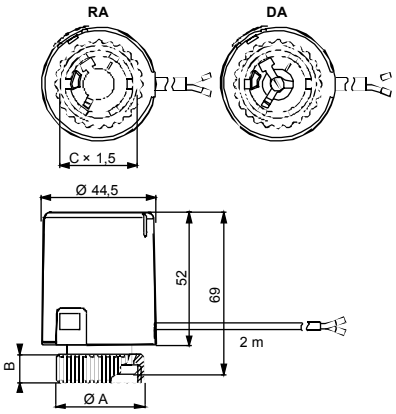
VA-7040 Thermal Zone Valve Actuator

Electric Valves and Actuators

VA-7040 with VG5000 valve body (left) and VA-7040 with VG4000 valve body (right)



Wiring



Actuator	A Ø	B	C Ø
VA-7040-2x	32	10	M28 x 1,5
VA-7047-2x	34	11	M30 x 1,5

Dimensions in mm

Description

The VA-7040 electric thermal actuator provides a two position (open / closed) control and can easily be mounted onto VG4000 and VG5000 series terminal unit valves.

The construction of the power element provides a smooth opening or closing action and is ideal for comfort installations.

Features

- Low and line voltage models available
- Compact design
- Can be mounted after valve body is installed
- Actuator can be rotated after mounting
- Smooth action
- NC/NO field-selectable
- Stroke indication

VA-7040 Electric Thermal Actuator Selection Table

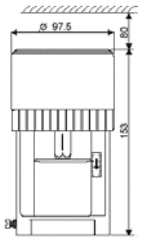
Supply Voltage (50/60Hz)	Nominal Force	Nominal Stroke	Protection Class	Power Consumption		Valve type	Type-Model Number	
				Continuous	Start-up			
24 VAC or 24 VDC ± 15%	125 N	4.5mm	IP 43	3 W	6 VA (250 mA) max	VG4000 VG5000	**VA-7040-21**	
						VB-5040-S	**VA-7047-21**	
230 VAC ±20%				2,5 W	58 VA (250 mA) max	VG4000 VG5000	**VA-7040-23**	
						VB-5040-S	**VA-7047-23**	

K

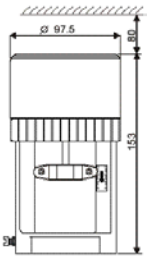
VA-7150 Control Valve Actuator

Electric Valves and Actuators

VA-7150 valve-actuator with VBF and VG7000 Valves



VA-715x-100x



VA-715x-820x

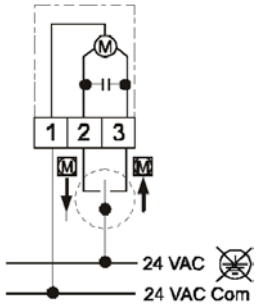
Dimensions in mm

Description

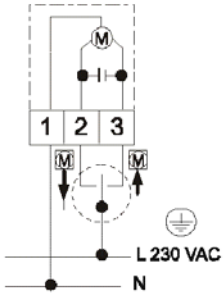
The VA-7150 series synchronous motor driven actuator provides floating or proportional control of valves with up to 19mm stroke in heating, ventilation and air conditioning applications.
This compact, non-spring return actuator has 500 N nominal force and responds to a variety of input signals.
The VA-7150 series can be easily fitted locally or ordered pre-fitted to VG7000 and VBF flanged valve series in accordance with the specified maximum close-off pressure ratings (see pertinent valve bulletins)

Features

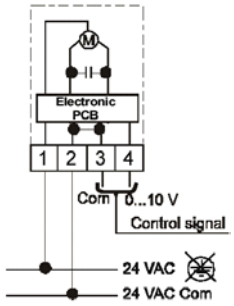
- 500 N force output in a compact unit
- Magnetic clutch
- Unique Yoke Design
- Coupler for simple actuator attachment to flanged valves
- Positioner with adjustable starting point and span, reverse and direct action modes
- "Signal fail" safe position



Wiring Floating models 24 VAC VA-7150-xx01



Wiring Floating models 230 VAC VA-7150-xx03



Wiring Proportional model 24 VAC VA-7152-xx01

K

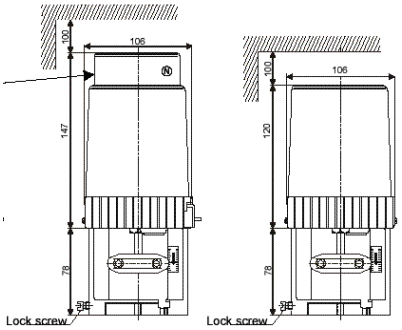
VA-7150 Electric Valve Actuator Selection Table

Supply Voltage (50/60Hz)	Action/Control	Motor Ratings	Electronic Positioner Ratings	Valve Type	Type-Model Number	
24 V ±15%	Floating (3 point) Optional 0…10 VDC feedback Optional 2 kΩ feedback Optional 1 aux. switch	2.7 VA	-	VG7000 VG9000	**VA-7150-1001**	
	Proportional 0…10 VDC		2 VA, 100kΩ input impedance		**VA-7152-1001**	
	Floating (3 point) Optional 0…10 VDC feedback Optional 2 kΩ feedback Optional 1 aux. switch		-	VBF	**VA-7150-8201**	
	Proportional 0…10 VDC		2 VA, 100kΩ input impedance		**VA-7152-8201**	
230 V ±15%	Floating (3 point)		-	VG7000 VG9000	**VA-7150-1003**	
				VBF	**VA-7150-8203**	

VA-7200 Control Valve Actuator

Electric Valves and Actuators

VA-7200 with VG7000 (left) and VG8000



With manual override **Without manual override**

Dimensions in mm

Description

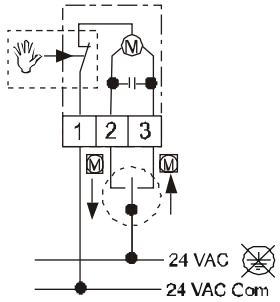
The VA-720x Series synchronous motor driven actuator provides floating, floating with feedback, proportional or proportional with feedback control of valves, with up to 19mm stroke in heating, ventilation and air conditioning applications.

This compact, non –spring return actuator has a 1000N nominal force and responds to a variety of input signals.

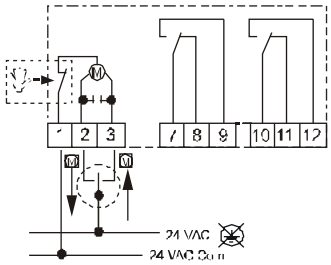
The VA-7200 Series can be easily field mounted or ordered factory coupled to VG7000, VG8000, VBD and VBF Series valves in accordance with the specified maximum close-off pressure ratings (see pertinent valve bulletins).

Features

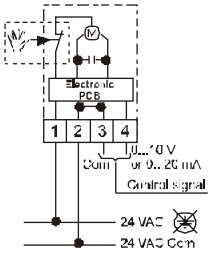
- 1000N Force Output compact unit
- Magnetic clutch
- Unique yoke design
- Optional hand wheel
- Positioner with adjustable starting point and span, reverse and direct action modes
- Built-In resistor for current input control
- Active 0…10 V position feedback on proportional and floating
- Auxiliary switches and feedback potentiometer available
- "Signal fail" safe position



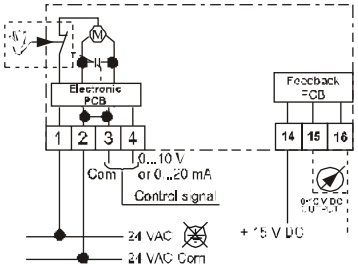
VA-7200-xx01 and VA-7240-xx01



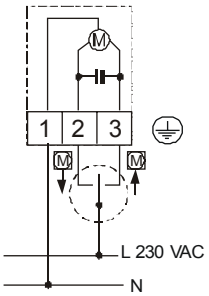
VA-7220-xx01 and VA-7250-xx01



VA-7202-xx01 and VA-7242-xx01



VA-7246-xx01



VA-7200-xx03 and VA-7240-xx03

VA-7200 Electric Valve Actuator Floating Models Selection Table

Supply Voltage (50/60Hz)	Motor Ratings	Enclosure Protection	Valve Type	Manual Override	Aux. switches	0..10 V Feedback Pot.	2 kΩ Feedback Pot.	Type-Model Number	
24 V ± 15%	5.6 VA at 50 Hz 6.7 at 60 Hz	IP 42	VG7000 and VG9000 series	-	-	-	-	**VA-7200-1001**	
		IP 42		-	-	yes	-	**VA-7201-1001**	
		IP 42		-	-	-	yes	**VA-7203-1001**	
		IP 40		-	2	-		**VA-7220-1001**	
		IP 42		yes	-	-	-	**VA-7240-1001**	
		IP 42		yes	-	yes	-	**VA-7241-1001**	
		IP 42		yes	-	-	yes	**VA-7243-1001**	
		IP 42		yes	2	-	-	**VA-7250-1001**	
		IP 42		yes	1	Switch for manual override signal		**VA-7270-1001**	

VA-7200 Control Valve Actuator (continued)

Electric Valves and Actuators

VA-7200 Electric Valve Actuator Floating Models Selection Table (continued)

Supply Voltage (50/60Hz)	Motor Ratings	Enclosure Protection	Valve Type	Manual Override	Aux. switches	0..10 V Feedback Pot.	2 kΩ Feedback Pot.	Type-Model Number	
24 V ± 15%	5.6 VA at 50 Hz 6.7 at 60 Hz	IP 42	VBD,VBF and VG8000	-	-	-	-	**VA-7200-8201**	
		IP 42		-	-	yes	-	**VA-7201-8201**	
		IP 42		-	-	-	yes	**VA-7203-8201**	
		IP 42		-	2	-		**VA-7220-8201**	
		IP 40		yes	-	-	-	**VA-7240-8201**	
		IP 40		yes	-	yes	-	**VA-7241-8201**	
		IP 40		yes	-	-	yes	**VA-7243-8201**	
		IP 40		yes	2	-	-	**VA-7250-8201**	
		IP 40		yes	1	Switch for manual override signal		**VA-7270-8201**	

VA-7200 Electric Valve Actuator Proportional Models (0…10 V) Selection Table

Supply Voltage (50/60Hz)	Motor Ratings	Enclosure Protection	Valve Type	Manual Override	Aux. switches	0..10 V Feedback Pot.	2 kΩ Feedback Pot.	Type-Model Number	
24 V ± 15%	5.6 VA at 50 Hz 6.7 at 60 Hz	IP 42	VG7000 and VG9000 series	-	-	-	-	**VA-7202-1001**	
		IP 42		-	-	yes	-	**VA-7206-1001**	
		IP 42		-	2	-	-	**VA-7222-1001**	
		IP 40		yes	-	-		**VA-7242-1001**	
		IP 42		yes	-	yes	-	**VA-7246-1001**	
		IP 42		yes	2	-	-	**VA-7252-1001**	
		IP 42		yes	-	Switch for manual override signal		**VA-7272-1001**	
24 V ± 15%	5.6 VA at 50 Hz 6.7 at 60 Hz	IP 42	VBD,VBF and VG8000	-	-	-	-	**VA-7202-8201**	
		IP 42		-	-	yes	-	**VA-7206-8201**	
		IP 42		-	2	-	-	**VA-7222-8201**	
		IP 40		yes	-	-		**VA-7242-8201**	
		IP 42		yes	-	yes	-	**VA-7246-8201**	
		IP 42		yes	2	-	-	**VA-7252-8201**	
		IP 42		yes	-	Switch for manual override signal		**VA-7272-8201**	

VA-7200 Electric Valve Actuator 230 V FloatingSelection Table

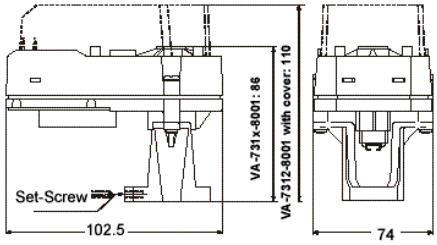
Supply Voltage (50/60Hz)	Action/Control	Motor Ratings	Enclosure Protection	Valve Type	Manual Override	2 Aux. switches	0..10 V Feedback Pot.	Type-Model Number	
230 V +10/-15%	Floating	5.6 VA at 50 Hz 6.7 at 60 Hz	IP 42	VG7000 and VG9000 series	-	-	-	**VA-7200-1003**	
			IP 40		yes	-	-	**VA-7240-1003**	
			IP 42	VBD,VBF and VG8000	-	-	-	**VA-7200-8203**	
			IP 40		yes	-	-	**VA-7240-8203**	

Note: All models with manual override and 24 V power supply are equipped with a power cut-off switch.

VA-7310 Control Valve Actuator

Electric Valves and Actuators

VA-7310 with VG-7000



Dimensions

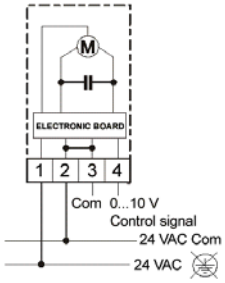
Description

The VA-7310 electric valve actuator is available with 3-point (floating) or proportional control.

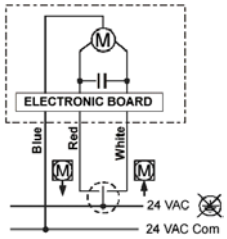
These actuators are available with 150 N nominal force. They can be used in combination with the VG7000 series valves, in accordance with the specified maximum close-off pressure ratings (see the pertinent valve bulletin).

Features

- Only one Setscrew for in-situ installation
- 3-point models with position switches, 0…10 V or 2 kΩ feedback are available
- Magnetic clutch and built-in electronic timer
- Manual override using standard 5-mm Allen key
- Proportional 0…5, 0…10, or 5…10 V control selectable in-situ



Wiring (Proportional model)



Wiring (Floating model)

VA-7310 Electric Valve Actuator Selection Table

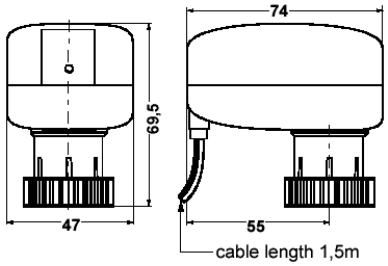
Supply Voltage (50Hz)	Action/Control	Command signal	Nominal Force	Nominal Stroke	Valve Type	Type-Model Number	
24 V ± 15%	Incremental	-	150 N ± 20%	8 mm (max. 10 mm)	Threaded valves: VG7000	**VA-7310-8001**	
	proportional	0…10 V				**VA-7312-8001**	

K

VA-7450 Zone Valve Actuator

Electric Valves and Actuators

VA-7450 microprocessor-based actuator with VG5000 (left) and VB-5040-S (right) valves



Dimensions

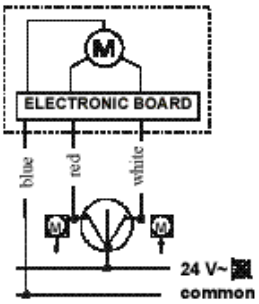
Description

The VA-7450 Series provides incremental or proportional control in HVAC (Heating, Ventilating, and Air Conditioning) applications. The compact design of this actuator makes it suitable for installation in confined spaces, such as fan coil applications.

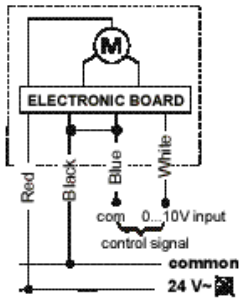
The VA-7450 series actuator is designed for field mounting onto VG4000, VG5000 and VB5040-S terminal unit valves (see pertinent bulletin).

Features

- Automatic calibration
- Selectable linear or equal percentage characteristic
- Compact design
- Can be mounted after valve body is installed
- Actuator can be rotated after mounting
- Periodic full cycle (anti-sticking) option
- LED operating status display
- Motor Time-out feature



Wiring Diagram Incremental Models



Wiring Diagram Proportional Models

K

VA-7450 Electric Valve Unit Valve Actuator Selection Table

Supply Voltage (50/60Hz)	Action/Control	Command signal	Nominal Force	Settings	Valve Type	Type-Model Number	
24 V ± 15%	Incremental (Floating or PAT)	-	120 N	Fixed	Threaded valves: VG4000 and VG5000	**VA-7450-1001**	
	Proportional	0…10 VDC		Fixed		**VA-7452-1001**	
	Proportional	0…10 / 0…5 / 5…10 VDC		Configurable		**VA-7452-9001**	

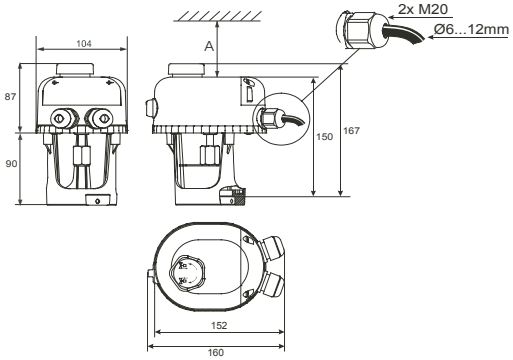
Accessories (order separately)

Description	Type-Model Number	
Manual override ring accessories for VG5000	**VA-7450-8900**	

VA-7700 Control Valve Actuator

Electric Valves and Actuators

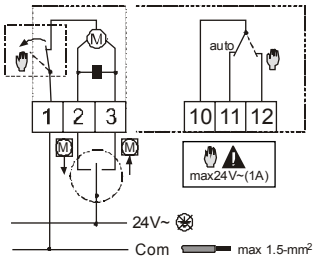
VA-7700 with VG7000



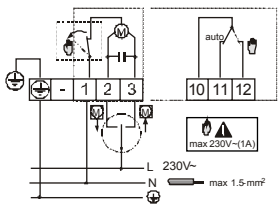
A 25 mm VA-770x actuators without manual override

A 80 mm VA-774x actuators with manual override

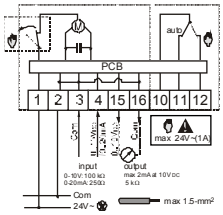
With mechanical manual override



VA-7740-1001
Incremental models, 24 VAC supply

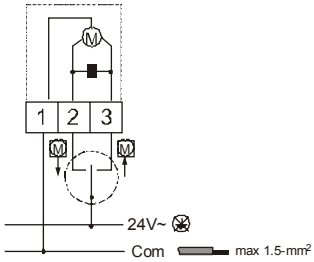


VA-7740-1003
Incremental models, 230 VAC supply

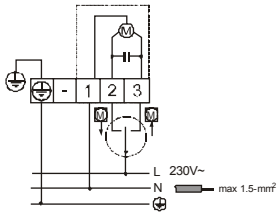


VA-7746-1001
Proportional models, 24 VAC supply

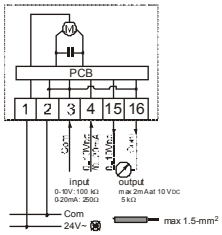
Without mechanical manual override



VA-7700-1001
Incremental models, 24 VAC supply



VA-7700-1003
Incremental models, 230 VAC supply



VA-7706-1001
Proportional models, 24 VAC supply

Description

The VA-77xx Series synchronous motor driven actuator, for valves in heating, ventilation and air conditioning applications, is available for incremental (floating) control or proportional control with 0-10 V position feedback signal. It provides a stroke capability of 8 mm to a maximum 20 mm.

This compact, non-spring return actuator has a 500 N nominal force and responds to a variety of input signals.

The actuator can be combined with VG7000 and VG9000 valves in accordance with the maximum close-off pressure ratings specified (see pertinent valve product bulletins). They can be ordered as a separate unit or as a factory fitted valve / actuator combination.

Features

- Self adjusting proportional actuators
- Column of 5 Light Emitting Diodes
- Optional models with mechanical manual override
- Manual contact micro switch on all models with manual override
- IP54 protection class
- Unique “C” shaped yoke design
- Positioner with selectable starting point and span, direct and reverse action modes
- Magnetic clutch
- Selectable “Signal failure position”

K

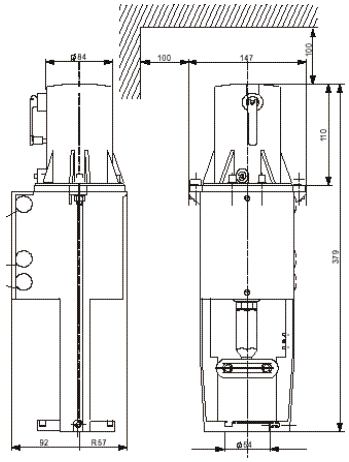
VA-7700 Electric Valve Unit Valve Actuator Selection Table

Supply Voltage (50/60Hz)	Action/Control	Command signal	Manual Override	Nominal Force	Settings	Valve Type	Type-Model Number	
24 V ± 15%	Incremental models (3-point)	Positioner Adjustment Time (PAT	No	500 N		VG7000 and VG9000	**VA-7700-1001**	
230 VAC ± 15%							**VA-7700-1003**	
24 V ± 15%			Mechanical				**VA-7740-1001**	
230 VAC ± 15%							**VA-7740-1003**	
24 V ± 15%	Proportional models	0...10 VDC or 0(4)...20 mA	Electrical		Configurable		**VA-7706-1001**	
			Electrical and Mechanical				**VA-7746-1001**	

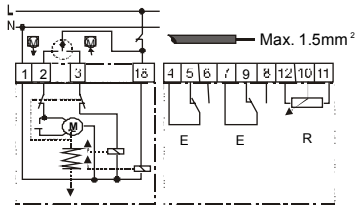
FA-1000 Control Valve Spring Return Actuator

Electric Valves and Actuators

FA-1000 Actuator with VG8000 (left) and VG7000 valve

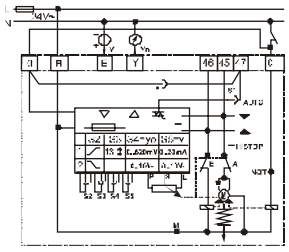


Dimensions



FA-1000 FA-1003 / -1005 only

3-Point Models



FA-1040

Proportional Models

Description

The FA-1000 series electro-hydraulic actuators are available for 3-point (floating) or with electronic positioner for 0…10 V or 0…20 mA control. It provides a fully variable valve aperture and features: calibrated pressure switches (specified close-off values), a power failure safety mechanism and a hand crank for manual override.

This actuator has a minimum force of 700 N; it can be used with VG8000, VBD and VG7000 series valves in accordance with the maximum close-off pressure settings specified.

The FA-1000 when delivered as a single unit is pre-set to facilitate installation with minimum adjustment. It is also available with a variety of options such as auxiliary switches and feedback potentiometers.

Features

- Power failure safety mechanism (spring return up).
- Uses hydraulic system with calibrated pressure switches.
- Models for 3-point and proportional 0…10 V or 0…20 mA control.
- Positioner with adjustable starting point, span, and direct / reverse action.
- Active 0…10 V feedback on proportional models.
- Hand crank.
- Special coupling clamp.
- Optional auxiliary switches and feedback potentiometers available.

K

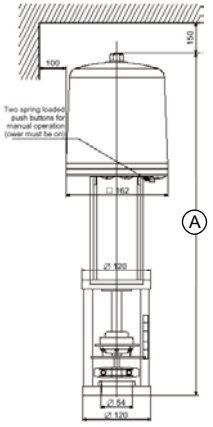
FA-1000 Spring return Electric Actuator Selection Table

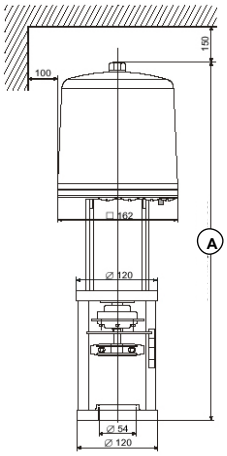
Supply Voltage	Action/Control	Nominal Force	Nominal Stroke	Nominal Running Speed	Valve Type	Type-Model* Number	
230 VAC	3-point	700 N	13 mm	120 s at 50 Hz	VG7000	**FA-1000-1101**	
					VG8000/VBD	**FA-1000-2101**	
24 V +10/-15%	Proportional				VG7000	**FA-1040-1106**	
					VG8000/VBD	**FA-1040-2106**	

* Models with aux. switches or feedback pot. meter on request.

FA-2000 Control Valve Spring Return Actuator

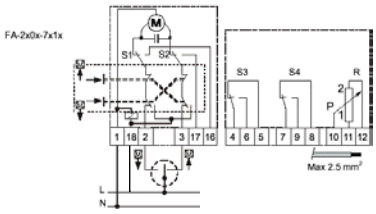
Electric Valves and Actuators



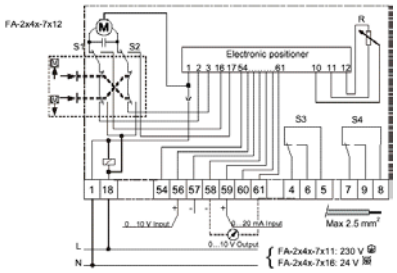


FA-2000 mounted on VG8000 flanged valve

	FA22/23/24	FA25/26/27
	A	+ Positioner
FA22/25	541	586
FA23/26	575	612
FA24/27	511	548



3-Point Models



Proportional Models

Description

The FA-2000 series electric actuators are available for 3-point control or with electronic positioner for 0…10 V or 0…20 mA control. It provides a fully variable valve aperture, a power failure spring return safety mechanism and an electrically operated manual override. Three models of the FA-2000 are available.
The FA-22 ("failsafe" position down = stem fully extended) and FA-25 ("failsafe" position up = stem fully retracted): this model pair has a 25 mm stroke and a minimum of 2400 N thrust.
The FA-23 ("failsafe" position down) and FA-26 ("failsafe" position up): this model pair has a 42 mm stroke of and a minimum thrust of 2200 N.
The FA-24 ("failsafe" position down) and FA-27 ("failsafe" position up): this model pair has a stroke of 13 mm and 2000 N minimum thrust.
The actuator can be combined with VG8000, VBB, and VBD series flanged valves in accordance with the maximum close-off pressure ratings specified.
The FA-2000, when delivered as a single unit, is pre-set to facilitate installation with minimum adjustment; it is also available with a variety of options such as auxiliary switches and feedback potentiometers.

Features

- Power failure safety mechanism (spring return).
- Visible calibration ring on stem coupling.
- Models for 3-point and proportional 0…10 V or 0…20 mA control.
- Positioner with adjustable: starting point, span and direct / reverse action.
- Active 0…10 V feedback on proportional models.
- Electrically operated manual override.
- Quick-fit coupling clamp.
- Optional auxiliary switches and feedback potentiometers available.

K

FA-2000 Spring return Electric Actuator Selection Table

Supply Voltage (50Hz)	Action/Control	Nominal Force	Nominal Stroke	Auxiliary contacts (2)	Close off direction	Type-Model Number	
24 VAC,	0..10 V proportional	2000 N	13 mm	2	Down	**FA-2441-7116**	
				2	Up	**FA-2741-7116**	
	3-point			-	Down	**FA-2400-7116**	
				-	Up	**FA-2700-7116**	
				2	Down	**FA-2401-7116**	
				2	Up	**FA-2701-7116**	
230 VAC	3-point			-	Down	**FA-2400-7111**	
				-	Up	**FA-2700-7111**	
				2	Down	**FA-2401-7111**	
				2	Up	**FA-2701-7111**	

FA-2000 Control Valve Spring Return Actuator (continued)

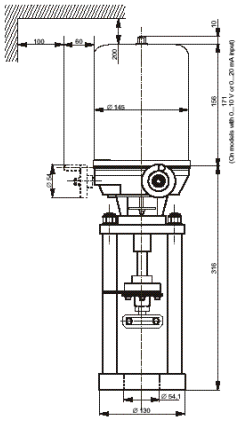
Electric Valves and Actuators

Supply Voltage (50Hz)	Action/Control	Nominal Force	Nominal Stroke	Auxiliary contacts (2)	Close off direction	Type-Model Number	
24 VAC,	0..10 V proportional	2400 N	25 mm	2	Down	**FA-2241-7516**	
				2	Up	**FA-2541-7516**	
	3-point			-	Down	**FA-2200-7516**	
				-	Up	**FA-2500-7516**	
				2	Down	**FA-2201-7516**	
				2	Up	**FA-2501-7516**	
230 VAC	3-point			-	Down	**FA-2200-7511**	
				-	Up	**FA-2500-7511**	
				2	Down	**FA-2201-7511**	
				2	Up	**FA-2501-7511**	
24 VAC,	0..10 V proportional	2200 N	42 mm	2	Down	**FA-2341-7416**	
				2	Up	**FA-2641-7416**	
	3-point			-	Down	**FA-2300-7416**	
				-	Up	**FA-2600-7416**	
				2	Down	**FA-2301-7416**	
				2	Up	**FA-2601-7416**	
230 VAC	3-point			-	Down	**FA-2300-7411**	
				-	Up	**FA-2600-7411**	
				2	Down	**FA-2301-7411**	
				2	Up	**FA-2601-7411**	

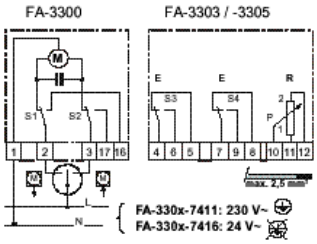
FA-3000 Control Valve Heavy Duty Actuator

Electric Valves and Actuators

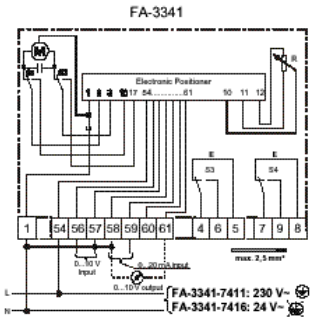
FA-3300 Actuator with VG8000 valve



Dimensions



3-Point Models



Proportional Models

Description

The FA-3300 series synchronous motor-driven, reversible, heavy duty actuators are available for 3-point (floating) or with electric positioner for 0…10 V or 0…20 mA control. They feature factory calibrated pressure switches to provide specified close-off ratings.

These actuators are available with 6000 N nominal force and can be used in combination with VG8000 and VBD series valves in accordance with the maximum close-off pressure ratings specified.

Factory fitted options, such as 2 kΩ feedback potentiometer and auxiliary switches are available. A hand wheel for manual positioning of the valve is standard on all models.

Features

- Uses synchronous motor with calibrated pressure limit switches.
- Special clamp coupler.
- Models for 3-point and proportional 0…10 V or 0…20 mA control.
- Positioner with adjustable starting point, span, and direct / reverse action.
- Active 0…10 V position feedback on proportional models.
- Optional auxiliary switches and feedback potentiometer available.
- A hand wheel is standard on all models.

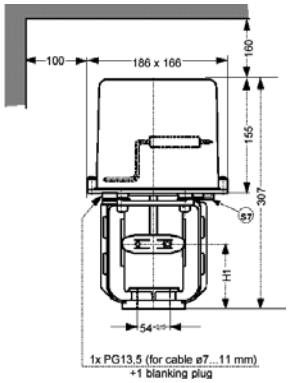
K

FA-3000 Electric Actuator Selection Table

Supply Voltage (50Hz)	Action/Control	Nominal Force	Nominal Stroke	Auxiliary contacts (2)	Potentiometer 2 kOhm	Type-Model Number	
24 VAC	0…10 V, Proportional	6000 N	42 mm	-	-	**FA-3340-7416**	
				YES	-	**FA-3341-7416**	
	3 point, Incremental			-	-	**FA-3300-7416**	
				YES	-	**FA-3301-7416**	
				YES	YES	**FA-3302-7416**	
230 VAC	3 point, Incremental			-	-	**FA-3300-7411**	
				YES	-	**FA-3301-7411**	
				YES	YES	**FA-3302-7411**	

RA-3000 Control Valve Actuator

Electric Valves and Actuators



	RA-3xxx-712x	RA-3xxx-722x	RA-3xxx-732x
H1	58 mm	66 mm	66 mm

Description

The RA-3000 series synchronous motor-driven reversible actuators are available for 3-point (floating) or with electric positioner for 0…10 V control. They feature factory calibrated pressure switches to provide specified close-off ratings.

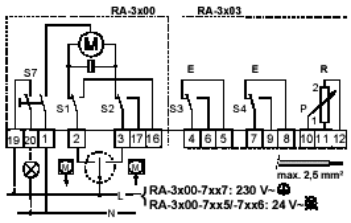
These actuators are available in three sizes with 1600 N, 1800 N and with 3000 N nominal force and can be used with JC flanged valves according to maximum close-off pressure ratings specified.

Factory fitted options, such as 2kΩ feedback potentiometer, auxiliary switches and hand crank are available.

Features

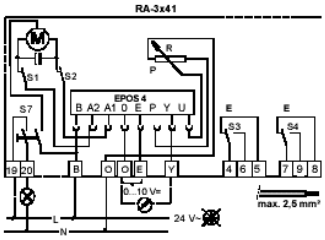
- Uses synchronous motor with pressure switches
- Special clamp coupler quick-fit system
- Models for 3-point and proportional 0…10 VDC control
- Positioner with adjustable starting point, span, and direct/reverse action
- Active 0…10 VDC position feedback on proportional models
- Optional auxiliary switches and feedback potentiometer available
- Optional hand crank

RA-3000 Actuator with VG8000N valve



3-Point Models

Dimensions



Proportional Models

RA-3000 Electric Actuator Selection Table

Supply Voltage (50/60Hz)	Action/Control	Nominal Force	Nominal Stroke	Auxiliary contacts (2)	Potentiometer 2 kOhm	Manual Override	Type-Model Number	
24 VAC	0…10 V	1600N	13 mm	YES	-	-	**RA-3041-7126**	
				YES	-	YES	**RA-3141-7126**	
	3 point			-	-	-	**RA-3000-7126**	
				YES	YES	-	**RA-3003-7126**	
				YES	YES	YES	**RA-3103-7126**	
230 VAC	3 point			-	-	-	**RA-3000-7127**	
				YES	YES	-	**RA-3003-7127**	
				YES	YES	YES	**RA-3103-7127**	
24 VAC	0…10 V	1800 N	25 mm	YES	-	-	**RA-3041-7226**	
				YES	-	YES	**RA-3141-7226**	
	3 point			-	-	-	**RA-3000-7226**	
				YES	YES	-	**RA-3003-7226**	
				YES	YES	YES	**RA-3103-7226**	
230 VAC	3 point			-	-	-	**RA-3000-7227**	
				YES	YES	-	**RA-3003-7227**	
				YES	YES	YES	**RA-3103-7227**	

K

RA-3000 Control Valve Actuator (continued)

Electric Valves and Actuators

RA-3000 Electric Actuator Selection Table (cont.)

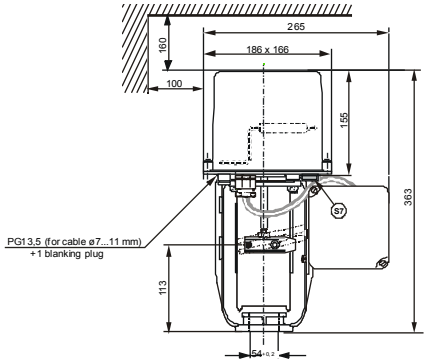
Supply Voltage (50Hz)	Action/ Control	Nominal Force	Nominal Stroke	Auxiliary contacts (2)	Potentiometer 2 kOhm	Manual Override	Type-Model Number	
24 VAC	0…10 V	3000N	42 mm	YES	-	-	**RA-3041-7326**	
				YES	-	YES	**RA-3141-7326**	
	3 point			-	-	-	**RA-3000-7326**	
				YES	YES	-	**RA-3003-7326**	
				YES	YES	YES	**RA-3103-7326**	
230 VAC	3 point			-	-	-	**RA-3000-7327**	
				YES	YES	-	**RA-3003-7327**	
				YES	YES	YES	**RA-3103-7327**	

K

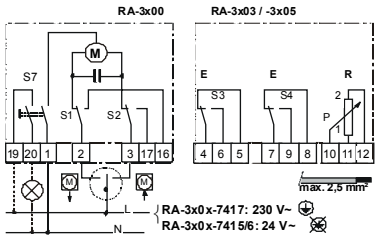
RA-3000-7410 Control Valve Actuator

Electric Valves and Actuators

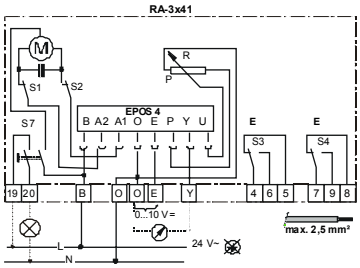
RA-3000-7410 Actuator with BD valve



Dimensions



3-Point Models



Proportional Models

Description

The RA-3000-7410 series synchronous motor-driven reversible actuators are available for 3-point (floating) or with electric positioner for 0…10 V control. They feature factory calibrated pressure switches to provide specified close-off ratings.

These actuators are available with 3000 N nominal force and can be used with BF, BD and BB series valves according to the maximum close-off pressure ratings specified.

The RA-3000-7410 series, electric actuators replace the EA-3000-7610 series, which has been discontinued.

Features

- Uses synchronous motor with force dependent end switches.
- Models for 3-point and proportional 0…10 V control.
- Positioner with adjustable starting point, span, and direct / reverse action.
- Active 0…10 VDC position feedback on proportional models.
- Optional hand wheel.

K

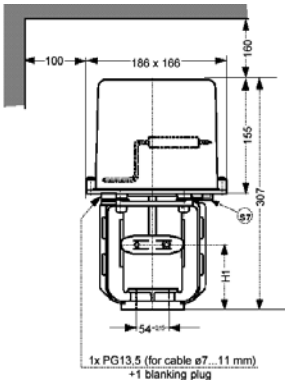
RA-3000-7410 Electric Actuator Selection Table

Supply Voltage (50Hz)	Action/Control	Nominal Force	Nominal Stroke	Auxiliary contacts (2)	Potentiometer 2 kOhm	Manual Override	Type-Model Number	
24 VAC	0…10 V	3000N	60 mm	YES	-	-	**RA-3041-7416**	
				YES	-	YES	**RA-3141-7416**	
	3 point			-	-	-	**RA-3000-7416**	
				YES	YES	-	**RA-3003-7416**	
				YES	YES	YES	**RA-3103-7416**	
230 VAC	3 point			-	-	-	**RA-3000-7417**	
				YES	YES	-	**RA-3003-7417**	
				YES	YES	YES	**RA-3103-7417**	

RA-3100-8026 Fast Running Control Valve Actuator

Electric Valves and Actuators

RA-3100 Actuator with VG8000N valve



	RA-31xx-8126	RA-31xx-8226
H1	58 mm	66 mm

Dimensions

Description

The RA-3100 series synchronous motor-driven reversible fast running actuators are available for 3-point (floating) or with electric positioner for 0…10 V control. They feature factory calibrated pressure switches to provide specified close-off ratings.

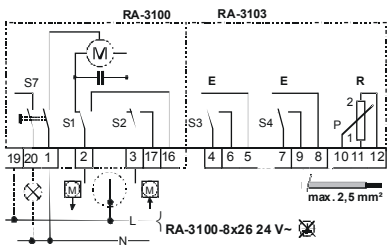
These actuators are available in two models of 1200 N nominal thrust with 13 mm stroke for size DN 15…DN 40 and 1700 N nominal thrust with 25 mm or 42 mm stroke for size DN 50…DN 150. They are intended for use with Johnson Controls flanged valves according to maximum close-off pressure ratings specified.

A hand crank for manual operation is standard.

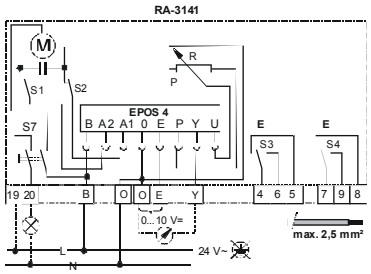
Factory fitted options, such as 2kΩ feedback potentiometer and auxiliary switches are available.

Features

- Fast Running
- Uses synchronous motor with pressure switches
- Special clamp coupler quick-fit system
- Models for 3-point and proportional 0…10 VDC control
- Positioner with adjustable starting point, span, and direct/reverse action
- Active 0…10 VDC position feedback on proportional models
- Optional auxiliary switches and feedback potentiometer available
- Hand crank for manual operation as standard



3-Point Models



Proportional Models

RA-3100 Electric Actuator Selection Table

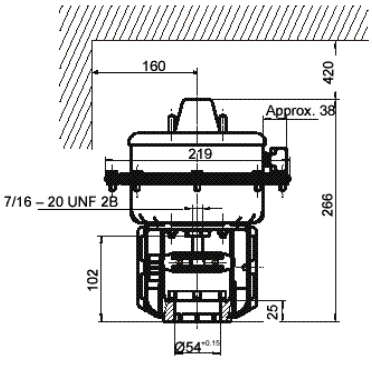
Supply Voltage (50/60Hz)	DN	Nominal Stroke	Nominal Force	Action/ Control	Auxiliary contacts (2)	Potentiometer 2 kOhm	Built-in electrinic Positioner 0…10 V	Type-Model Number	
24 VAC ±10% 50 Hz	15…40	13 mm	1200N	3 point or 0…10 V	-	-	-	**RA-3100-7126**	
					YES	YES	-	**RA-3103-7126**	
					YES	-	YES	**RA-3141-7126**	
24 VAC ±10% 50/60 Hz	50…80 100…150	25 mm 42 mm	1700N	3 point or 0…10 V	-	-	-	**RA-3100-7226**	
					YES	YES	-	**RA-3103-7226**	
					YES	-	YES	**RA-3141-7226**	

K

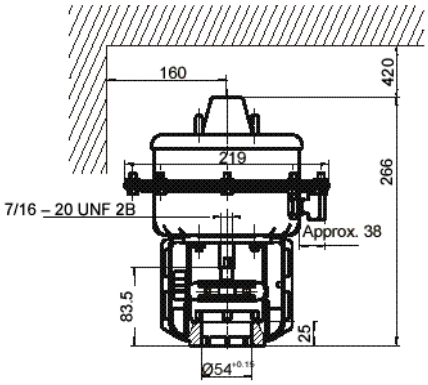
MP8000 Pneumatic Actuator

Pneumatic Valves and Actuators

MP8000 pneumatic actuator with positioner on VG8000 valve



Dimensions
Direct Acting Actuator



Dimensions
Reserve Acting Actuator

Description

The MP8000 series pneumatic valve-actuators are designed to accurately position valve plugs in larger chilled water, hot water and steam applications in response to a pneumatic signal from a controller. A pneumatic positioner is also available for use in applications where sequential operation is desired or more positioning power and accuracy are required. They can be ordered as a factory fitted and ready-to-install valve/actuator combination or separately for local installation.

This robust actuator can be combined with VBD and VG8000 series flanged valves in accordance with the maximum close-off pressure ratings specified.

Features

- Pneumatic positioner.
- Quick-fit coupler system.
- Action reversible in-situ.
- Optional hand wheel for factory or in-situ installation.
- Optional auxiliary switches and feedback potentiometer available.

K

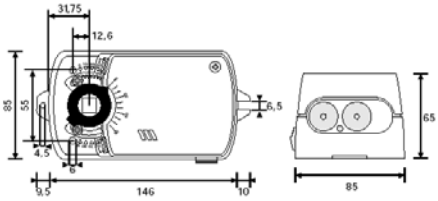
MP8000 Pneumatic Actuator Selection Table

Action Mode	Spring Range (kPa)	Nominal Stroke	Spring Force (N)	Type-Model Number	
Direct Acting	20 – 50	13 mm	220	**MP822C6020**	
	60 - 90		960	**MP822E6020**	
	60 - 90		960	**MP822E7020**	
Reverse Acting	20 – 50		320	**MP832C6020**	
	60 - 90		960	**MP832E6020**	

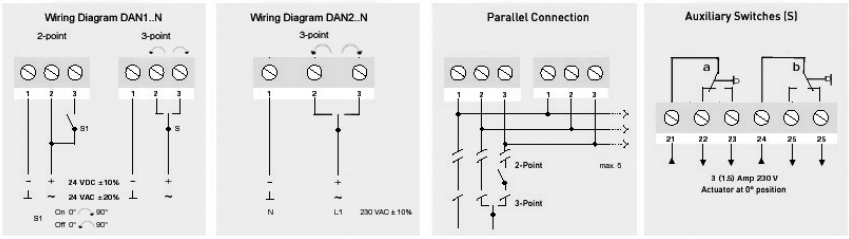
Silence 2- and 3-point Electric Actuator

Electric Damper Actuators

Silence 2- and 3-point Electric Actuator



Dimensions



Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 2 or 3-point control
- Power independent running time
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 6 to 16 mm dia. or adapter Z01DN... for Square spindles 8, 10, 11, 12 mm min. ax length 45 mm
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Silence 2- and 3-point Electric Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Control signals	2 x Adj. Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
						Joventa*	Johnson Controls
4Nm	35	0.8	2 or 3 point		24 VAC/DC	DAN1.N	M-9304-AGA-1N
				Yes		DAN1.SN	M-9304-AGC-1N
			3-point		230 VAC	DAN2.N	M-9304-ADA-1N
				Yes		DAN2.SN	M-9304-ADC-1N

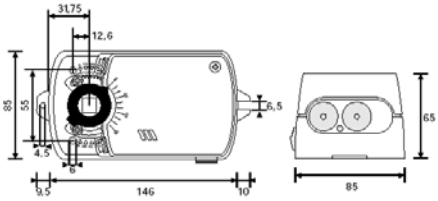
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

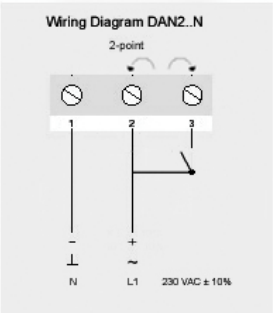
Silence 2-point Electric Actuator

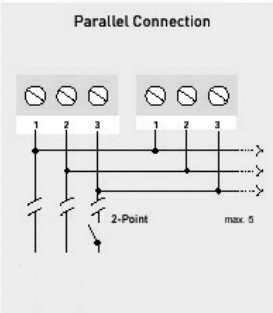
Electric Damper Actuators

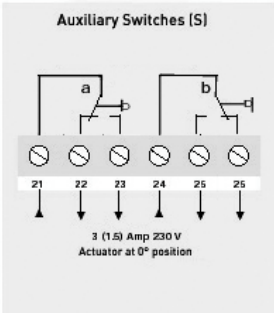
Silence 2-point Electric Actuator



Dimensions







Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 2 -point control
- Power independent running time
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 6 to 16 mm dia. or adapter Z01DN... for Square spindles 8, 10, 11, 12 mm min. ax length 45 mm.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Silence 2-point Electric Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Control signals	2 x Adj. Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
						Joventa*	
4Nm	35	0.8	2 point		230 VAC	**DAN2.C**	
				Yes		**DAN2.SC**	

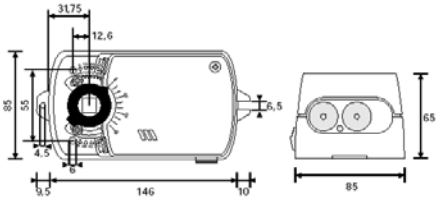
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

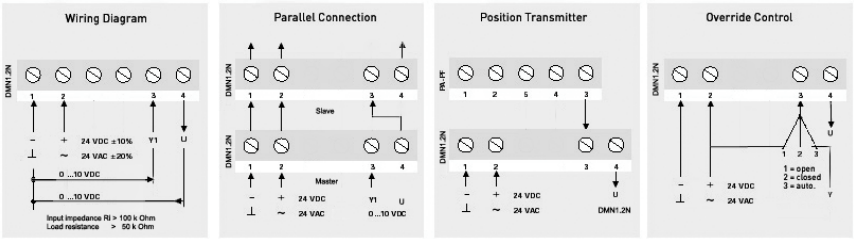
Silence Modulating Electric Actuator

Electric Damper Actuators

Silence Modulating Electric Actuator



Dimensions



Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~ spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 0 … 10 VDC control
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 6 to 16 mm dia. or adapter Z01DN... for Square spindles 8, 10, 1 1, 12 mm with min. 45 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Silence Modulating Electric Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Control signals	Supply Voltage (50/60Hz)	Type-Model Number	
					Joventa*	Johnson Controls
4Nm	35	0.8	0 … 10 VDC	24 VAC/DC	**DMN1.2N**	**M9304-GGA-1N**

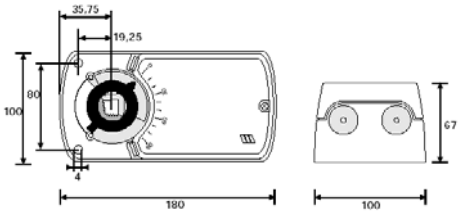
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

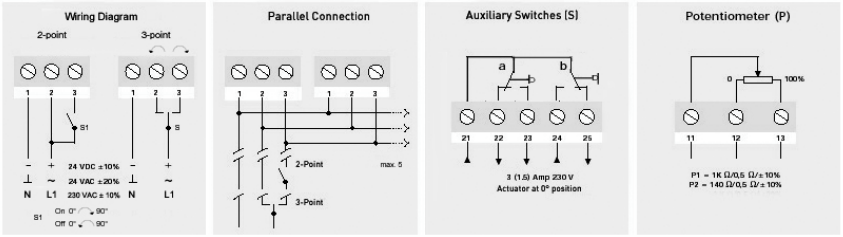
Standard 2- and 3-point Electric Actuator

Electric Damper Actuators

Standard 2- and 3-point Electric Actuator



Dimensions



Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~ spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 2 and 3-point control
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10 to 20 mm dia. or Square spindles 10 ...16 mm with min. 48 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Standard 2- and 3-point Electric Actuator Selection Table

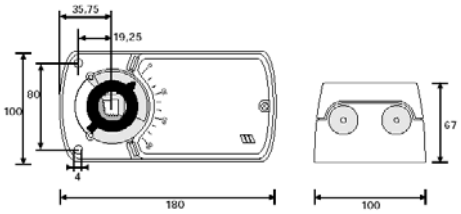
Torque	Running time (s)	Damper size (m^2)	Control signals	2 x Auxiliary contacts	Feed back Potentiometer	Supply Voltage (50/60Hz)	Type-Model Number	
							Joventa*	Johnson Controls
8Nm	30 … 45	1.5	2 and 3 point			24 VAC/DC	DAS1	**M9108-AGA-1**
				Yes			DAS1.S	**M9108-AGC-1**
					1 KOhm		DAS1.P1	**M9108-AGE-1**
					140 Ohm		DAS1.P2	**M9108-AGD-1**
						230 VAC	DAS2	**M9108-ADA-1**
				Yes			DAS2.S	**M9108-ADC-1**
					1 KOhm		DAS2.P1	**M9108-ADE-1**
					140 Ohm		DAS2.P2	**M9108-ADD-1**
16Nm	80 … 110	3	2 and 3 point			24 VAC/DC	DA1	**M9116-AGA-1**
				Yes			DA1.S	**M9116-AGC-1**
					1 KOhm		DA1.P1	**M9116-AGE-1**
					140 Ohm		DA1.P2	**M9116-AGD-1**
						230 VAC	DA2	**M9116-ADA-1**
				Yes			DA2.S	**M9116-ADC-1**
					1 KOhm		DA2.P1	**M9116-ADE-1**
					140 Ohm		DA2.P2	**M9116-ADD-1**
24Nm	125 … 160	4.5	2 and 3 point			24 VAC/DC	DAL1	**M9124-AGA-1**
				Yes			DAL1.S	**M9124-AGC-1**
					1 KOhm		DAL1.P1	**M9124-AGE-1**
					140 Ohm		DAL1.P2	**M9124-AGD-1**
						230 VAC	DAL2	**M9124-ADA-1**
				Yes			DAL2.S	**M9124-ADC-1**
					1 KOhm		DAL2.P1	**M9124-ADE-1**
					140 Ohm		DAL2.P2	**M9124-ADD-1**

* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

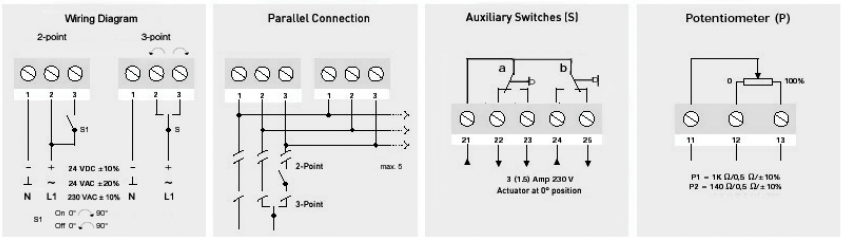
Standard 2- and 3-point Electric Actuator

Electric Damper Actuators

Standard 2- and 3-point Electric Actuator



Dimensions



Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~ spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 2 and 3-point control
- Load independent running time
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10 to 20 mm dia. or
  Square spindles 10 ...16 mm with min. 48 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Standard 2- and 3-point Electric Actuator Selection Table

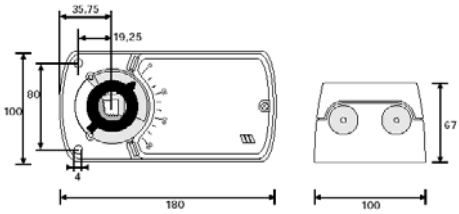
Torque	Running time (s)	Damper size (m^2)	Control signals	2 x Auxiliary contacts	Feed back Potentio-meter	Supply Voltage (50/60Hz)	Type-Model Number	
							Joventa*	Johnson Controls
32 Nm	140	6	2 and 3 point			24 VAC/DC	**DAG1**	**M9132-AGA-1**
				Yes			**DAG1.S**	**M9132-AGC-1**
					1 K Ohm		**DAG1.P1**	**M9132-AGE-1**
					140 Ohm		**DAG1.P2**	**M9132-AGD-1**
					2 K Ohhm			**M9132-AGF-1**
						230 VAC	**DAG2**	**M9132-ADA-1**
				Yes			**DAG2.S**	**M9132-ADC-1**
					1 K Ohm		**DAG2.P1**	**M9132-ADE-1**
					140 Ohm		**DAG2.P2**	**M9132-ADD-1**
					2 K Ohhm			**M9132-ADF-1**

* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

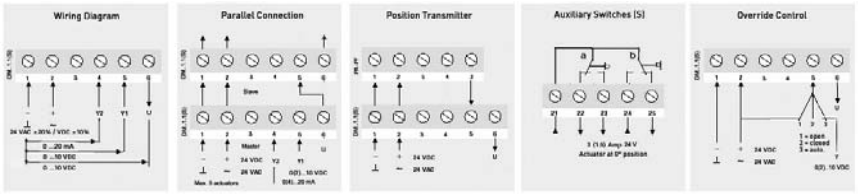
Standard Modulating Electric Actuator

Electric Damper Actuators

Standard Modulating Electric Actuator



Dimensions



Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~ spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 0(2)…10 VDC and 0(4)…20 mA control
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10 to 20 mm dia. or
  Square spindles 10 ...16 mm with min. 48 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Standard Modulating Electric Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Signals			2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
			Y1	Y2	U			Joventa*	Johnson Controls
8Nm	30…45	1.5	0(2)…10 VDC	0(4)…20 mA	0(2)…10 VDC		24 VAC/DC	DMS1.1	M9108-GGA-1
						Yes		DMS1.1S	M9108-GGC-1
16 Nm	80…110	3						DM1.1	M9116-GGA-1
						Yes		DM1.1S	M9116-GGC-1
24 Nm	125…160	4.5						DML1.1	M91024-GGA-1
						Yes		DML1.1S	M9124-GGC-1

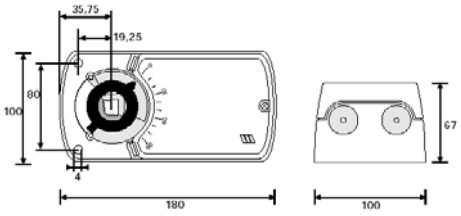
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

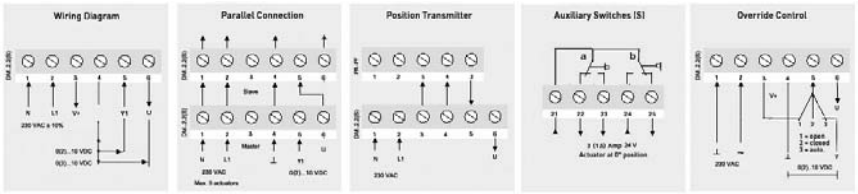
Standard Modulating Electric Actuator

Electric Damper Actuators

Standard Modulating Electric Actuator



Dimensions



Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~ spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 0(2)…10 VDC control
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10 to 20 mm dia. or
  Square spindles 10 ...16 mm with min. 48 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Standard Modulating Electric Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Signals			2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
			Y1	Y2	U			Joventa*	Johnson Controls
8Nm	30…45	1.5	0(2)…10 VDC	None	0(2)…10 VDC		230 VAC	DMS2.2	M9108-GDA-1
						Yes		DMS2.2S	M9108-GDC-1
16 Nm	80…110	3						DM2.2	M9116-GDA-1
						Yes		DM2.2S	M9116-GDC-1
24 Nm	125…160	4.5						DML2.2	M9124-GDA-1
						Yes		DML2.2S	M9124-GDC-1

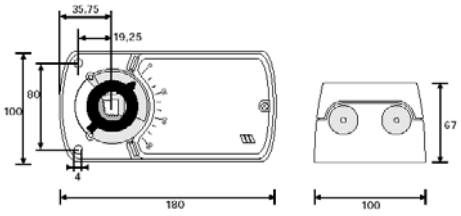
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

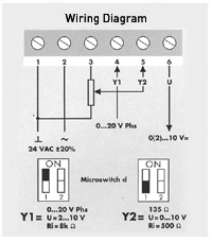
Standard Modulating Electric Actuator

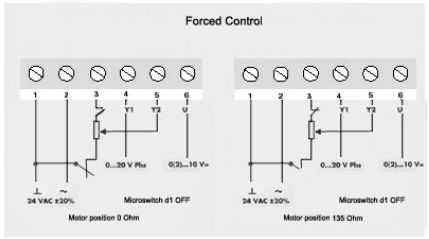
Electric Damper Actuators

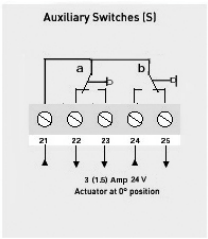
Standard Modulating Electric Actuator



Dimensions







Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~ spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 0…20 V Phasecut or 0…135 Ohm potentiometer
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10 to 20 mm dia. or
  Square spindles 10 ...16 mm with min. 48 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Standard Modulating Electric Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Control signals	2 x adjustable auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
						Joventa*	Johnson Controls
8Nm	30…45	1.5	0…20 V Phs or 0…135 Ohm Pot.meter		24 VAC/DC	DMS1.3	M9108-JGA-1
				Yes		DMS1.3S	M9108-JGC-1
16 Nm	80…110	3				DM1.3	M9116-JGA-1
				Yes		DM1.3S	M9116-JGC-1
24 Nm	125…160	4.5				DML1.3	M9124-JGA-1
				Yes		DML1.3S	M9124-JGC-1

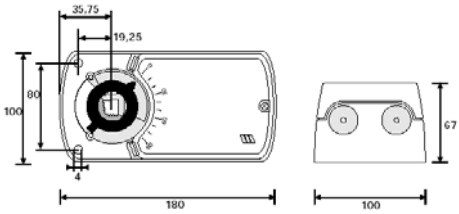
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

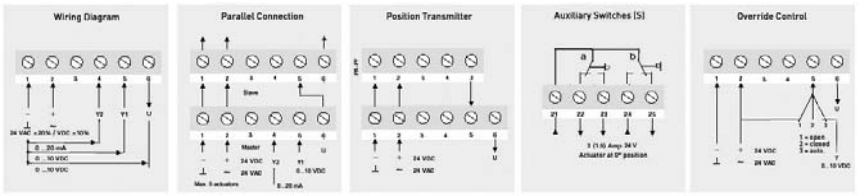
Standard Modulating Electric Actuator

Electric Damper Actuators

Standard Modulating Electric Actuator



Dimensions



Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~ spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 0…10 VDC and 0…20 mA control
- Load-independent running time
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10 to 20 mm dia. or
  Square spindles 10 ...16 mm with min. 48 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Standard Modulating Electric Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Signals			2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
			Y1	Y2	U			Joventa*	Johnson Controls
32 Nm	140	6	0…10 VDC	0…20 mA	0…10 VDC		24 VAC/DC	**DMG1.1**	**M9132-CGA-1**
						Yes		**DMG1.1S**	**M9132-CGC-1**

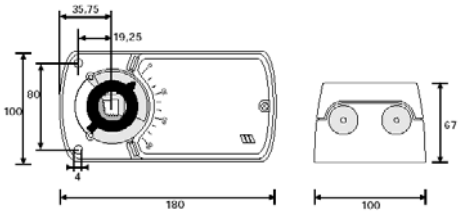
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

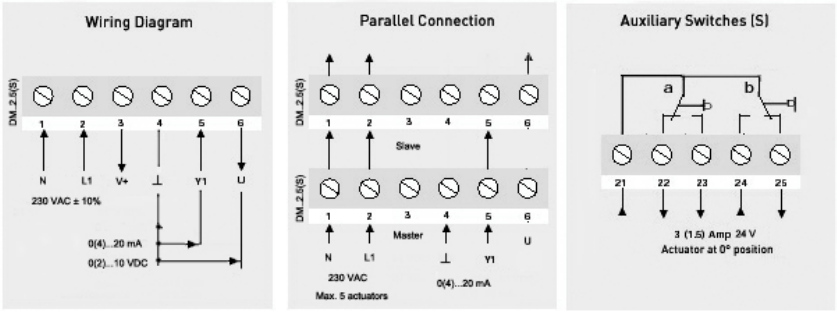
Standard Modulating Electric Actuator

Electric Damper Actuators

Standard Modulating Electric Actuator



Dimensions



Wiring Diagrams

Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA~ spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 0(4)…20 mA control
- Load-independent running time
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10 to 20 mm dia. or
  Square spindles 10 ...16 mm with min. 48 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Standard Modulating Electric Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Signals			2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
			Y1	Y2	U			Joventa*	Johnson Controls
8Nm	30…45	1.5	0(4)...20 mA Ri> 100 Ohm	None	0(2)...10 VDC Ri > 50 Ohm		230 VAC	DMS2.5	M9108-GDA-1.01
						Yes		DMS2.5S	M9108-GDC-1.01
16 Nm	80…110	3						DM2.5	M9116-GDA-1.01
						Yes		DM2.5S	M9116-GDC-1.01
24 Nm	125…160	4.5						DML2.5	M9124-GDA-1.01
						Yes		DML2.5S	M9124-GDC-1.01

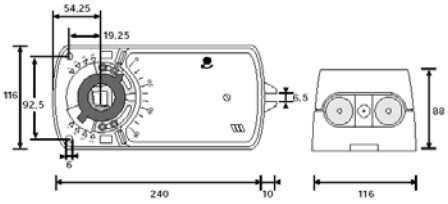
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

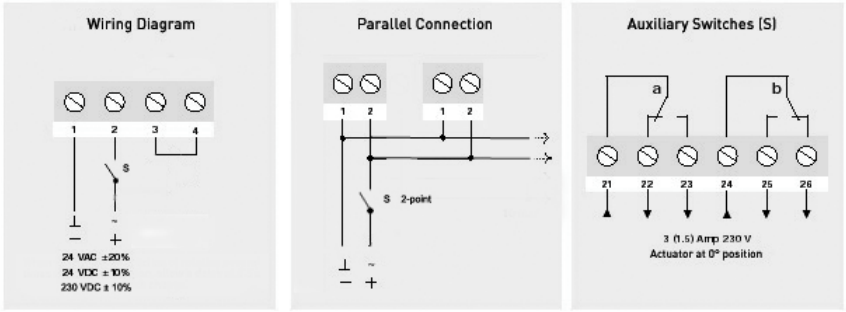
Spring-return 2-point Electric Actuator

Electric Damper Actuators

Spring-return 2-point Electric Actuator



Dimensions



Wiring

Application
JOVENTA electric actuators have been specially designed for the motorised operation of safety dampers for purposes such as frost protection, smoke protection and tight sealing. As the actuator moves the damper to its normal operating position it also tensions the integral closing spring.
Should the power supply to the actuator be interrupted, the stored energy in the spring will immediately move the damper to the safe position.
The manual locking is cancelled automatically when the actuator is operated electrically.

Key Features
- 2-point control
- Screw terminal connections
- Paralleling of up to 5 actuators possible
- Universal adapter for:
  Round spindles from 10...20 mm dia.
  Square spindles 10 ...16 mm with min. 77 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by spindle
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Spring-return 2-point Electric Actuator Selection Table

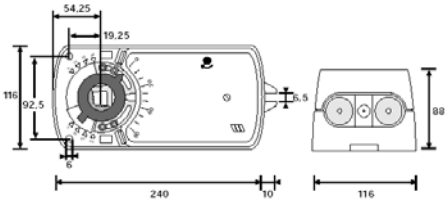
Torque	Running time (s)		Damper size (m^2)	Control signals	2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
	motor	spring					Joventa*	Johnson Controls
16 Nm	90 … 120	10	3	2 point		24 VAC/DC	DA1.F	M9216-BGA-1
					Yes		DA1.FS	M9216-BGC-1
						230 VAC	DA2.F	M9216-BDA-1
					Yes		DA2.FS	M9216-BDC-1

* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

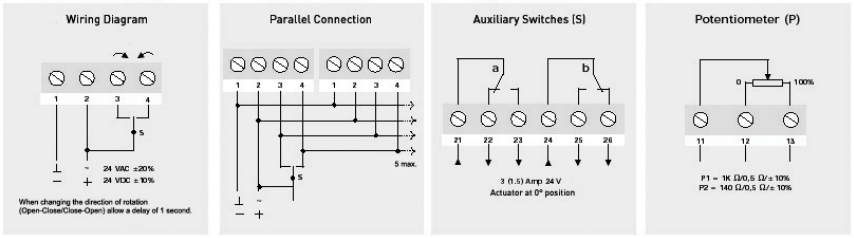
Spring-return 3-point Electric Actuator

Electric Damper Actuators

Spring-return 3-point Electric Actuator



Dimensions



Wiring Diagrams

Application
JOVENTA electric actuators have been specially designed for the motorised operation of safety dampers for purposes such as frost protection, smoke protection and tight sealing. As the actuator moves the damper to its normal operating position it also tensions the integral closing spring.
Should the power supply to the actuator be interrupted, the stored energy in the spring will immediately move the damper to the safe position.
The manual locking is cancelled automatically when the actuator is operated electrically.

Key Features
- 3-point control
- Screw terminal connections
- Paralleling of up to 5 actuators possible
- 2 floating auxiliary switches
- Feedback potentiometer
- Universal adapter for:
  Round spindles from 10...20 mm dia.
  Square spindles 10 ...16 mm with min. 77 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual positioning with crank handle
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Spring-return 3-point Electric Actuator Selection Table

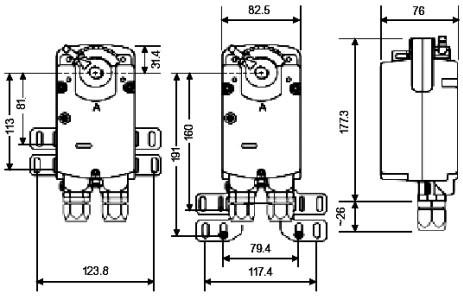
Torque	Running time (s)		Damper size (m^2)	Control signals	2 x Auxiliary contacts	Feed back Potentiometer	Supply Voltage (50/60Hz)	Type-Model Number	
	motor	spring						Joventa*	Johnson Controls
16 Nm	90 … 120	10	3	3 point			24 VAC/DC	DA1.4F	M9216-AGA-1
					Yes			DA1.4FS	M9216-AGC-1
						1000 Ohm		DA1.4FP1	M9216-AGE-1
						140 Ohmn		DA1.4FP2	M9216-AGD-1
						2000 Ohm			M9216-AGF-1

* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

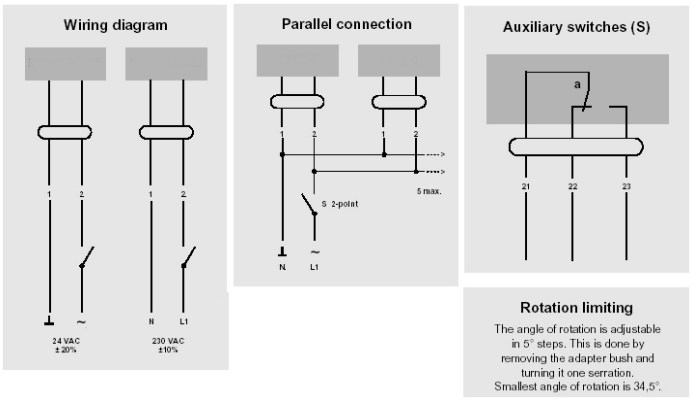
Spring-return 2-point Electric Actuator

Electric Damper Actuators

Spring-return 2-point Electric Actuator



Dimensions



Wiring Diagrams

Application

The JOVENTA SPRINGBACK electric actuator series is specially designed for the motorization of safety dampers with the purpose of frost protection, smoke protection and tight sealing.
When the control signal is applied the actuator drives the damper to the operational position, while evenly tensioning the integrated spring. Should the power supply to the actuator be interrupted, the stored energy in the spring will immediately move the damper to the safety position.
The compact design and universal adapter fitted with limitation of rotation angle make this actuator highly versatile.

Key Features

- 2-point control
- Electrical connections with
- halogen-free cable 1.2 m
- Up to 5 actuators in parallel
- operation possible
- Simple direct-mount with universal adapter from Ø10...16 mm shaft or square shaft from 10...14 mm. Minimum damper shaft of 45 mm length
- Selectable direction of rotation
- Limitation of rotation angle
- 1 variable auxiliary switch.
- Automatic shut-off at end position (overload switch)
- Energy saving at end positions
- Customer versions available
- Devices meet CE requirements

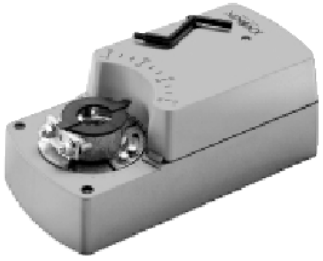
L

Spring-return 2-point Electric Actuator Selection Table

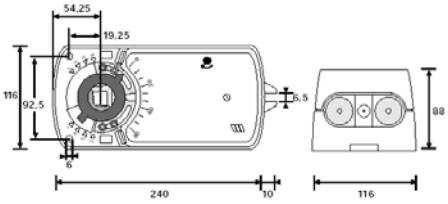
Torque	Running time (s)		Damper size (m^2)	Control signals	1 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
	motor	spring					Joventa	Johnson Controls
6 Nm	10...40	35...70	1.1	2 point		24 VAC	**DAF1.06**	**M9206-BGA-1S**
					Yes		**DAF1.06S**	**M9206-BGB-1S**
	10...65					230 VAC	**DAF2.06**	**M9206-BDA-1S**
					Yes		**DAF2.06S**	**M9206-BDB-1S**

Spring-return Modulating Electric Actuator

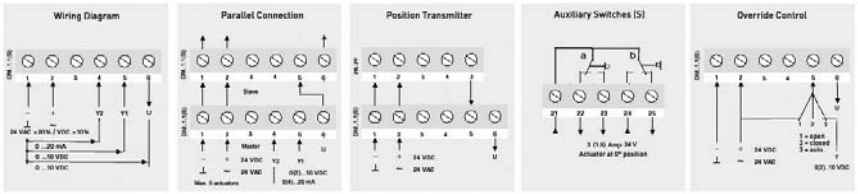
Electric Damper Actuators



Spring-return Modulating Electric Actuator



Dimensions



Wiring Diagrams

Application
JOVENTA electric actuators have been specially designed for the motorised operation of safety dampers for purposes such as frost protection, smoke protection and tight sealing. As the actuator moves the damper to its normal operating position it also tensions the integral closing spring.
Should the power supply to the actuator be interrupted, the stored energy in the spring will immediately move the damper to the safe position.
The manual locking is cancelled automatically when the actuator is operated electrically.

Key Features
- 0…10 VDC or 0…20 mA control
- Load-independent running time
- Up to 5 actuators in parallel
- Screw terminal connections
- 2 floating auxiliary switches
- Universal adapter for:
  Round spindles from 10...20 mm dia.
  Square spindles 10 ...16 mm with min. 77 mm ax length.
- Choice of rotation
- Angle-of-rotation limiting
- Manual positioning with crank handle
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Spring-return Modulating Electric Actuator Selection Table

Torque	Running time (s)		Damper size (m^2)	Control signals		2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
	motor	spring		Y1	Y2			Joventa*	Johnson Controls
16 Nm	90	10	3	0…10 VDC	0 … 20 mA		24 VAC/VDC	DM1.1F	M9216-HGA-1R
						Yes		DM1.1FS	M9216-HGC-1R

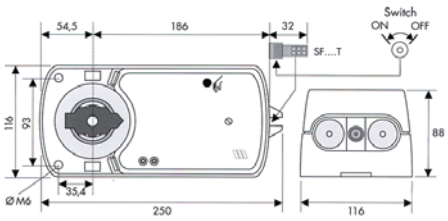
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

Security Fire Spring-return 2-point Actuators for Safety Dampers

Electric Damper Actuators

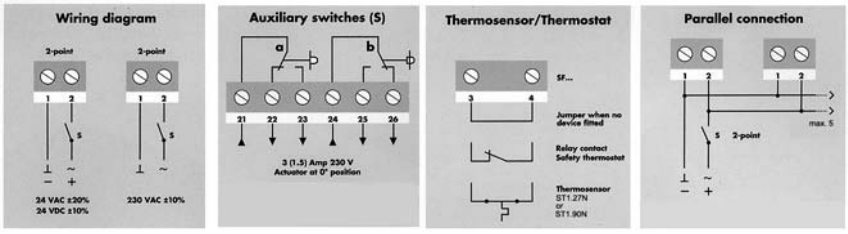
Security Fire Spring-return 2-point Actuators for Safety Dampers



Dimensions

Application
JOVENTA' S electric actuator have been specially designed for the motorised operation of safety dampers for purposes such as fire protection, smoke protection and tight sealing. As the actuator, moves the damper to its normal operating closing spring. Should the power supply to the actuator be interrupted, the stored energy in the spring will immediately move the damper to the safe position (damper close).
The manual locking is cancelled automatically when the actuator is operated electrically.

Key Features
- 2-point control
- 2 adjustable auxiliary switches
- 10/1 1/12/14 mm Square shaft adapter
- Direct connection of thermal sensor ST 1.72 or ST1.90 for duct interior temperature monitoring ca. 72°C or 90 °C
- Actuator thermal sensor for ambient temperature monitoring ca. 72°C
- Screw terminal connections
- Choice of rotation
- Angle-of-rotation limiting
- Manual positioning with crank handle
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval



Wiring Diagrams

Security Fire Spring-return 2-point Actuators for Safety Dampers Selection Table

Torque	Running time (s) motor	Running time (s) spring	Damper size	Control signal	2 x Adjustable Auxiliary contacts	Square Shaft Size (mm)	Thermo-sensor	Angle Rotation °	Spring return direction	Supply Voltage (50/60Hz)	Type-Model Number	
16 Nm	90..120	10	According to manufacturer's instructions	2-point	Yes	10		90	Left	24VAC/VDC	**SFL1.90/10**	
							T				**SFL1.90T/10**	
						11					**SFL1.90/11**	
							T				**SFL1.90T/11**	
						12					**SFL1.90/12**	
							T				**SFL1.90T/12**	
						14					**SFL1.90/14**	
							T				**SFL1.90T/14**	
						10			Right		**SFR1.90/10**	
							T				**SFR1.90T/10**	
						11					**SFR1.90/11**	
							T				**SFR1.90T/11**	
						12					**SFR1.90/12**	
							T				**SFR1.90T/12**	
						14					**SFR1.90/14**	
							T				**SFR1.90T/14**	

Continued on next page.

Security Fire Spring-return 2-point Actuators for Safety Dampers (cont.)

Electric Damper Actuators

Security Fire Spring-return 2-point Actuators for Safety Dampers Selection Table

Torque	Running time (s)		Damper size	Control signal	2 x Adjustable Auxiliary contacts	Square Shaft Size (mm)	Thermo-sensor	Angle ° Rotation	Spring return direction	Supply Voltage (50/60Hz)	Type-Model Number	
	motor	spring										
16 Nm	90..120	10	According to manufacturer's instructions	2-point	Yes	10		90	Left	230 VAC	**SFL2.90/10**	
							T				**SFL2.90T/10**	
						11					**SFL2.90/11**	
							T				**SFL2.90T/11**	
						12					**SFL2.90/12**	
							T				**SFL2.90T/12**	
						14					**SFL2.90/14**	
							T				**SFL2.90T/14**	
						10			Right		**SFR2.90/10**	
							T				**SFR2.90T/10**	
						11					**SFR2.90/11**	
							T				**SFR2.90T/11**	
						12					**SFR2.90/12**	
							T				**SFR2.90T/12**	
						14					**SFR2.90/14**	
							T				**SFR2.90T/14**	
10 Nm	120…150	10	According to manufacturer's instructions	2-point	Yes	10		180	Left	24VAC/VDC	**SFL1.180/10**	
							T				**SFL1.180T/10**	
						11					**SFL1.180/11**	
							T				**SFL1.180T/11**	
						12					**SFL1.180/12**	
							T				**SFL1.180T/12**	
						14					**SFL1.180/14**	
							T				**SFL1.180T/14**	
						10			Right		**SFR1.180/10**	
							T				**SFR1.180T/10**	
						11					**SFR1.180/11**	
							T				**SFR1.180T/11**	
						12					**SFR1.180/12**	
							T				**SFR1.180T/12**	
						14					**SFR1.180/14**	
							T				**SFR1.180T/14**	

Continued on next page.

L

Security Fire Spring-return 2-point Actuators for Safety Dampers (cont.)

Electric Damper Actuators

Security Fire Spring-return 2-point Actuators for Safety Dampers Selection Table

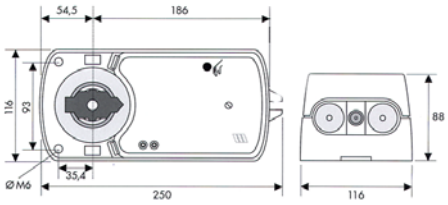
Torque	Running time (s)		Damper size	Control signal	2 x Adjustable Auxiliary contacts	Square Shaft Size (mm)	Thermo-sensor	Angle ° Rotation	Spring return direction	Supply Voltage (50/60Hz)	Type-Model Number	
	motor	spring										
10 Nm	120...150	10	According to manufacturer's instructions	2-point	Yes	10		180	Left	230 VAC	**SFL2.180/10**	
							T				**SFL2.180T/10**	
						11					**SFL2.180/11**	
							T				**SFL2.180T/11**	
						12					**SFL2.180/12**	
							T				**SFL2.180T/12**	
						14					**SFL2.180/14**	
							T				**SFL2.180T/14**	
						10			Right		**SFR2.180/10**	
							T				**SFR2.180T/10**	
						11					**SFR2.180/11**	
							T				**SFR2.180T/11**	
						12					**SFR2.180/12**	
							T				**SFR2.180T/12**	
						14					**SFR2.180/14**	
							T				**SFR2.180T/14**	

L

Security Smoke 2-point Safety Actuators for Smoke Dampers

Electric Damper Actuators

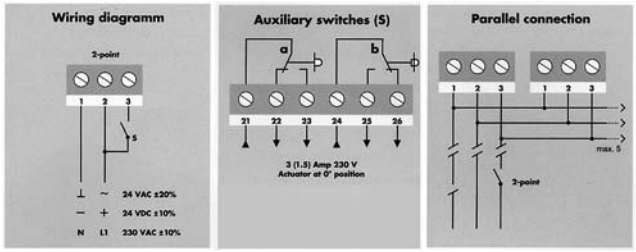
Security Smoke 2-point Safety Actuators for Smoke Dampers



Dimensions

Application
JOVENTA' S Series SE.. electric actuators have been designed specifically for the motorised Operation of smoke extraction dampers. The actuator drives the damper to the safe position (damper open).
In the event of a power failure and at the end position the gearing is interlocked mechanically. This means that the actuator satisfies the requirements of DIN V 1 8232 T6. The form-fit adapter with a position indicator is an especially useful feature.

Key features
- 2-point control
- Load-independent running time
- 2 floating auxiliary switches
- 10/11/12/14 mm square form-fitsteel adapter
- Screw terminals
- Manual positioning with crank handle
- Mechanical interlocking
- Power saving at end position
- Customising available
- CE approval



Wiring Diagrams

Security Smoke 2-point Safety Actuators for Smoke Dampers Selection Table

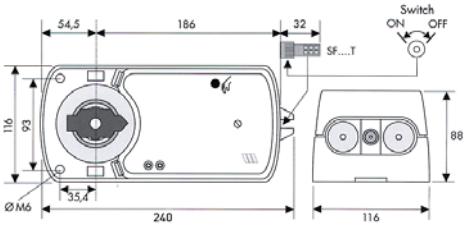
Torque	Running time (s)		Damper size	Control signals	2 x Auxiliary contacts	Direction of Rotation	Angle of Rotation°	Square form-fit adapter	Supply Voltage (50/60Hz)	Type-Model Number	
	Open	Close									
40 Nm	60	60	As specified by the manufacturer	2-point	Yes	Left	90	10	24VAC/VDC	**SEL1.90/10**	
								11		**SEL1.90/11**	
								12		**SEL1.90/12**	
								14		**SEL1.90/14**	
						Right	90	10		**SER1.90/10**	
								11		**SER1.90/11**	
								12		**SER1.90/12**	
								14		**SER1.90/14**	
						Left	90	10	230VAC	**SEL2.90/10**	
								11		**SEL2.90/11**	
								12		**SEL2.90/12**	
								14		**SEL2.90/14**	
						Right	90	10		**SER2.90/10**	
								11		**SER2.90/11**	
								12		**SER2.90/12**	
								14		**SER2.90/14**	

L

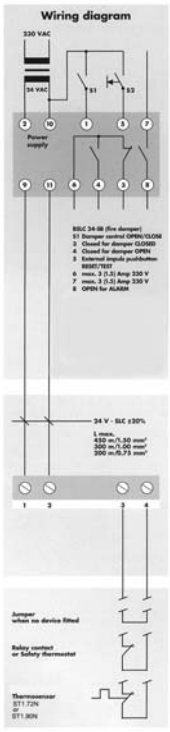
Security fire SLC Safety System for Safety Dampers

Electric Damper Actuators

Security fire SLC Safety System for Safety Dampers



Dimensions



Wiring Diagram

Application
The electrically powered spring-return actuators of the JOVENTA range have been designed specially for motorising safety dampers such as those that offer protection against fire and smoke and for other similar purposes.
As the actuator is moving the damper to its operating position, it also tensions a built-in spring. Should the power supply be interrupted subsequently for any reason, the damper will be moved to the safe position immediately by means of the energy stored in the spring.
The manual locking is released automatically when the actuator is operated electrically.

Key Features
- 24 volts power supply
- minimum installation cost
- 10/11/12/14 mm square form-fitsteel adapter
- Screw terminals
- 2-wire conductors, interchangeable
- no wiring errors
- Relay outputs for linking to building management systems
- Direct connection of thermol sensor ST1.72N or ST1.90N for duct interior temperature monitoring ca. 72°C or 90 °C
- Actuator thermal sensor for ambient temperature monitoring ca. 72°C
- Manua control with crank handle
- Power saving at end stops
- Maintenance-free
- Customising available
- CE approval

Safety Module

L

Description	Supply Voltage (50/60 Hz)	Type Number	
For fire damper	24 VAC	**BSLC 24-SB**	

Security fire SLC Safety System for Safety Dampers Selection Table

Torque	Running time (s) motor	Running time (s) spring	Damper size	Control signal	2 x Adjustable Auxiliary contacts	Square Shaft Size (mm)	Thermo-sensor	Angle ° Rotation	Spring return direction	Supply Voltage (50/60Hz)	Type-Model Number	
16 Nm	90	10	According to manufacturer's instructions	SLC	Yes	10		90	Left	24V from Safety Module	**SFL1.90SLC/10**	
							T				**SFL1.90T SLC /10**	
						11					**SFL1.90 SLC /11**	
							T				**SFL1.90T SLC /11**	
						12					**SFL1.90 SLC /12**	
							T				**SFL1.90T SLC /12**	
											SFL1.90 SLC /14	
							T				**SFL1.90T SLC /14**	
10 Nm	120					10		180			**SFL1.180 SLC /10**	
							T				**SFL1.180T SLC /10**	
						11					**SFL1.180 SLC /11**	
							T				**SFL1.180T SLC /11**	
						12					**SFL1.180 SLC /12**	
							T				**SFL1.180T SLC /12**	
											SFL1.180 SLC /14	
							T				**SFL1.180T SLC 14**	

Continued on next page.

Security fire SLC Safety System for Safety Dampers (cont.)

Electric Damper Actuators

Security fire SLC Safety System for Safety Dampers Selection Table (continued)

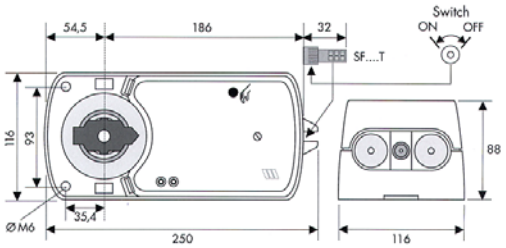
Torque	Running time (s)		Damper size	Control signal	2 x Adjustable Auxiliary contacts	Square Shaft Size (mm)	Thermo-sensor	Angle ° Rotation	Spring return direction	Supply Voltage (50/60Hz)	Type-Model Number	
	motor	spring										
16 Nm	90	10	According to manufacturer's instructions	SLC	Yes	10		90	Right	24V from Safety Module	SFR1.90 SLC /10	
							T				SFR1.90T SLC /10	
						11					SFR1.90 SLC /11	
							T				SFR1.90T SLC /11	
						12					SFR1.90 SLC /12	
							T				SFR1.90T SLC /12	
											SFR1.90 SLC /14	
							T				SFR1.90T SLC /14	
10 Nm	120					10		180			SFR1.180 SLC /10	
							T				SFR1.180T SLC /10	
						11					SFR1.180 SLC /11	
							T				SFR1.180T SLC /11	
						12					SFR1.180 SLC /12	
							T				SFR1.180T SLC /12	
											SFR1.180 SLC /14	
							T				SFR1.180T SLC /14	

L

Security Smoke SLC Safety System for Safety Dampers

Electric Damper Actuators

Security Smoke SLC Safety System for Safety Dampers



Dimensions

Wiring Diagrams

Application
JOVENTA' S Series SE.. electric actuators have been designed specifically for the motorised Operation of smoke extraction dampers. The actuator drives the damper to the safe position (damper open).
In the event of a power failure and at the end position the gearing is interlocked mechanically. This means that the actuator satisfies the requirements of DIN V 1 8232 T6. The form-fit adapter with a position indicator is an especially useful feature.

Key Features
- 24 volts power supply from safety module
- minimum installation cost
- 10/11/12/14 mm square form-fitsteel adapter
- Screw terminals
- 2-wire conductors, interchangeable
- no wiring errors
- Relay outputs for linking to building management systems
- Manua control with crank handle
- Power saving at end stops
- Maintenance-free
- Customising available
- CE approval

Safety Module

Description	Supply Voltage (50/60 Hz)	Type Number	
For smoke damper	24 VAC	BSLC 24-SR	

L

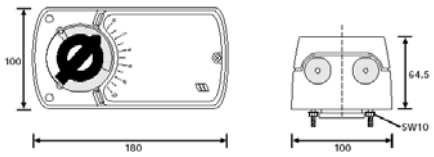
Security Smoke SLC Safety System for Safety Dampers Selection Table

Torque	Running time (s)		Damper size	Control signals	2 x Auxiliary contacts	Direction of Rotation	Angle of Rotation°	Square form-fit adapter	Supply Voltage (50/60Hz)	Type-Model Number	
	Open	Close									
40 Nm	60	60	As specified by the manufacturer	SLC	Yes	Left	90	10	24V from Safety Module	**SEL1.90SLC/10**	
								11		**SEL1.90 SLC /11**	
								12		**SEL1.90 SLC /12**	
								14		**SEL1.90 SLC /14**	
						Right	90	10		**SER1.90 SLC /10**	
								11		**SER1.90 SLC /11**	
								12		**SER1.90 SLC /12**	
								14		**SER1.90 SLC /14**	

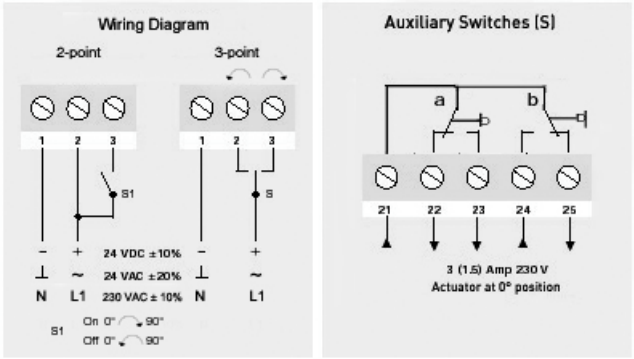
Valve 2 and 3-point Electric Mixing Actuator

Electric Damper Actuators

Valve 2 and 3-point Electric Mixing Actuator



Dimensions



Wiring Diagrams

Application
JOVENTA electric actuators have been specially designed for the motorised operation of various types of water valves and fittings such as mixing valves, butterfly valves and ball valves. The mechanical design of the actuators is such that, with the aid of mounting kits, they can be used on many different types of valves and fittings. The universal coupling between the actuator and the final controlling element is simplicity itself to use since it provides both; a positive drive and flexibility.

Key Features
- 2 and 3-point control
- Load independent running time
- Screw terminal connections
- Universal adapter with knob for manual operation and position indication
- Reversible
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Accessories for mixer mounting kits
- ZMA001 for Esbe mixers
- ZMA002 for Centra-Duplex mixers
- ZMA003 for Holter mixers
- ZMA004 for GF ball valves

Valve 2 and 3-point Electric Mixing Actuator Selection Table

Torque	Running time (s)	Control signals	2 x Auxiliary contacts		Supply Voltage (50/60Hz)	Type-Model Number *	
16 Nm	120	2- and 3-point			24 VAC	**MA1**	
			Yes			**MA1.S**	
					230 VAC	**MA2**	
			Yes			**MA2.S**	

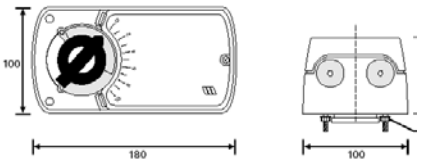
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

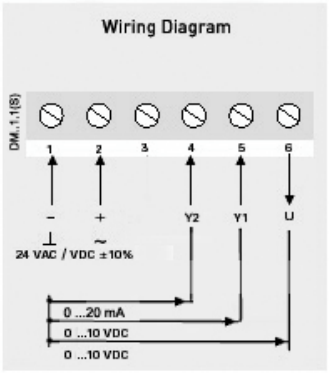
Valve Modulating Electric Mixing Actuator

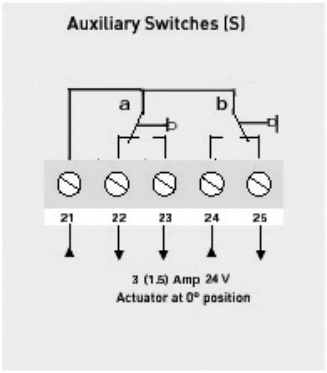
Electric Damper Actuators

Valve Modulating Electric Mixing Actuator



Dimensions





Wiring Diagrams

Application
JOVENTA electric actuators have been specially designed for the motorised operation of various types of water valves and fittings such as mixing valves, butterfly valves and ball valves. The mechanical design of the actuators is such that, with the aid of mounting kits, they can be used on many different types of valves and fittings. The universal coupling between the actuator and the final controlling element is simplicity itself to use since it provides both: a positive drive and flexibility.

Key Features
- 0..10 VDC control signals and 0…20 mA
- Load independent running time
- Screw terminal connections
- Universal adapter with knob for manual operation and position indication
- Reversible
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Accessories for mixer mounting kits
- ZMA001 for Esbe mixers
- ZMA002 for Centra-Duplex mixers
- ZMA003 for Holter mixers
- ZMA004 for GF ball valves

Valve Modulating Electric Mixing Actuator Selection Table

L

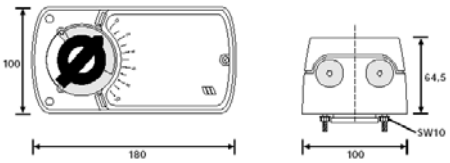
Torque	Running time (s)	Signals			2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
		Y1	Y2	U			Joventa*	Johnson Controls
16 Nm	120	0…10 VDC	0…20 mA	0…10 VDC		24 VAC	**MM1.1**	**M9116-GGA-1.02**
					Yes		**MM1.1S**	**M9116-GGC-1.02**

* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

Valve Modulating Electric Mixing Actuator

Electric Damper Actuators

Valve Modulating Electric Mixing Actuator

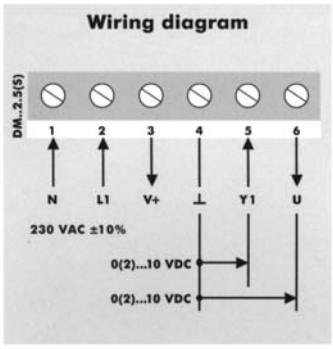


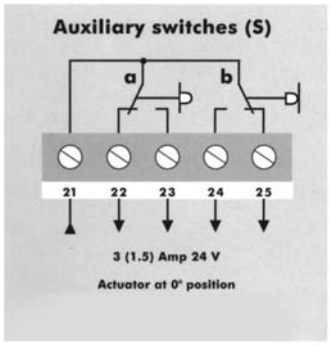
Dimensions

Application
JOVENTA electric actuators have been specially designed for the motorised operation of various types of water valves and fittings such as mixing valves, butterfly valves and ball valves. The mechanical design of the actuators is such that, with the aid of mounting kits, they can be used on many different types of valves and fittings. The universal coupling between the actuator and the final controlling element is simplicity itself to use since it provides both; a positive drive and flexibility.

Key Features
- 0(2)…10 VDC
- Load independent running time
- Screw terminal connections
- Universal adapter with knob for manual operation and position indication
- Reversible
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Accessories for mixer mounting kits
- ZMA001 for Esbe mixers
- ZMA002 for Centra-Duplex mixers
- ZMA003 for Holter mixers
- ZMA004 for GF ball valves





Wiring Diagrams

Valve Modulating Electric Mixing Actuator Selection Table

Torque	Running time (s)	Signals			2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number *	
		Y1	Y2	U				
16	120	0(2)…10 VDC	none	0(2)…10 VDC		230 VAC/VDC	**MM2.2**	
					Yes		**MM2.2S**	

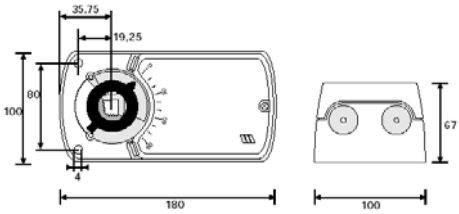
L

* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

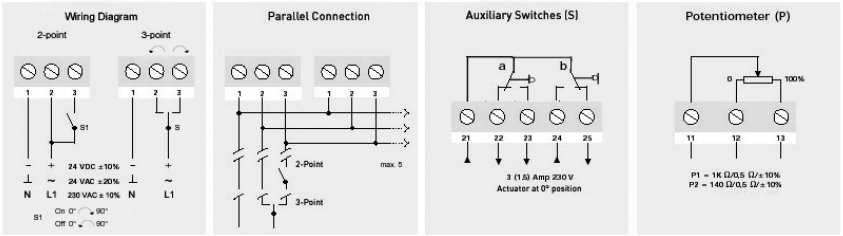
Special 2- and 3-point Electric Damper Actuator

Electric Damper Actuators

Special 2- and 3-point Electric Damper Actuator



Dimensions



Application

JOVENTA electric actuators have been specially designed for use with small and medium-sized air dampers and for terminal control units in air volume control systems. Thanks to their very small size and clever construction they are also ideal for applications where space is limited. A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 2 and 3-point control
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10 to 20 mm dia. or adapter Z01DN... for Square spindles 10to 16 mm, min. ax length 48 mm
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special 2- and 3-point Electric Damper Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Control signals	2 x Auxiliary contacts	Feed back Potentiometer	Supply Voltage (50/60Hz)	Type-Model Number	
							Joventa*	Johnson Controls
16 Nm	16	3	2 and 3 point			24 VAC/DC	**SA1.10**	**M9116-AGA-1.04**
				Yes			**SA1.10S**	**M9116-AGC-1.04**
					1 KOhm		**SA1.10P1**	**M9116-AGE-1.04**
					140 Ohm		**SA1.10P2**	**M9116-AGD-1.04**
						230 VAC	**SA2.10**	**M9116-ADA-1.04**
				Yes			**SA2.10S**	**M9116-ADC-1.04**
8 Nm	8	1.5	2 and 3 point			24 VAC/DC	**SA1.12**	**M9108-AGA-1.04**
				Yes			**SA1.12S**	**M9108-AGC-1.04**
					1 KOhm		**SA1.12P1**	**M9108-AGE-1.04**
					140 Ohm		**SA1.12P2**	**M9108-AGD-1.04**
						230 VAC	**SA2.12**	**M9108-ADA-1.04**
				Yes			**SA2.12S**	**M9108-ADC-1.04**

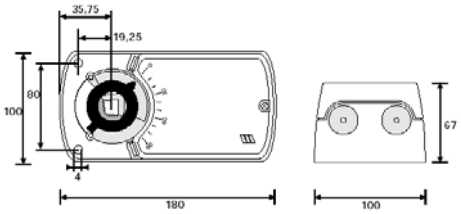
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

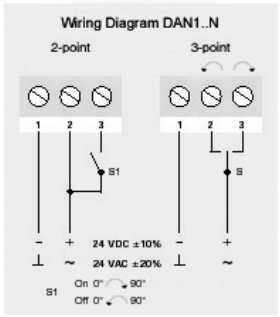
Special 2- and 3-point Electric Damper Actuator (continued)

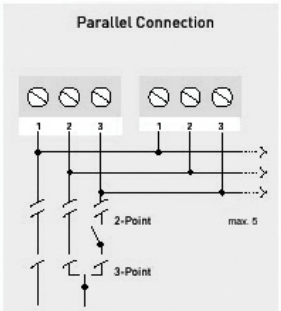
Electric Damper Actuators

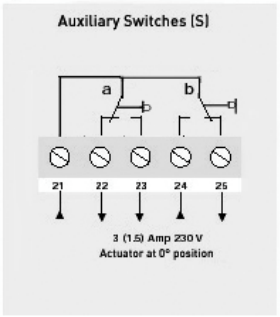
Special 2- and 3-point Electric Damper Actuator



Dimensions







Application
JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features
- 2 and 3-point control
- Load independent running time
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min. ax length 48 mm
- Low noise level
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special 2- and 3-point Electric Damper Actuator Selection Table

Torque	Running time (s)		Damper size (m^2)	Control signals	2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number *	
	Open	Close						
16 Nm	90	360	3	2 and 3 point		24 VAC/DC	**SA1.26**	
					Yes		**SA1.26S**	
4 Nm	8	30	0.8				**SA1.28**	
					Yes		**SA1.28S**	

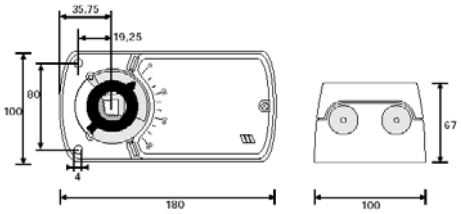
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

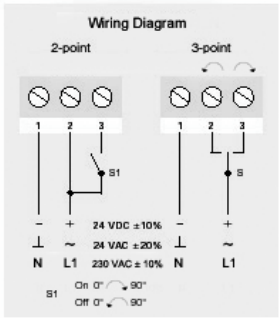
Special 2- and 3-point Electric Damper Actuator (continued)

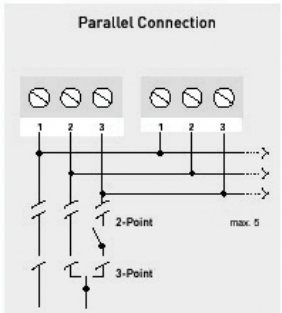
Electric Damper Actuators

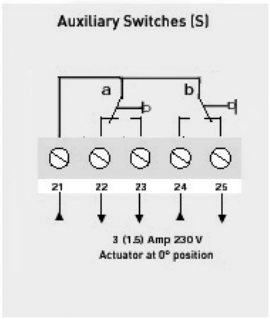
Special 2- and 3-point Electric Damper Actuator



Dimensions







Application
JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features
- 2 and 3-point control
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min. ax length 48 mm
- Low noise level
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special 2- and 3-point Electric Damper Actuator Selection Table

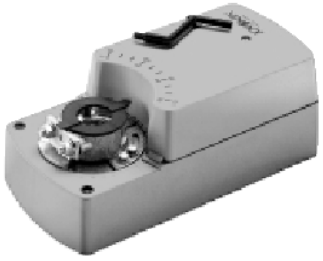
Torque	Running time (s)	Damper size (m^2)	Control signals	2 x Auxiliary contacts	Supply Voltage (50Hz)	Type-Model Number	
						Joventa*	Johnson Controls
16 Nm	80…110	3	2 and 3 point		100 VAC	**SA3.30**	
				Yes		**SA3.30S**	
					110 VAC	**SA4.30**	**M9116-AAA-1**
				Yes		**SA4.30S**	**M9116-AAC-1**
					200 VAC	**SA6.30**	
				Yes		**SA6.30S**	

* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

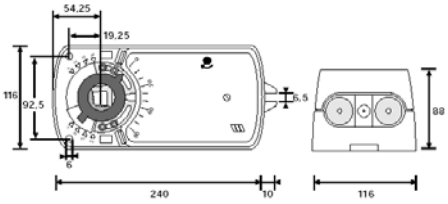
L

Special Spring-return 2-point Electric Damper Actuator

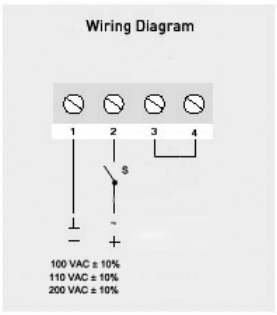
Electric Damper Actuators

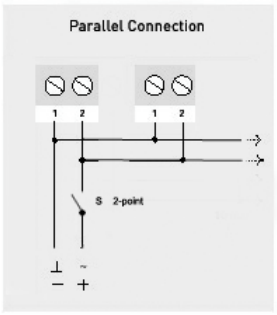


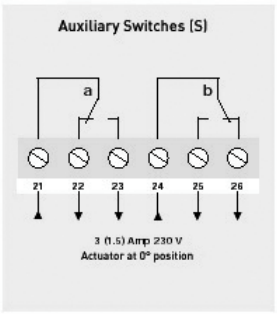
Special Spring-return 2-point Electric Damper Actuator



Dimensions







Application
JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features
- 2-point control
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min. ax length 77 mm
- Low noise level
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special Spring-return 2-point Electric Damper Actuator Selection Table

Torque	Running time (s)		Damper size (m^2)	Control signals	2 x Auxiliary contacts	Supply Voltage (50Hz)	Type-Model Number	
	Open	Close					Joventa*	Johnson Controls
16 Nm	80…110	10	3	2 point		100 VAC	**SA3.30F**	
					Yes		**SA3.30FS**	
						110 VAC	**SA4.30F**	**M9216-BAA-1**
					Yes		**SA4.30FS**	**M9216-BAC-1**
						200 VAC	**SA6.30F**	
					Yes		**SA6.30FS**	

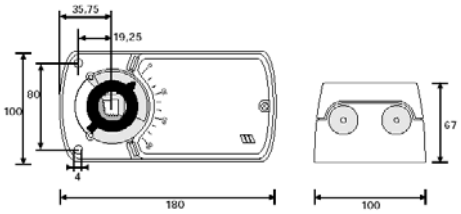
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

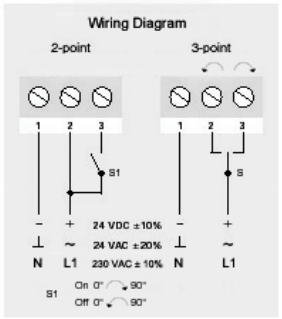
Special 2- and 3-point Electric Damper Actuator (continued)

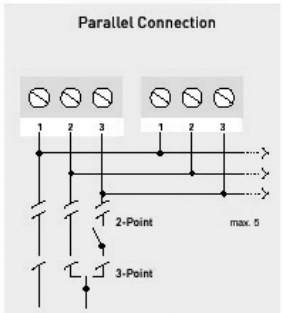
Electric Damper Actuators

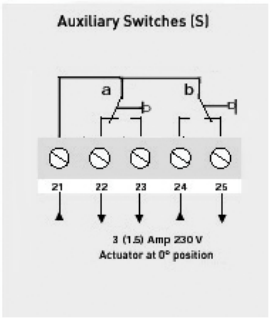
Special Spring-return 2-point Electric Damper Actuator



Dimensions







Application
JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features
- 2 and 3-point control
- Load independent running time
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min. ax length 48 mm
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special Spring-return 2-point Electric Damper Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Control signals	2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number	
						Joventa*	Johnson Controls
8 Nm	30	1.5	2 and 3 point		24 VAC/VDC	**SAS1.23**	**M9108-AGA-1.03**
				Yes		**SAS1.23S**	**M9108-AGC-1.03**
16 Nm	80	3				**SA1.23**	**M9116-AGA-1.03**
				Yes		**SA1.23S**	**M9116-AGC-1.03**
24 Nm	125	4.5				**SAL1.23**	**M9124-AGA-1.03**
				Yes		**SAL1.23S**	**M9124-AGC-1.03**
8 Nm	30	1.5	2 and 3 point		230 VAC	**SAS2.23**	**M9108-ADA-1.03**
				Yes		**SAS2.23S**	**M9108-ADC-1.03**
16 Nm	80	3				**SA2.23**	**M9116-ADA-1.03**
				Yes		**SA2.23S**	**M9116-ADC-1.03**
24 Nm	125	4.5				**SAL2.23**	**M9124-ADA-1.03**
				Yes		**SAL2.23S**	**M9124-ADC-1.03**

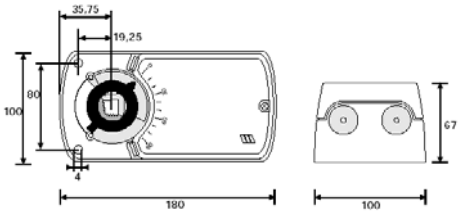
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

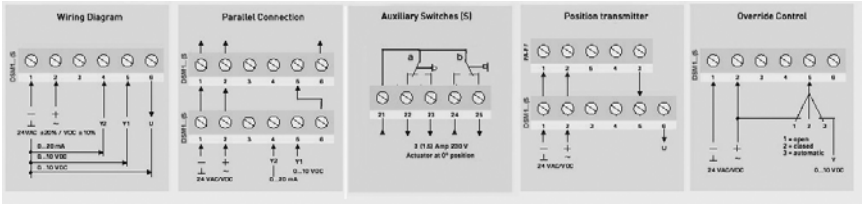
Special Modulating Electric Damper Actuator

Electric Damper Actuators

Special Modulating Electric Damper Actuator



Dimensions



Application
JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features
- 0…10 VDC and 0…20 mA control signal
- Load independent running time
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min.ax length 48 mm
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special Modulating Electric Damper Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Signals			2 x Auxiliary contacts	Supply Voltage (50/60Hz)	Type-Model Number *	
			Y1	Y2	U			Joventa	Johnson Controls
16 Nm	16	3	0…10 VDC	0…20 mA	0…10 VDC		24 VAC/VDC	SM1.10	M9116-GGA-1.04
						Yes		SM1.10S	M9116-GGC-1.04
8 Nm	8	1.5						SM1.12	M9108-GGA-1.04
						Yes		SM1,12S	M9108-GGC-1.04

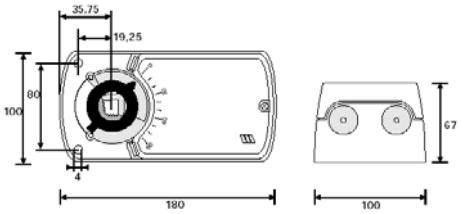
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

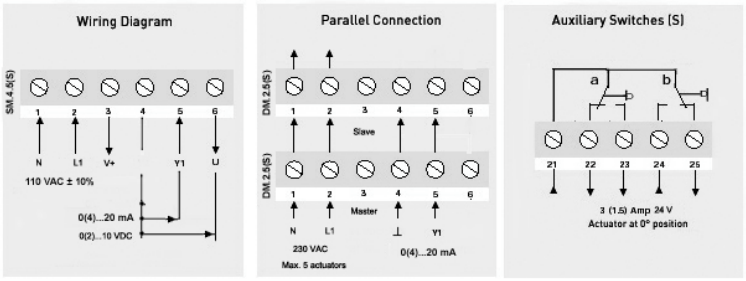
Special Modulating Electric Damper Actuator

Electric Damper Actuators

Special Modulating Electric Damper Actuator



Dimensions



Application

JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features

- 0(4)...20 mA control signal
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min.ax length 48 mm
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special Modulating Electric Damper Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Signals			2 x Auxiliary contacts	Supply Voltage (50-60Hz)	Type-Model Number	
			Y1	Y2	U			Joventa*	Johnson Controls
8 Nm	30..45	1.5	0(4)...20 mA	None	0(2)..10 VDC		110 VAC	**SMS4.5**	**M9108-GAA-1.01**
						Yes		**SMS4.5S**	**M9108-GAC-1.01**
16 Nm	80..110	3						**SM4.5**	**M9116-GAA-1.01**
						Yes		**SM4.5S**	**M9116-GAC-1.01**
24 Nm	125..160	4.5						**SML4.5**	**M9124-GAA-1.01**
						Yes		**SML4.5S**	**M9124-GAC-1.01**

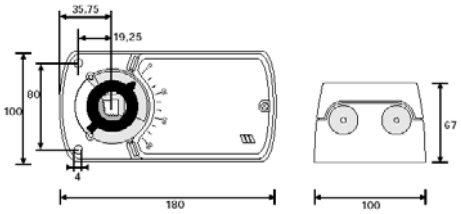
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

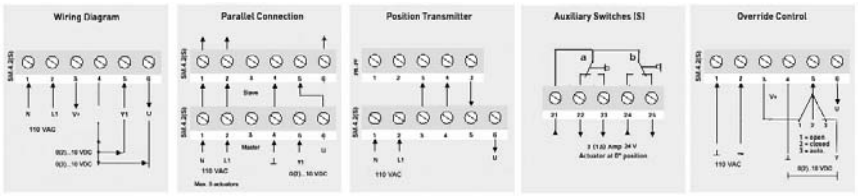
Special Modulating Electric Damper Actuator

Electric Damper Actuators

Special Modulating Electric Damper Actuator



Dimensions



Application
JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features
- 0(2)...10 VDC control signal
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min.ax length 48 mm
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special Modulating Electric Damper Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Signals			2 x Auxiliary contacts	Supply Voltage (50-60Hz)	Type-Model Number	
			Y1	Y2	U			Joventa*	Johnson Controls
8 Nm	30..45	1.5	0(2)..10 VDC	None	0(2)..10 VDC		110 VAC	SMS4.2	M9108-GAA-1
						Yes		SMS4.2S	M9108-GAC-1
16 Nm	80..110	3						SM4.2	M9116-GAA-1
						Yes		SM4.2S	M9116-GAC-1
24 Nm	125..160	4.5						SML4.2	M9124-GAA-1
						Yes		SML4.2S	M9124-GAC-1

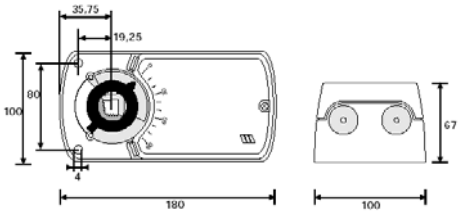
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

Special 2- and 3 Point Electric Damper Actuator

Electric Damper Actuators

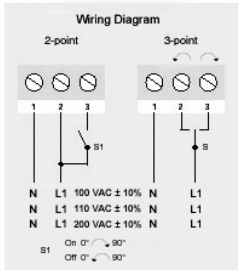
Special 2- and 3 Point Electric Damper Actuator

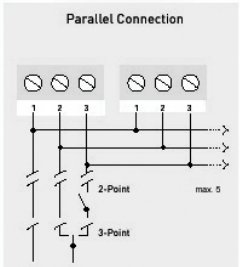


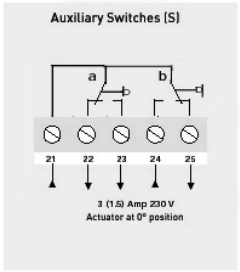
Dimensions

Application
JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features
- 2- and 3 point control signal
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min.ax length 48 mm
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval







Special 2- and 3 Point Electric Damper Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Control signals	2 x Auxiliary contacts	Supply Voltage (50Hz)	Type-Model Number *	
8 Nm	30..45	1.5	2- or 3 point		100 VAC	**SAS3.30**	
				Yes		**SAS3.30S**	
					110 VAC	**SAS4.30**	
				Yes		**SAS4.30S**	
					200 VAC	**SAS6.30**	
				Yes		**SAS6.30S**	

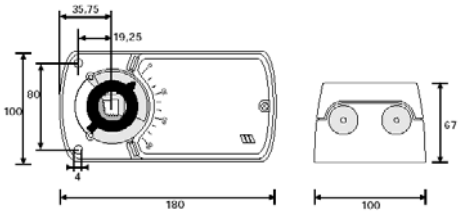
L

* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

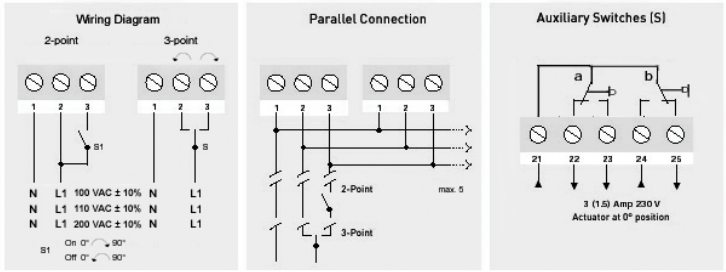
Special 2- and 3 Point Electric Damper Actuator

Electric Damper Actuators

Special 2- and 3 Point Electric Damper Actuator



Dimensions



Application
JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features
- 2- and 3 point control signal
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min.ax length 48 mm
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special 2- and 3 Point Electric Damper Actuator Selection Table

Torque	Running time (s)	Damper size (m^2)	Control signals	2 x Auxiliary contacts	Supply Voltage (50Hz)	Type-Model Number *	
24 Nm	125…160	4.5	2 and 3 point		100 VAC	**SAL3.30**	
				Yes		**SAL3.30S**	
					110 VAC	**SAL4.30**	
				Yes		**SAL4.30S**	
					200 VAC	**SAL6.30**	
				Yes		**SAL6.30S**	

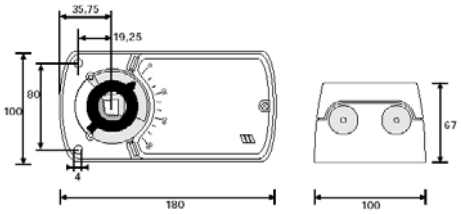
* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

L

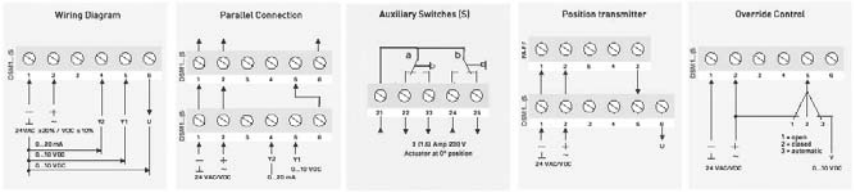
Special Modulating Electric Damper Actuator

Electric Damper Actuators

Special Modulating Electric Damper Actuator



Dimensions



Application
JOVENTA electric actuators have been specially designed for use with medium and large air dampers.
Thanks to their very small size and clever construction they are ideal for applications where space is limited.
A key feature of the design is the special JOVENTA spindle adapter which also incorporates angle-of-rotation limiting and position indication.

Key Features
- 0…10 VDC or 0…20 mA control signal
- Power independent running time
- Paralleling of up to 5 actuators possible
- Screw terminal connections
- Universal adapter for:
  Round spindles from 10...20 mm
  Square spindles from 10...16 mm min.ax length 48 mm
- Choice of rotation
- Angle-of-rotation limiting
- Manual control by pushbutton
- 2 floating auxiliary switches
- Automatic end stops
- Power saving at end stops
- Customising available
- CE approval

Special Modulating Electric Damper Actuator Selection Table

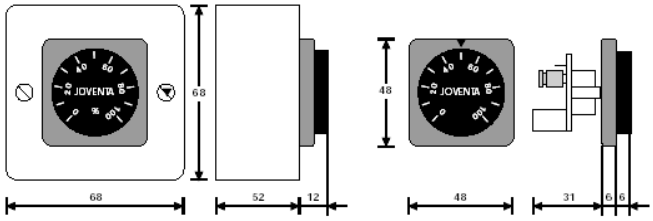
Torque	Running time (s)	Damper size (m^2)	Signals			2 x Auxiliary contacts	Supply Voltage (50-60Hz)	Type-Model Number	
			Y1	Y2	U			Joventa*	Johnson Controls
8 Nm	30	1.5	0..10 VDC	0...20 mA	0..10 VDC		24 VAC/VDC	SMS1.23	M9108-GGA-1.03
						Yes		SMS1.23S	M9108-GGC-1.03
16 Nm	60	3						SM1.23	M9116-GGA-1.03
						Yes		SM1.23S	M9116-GGC-1.03
24 Nm	125	4.5						SML1.23	M9124-GGA-1.03
						Yes		SML1.23S	M9124-GGC-1.03

* by adding a K after the type number you will acquire the same model with a Halogene free cable (1 m)

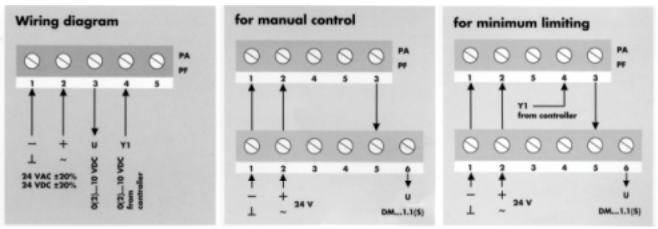
L

PA-PF Transmitters

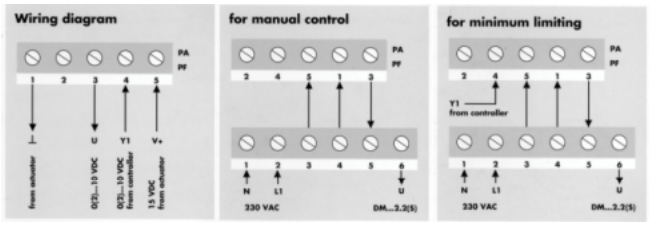
Accessories Electric Damper Actuators



PA in surface mounting box **PF for front mounting**



Wiring Diagrams PA-PF for modulating actuators 24 V



Wiring Diagrams PA-PF for modulating actuators 230 V

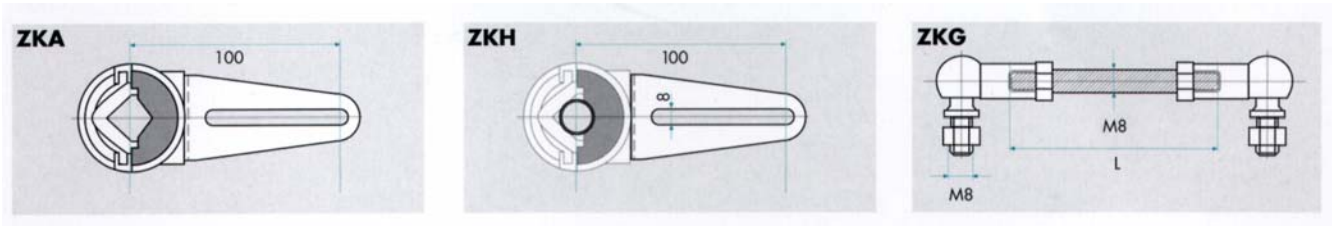
PA-PF Transmitters Selection Table

Actuator	Power Supply	Frequency	Output signals U	Output rating	Control signal V	Mounting	Type-Model Number	
DMN1.2/DM1.1(S) DM1.1F(S)/SM1..(S) MM1.1(S)	24 VAC/VDC	50/60 Hz	0…10 VDC	For up to 5 actuators	0(2)…10 VDC	Surface	**PA**	
						Front	**PF**	
DM…2.2/MM2.2(S)	15 VDC+	-				Surface	**PA**	
						Front	**PF**	

L

Damper Linkage

Accessories Electric Damper Actuators

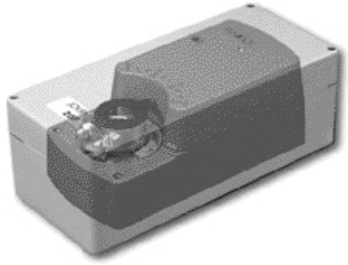


Actuator/Damper Linkage Selection Table

Description	Type-Model Number	
	Joventa	Johnson Controls
Complete set of accessories	**ZK**	**M9000-ZK**
Universal crank arm and adapter to be fixed to the damper shaft	**ZKA**	**M9000-ZKA**
Crank arm to be fixed to the actuator, including a center bolt	**ZKH**	**M9000-ZKH**
Two ball joints to be fixed to ZKA and ZKH and to be linked by a rod with an 8 mm thread. Two M8 nuts to secure the rod.	**ZKG**	**M9000-ZKG**

IP 65 Housing

Accessories Electric Damper Actuators



IP 65 Housing

IP 65 Housing Selection Table

Description	Type-Model Number	
For Standard actuator with round spindle 12 mm	**ZGS.12**	
For Standard actuator with round spindle 16 mm	**ZGS.16**	
For Standard actuator with round spindle 18 mm	**ZGS.18**	
For Standard actuator with round spindle 20 mm	**ZGS.20**	
For Standard actuator with square spindle 12 mm	**ZGS12V**	
For Spring-Return actuator with round spindle 12 mm	**ZGF.12**	
For Spring-Return actuator with round spindle 16 mm	**ZGF.16**	
For Spring-Return actuator with round spindle 18 mm	**ZGF.18**	
For Spring-Return actuator with round spindle 20 mm	**ZGF.20**	
For Spring-Return actuator with square spindle 12 mm	**ZGF12V**	

L

Temperature Sensor

Accessories Electric Damper Actuators

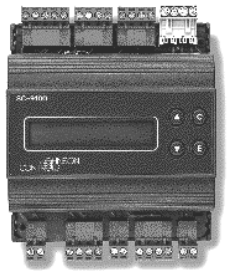
Temperature Sensor

Temperature Sensor Selection Table

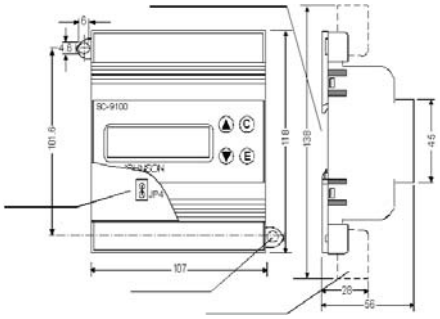
Description	Type-Model Number	
Duct temperature sensor, 72 °C, 24 VAC/VDC, Switch 3A max.	**ST1.72N**	
Duct temperature sensor, 90 °C, 24 VAC/VDC, Switch 3A max.	**ST1.90N**	

Series SC-9100 *Easy* DDC Controller

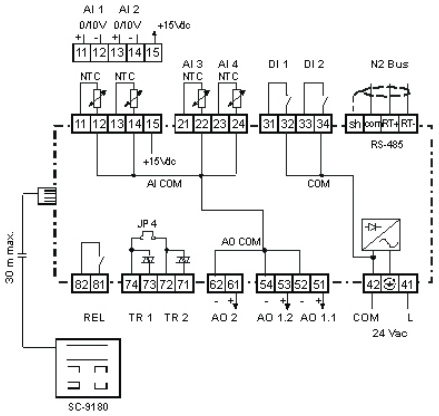
Easy DDC Controllers



Series SC-9100 *Easy* DDC Controller



Dimensions



Typical Wiring Diagram

Description

SC 9100 is a preconfigured, controller, designed for the control of heating, ventilation or air conditioning installations. The SC-9100 is a unique controller with multiple standard applications, which can be chosen from the controller's memory during installation. Parameters can be adapted to fit the exact requirements. Other application programs may be created on quantity order.

The display shows in clear text the inputs, outputs and main control information. The controller is protected to avoid unauthorized use (password). The SC 9100 is a full stand-alone controller, and may be connected to a communication bus as part of a JOHNSON CONTROLS Supervisory System.

The room command module SC-9180 may be connected to the SC-9100 to provide remote set point and real time clock.

Features

- Ready-to-use connection diagrams
- Great number of application programs available from a single controller
- Clear alpha-numeric backlighted display
- Removable connectors, DIN rail mounting or screw mounting
- Communication bus
- Real time clock option using SC-9180 room command module

M

Series SC-9100 *Easy* DDC Controller Selection Table

Application Examples	Analog Inputs				Binary Inputs		Analog Outputs			Binary Outputs				Supply Voltage 50/60 Hz	Type-Model Number	
	AI1	AI2	AI3	AI4	DI1	DI2	AO1.1	AO1.2	AO2	TR1	TR2	REL	15VDC			
Single loop, 1 output	x	x	x		x	x	x			x	x			24 VAC, +15%-10%	SC-9100-8GEN-1*	
Single loop, 2 output	x	x	x		x	x	x		x							
Outdoor air comp., 1 output	x	x	x		x	x	x			x	x					
Outdoor air comp., 2 output	x	x	x		x	x	x		x							
Cascade, 1 output	x	x	x	x	x	x	x			x	x					
Cascade, 2 output	x	x	x	x	x	x	x		x							
Single loop + limit, 1 output	x	x			x	x	x			x	x					

* The SC-9100 has models that are defined to local applications. For the local code numbers, please contact your nearest supplier.

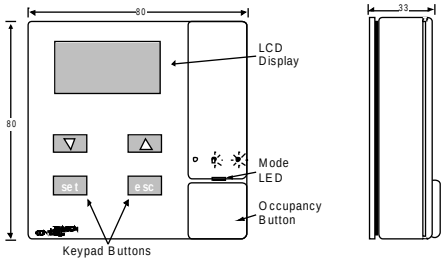
***Accessories* (order separately)**

Description	Type-Model Number	
Mounting kit for panel mount	SC-9100-MK	

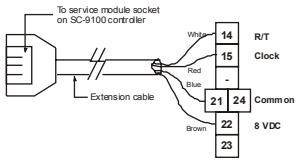
Series SC-9180 Room Command Module for SC-9100

Easy DDC Controllers

Series SC-9180 Room Command Module



Dimensions



Typical Wiring Diagram

Description

The room command module SC-9180 with LCD display is designed for use with the SC-9100 series *Easy* DDC controller.

A Key pad and LCD display on the front of the module allow the room occupant to view and change the operating parameters of the connected SC-9100 controller.

In addition, an occupancy button enables the occupant to change the mode operation of the controller from “COMFORT” to “STANDBY” or to request a temporary “COMFORT” during “NIGHT” operation. The current operating mode is shown by an LED indicator.

Features

- LCD display with decimal point
- Temperature and setpoint reading
- Weekly scheduling
- Occupancy button
- Clock back-up supply

Series SC-9180 Room Command Module Selection Table

Displays	Temperature Sensor	Communications Interface	Mounting	Clock Back-up Supply	Mode Indicator	Type-Model Number	
Room Temperature	NTC Thermistor (sensor included)	Synchronous serial link	Direct surface mount	15 hours	Red LED to indicate: Comfort (ON) Standby (BLINK) Night/Off (OFF)	**SC-9180-0000-W**	
External TS-9100	Not included					**SC-9180-1000-W**	

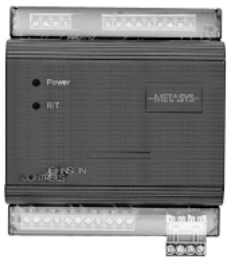
Accessories (order separately)

Description	Type-Model Number	
Plastic base for surface mount (white RAL 9010)	**TM-9100-8931-W**	
Mounting kit for wall box (white RAL 9010)	**TM-9100-8941-W**	
Mounting kit for panel mount (white RAL 9010)	**TM-9100-8951-W**	
Tool for opening module	**TM-9100-8900**	
20 m extention cable	**SC-9180-8900**	
NTC element with 1.5 m cable	**TE-9100-8501**	
Mounting kit for TE-9100-8501	**TE-8800-8902**	
Rubber grommet for NTC sensor cable	**TE-8800-8901**	

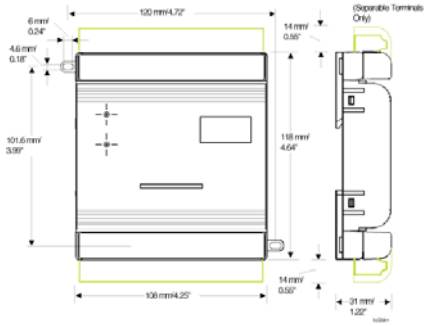
For TM-9100 see page 62

Series TC-9102 Fan Coil Unit Controller

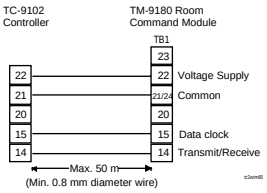
Easy DDC Controllers



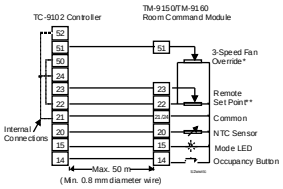
Series TC-9102 Fan Coil Unit Controller



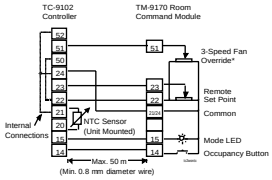
Dimensions



Wiring to TM-9180 Room Command Module



Wiring to TM-9180 Room Command Module



Wiring to TM-9180 Room Command Module with Unit Mounted NTC Sensor

Description

The TC-9102 Series Fan Coil Unit Controller is designed for digital control of fan coil units with heating and/or cooling coils, and a single-speed, three-speed or variable-speed fan. The comfort set point and occupancy mode may be adjusted from the TM-9100 Series Room Command Module, which can also provide manual override of fan speed in three-speed fan applications. The intelligent room command module also provides local weekly time scheduling control. The controller is designed for field installation or for use by original equipment manufacturers. The fan coil unit controller can operate in standlone mode with local room override control, or it can communicate on the Metasys® N2 Bus, allowing monitoring and facility-wide control applications on the network

Features

- Range of models designed for field and factory installations
- Relay outputs for fan control
- Choice of output types for heating and cooling control
- Software configuration tool
- Library of configurations for all models
- Multiple modes of operation for various occupancy conditions
- Setpoint adjustment and mode override from room command module
- Local display of room temperature and set point in intelligent room command module
- Weekly time schedule option in intelligent room command module
- N2 Bus communications for supervisory network
- Dynamic Data Access™ networking software capabilities
- Standalone operation
- Nonvolatile memory (EEPROM)

M

Series TC-9102 Fan Coil Unit Controller Selection Table

Outputs		Set point Range	Type-Model Number	
0 to 10 VDC Fan Control	2 x 0 to 10 VDC	12 -28°C	**TC-91a2-b220**	
		+/-3 K	**TC-91a2-b225**	
	2 x DAT	12 -28°C	**TC-91a2-b440**	
		+/-3 K	**TC-91a2-b445**	
	2 x PAT	12 -28°C	**TC-91a2-b550**	
		+/-3 K	**TC-91a2-b555**	
	2 x 2 Stage On/Off	12 -28°C	**TC-91a2-b660**	
		+/-3 K	**TC-91a2-b655**	
On/Off Fan	2 x 0 to 10 VDC	12-28°C	**TC-91a2-b221**	
		+/-3 K	**TC-91a2-b226**	
	2 x DAT	12-28°C	**TC-91a2-b441**	
		+/-3 K	**TC-91a2-b446**	
	2 x PAT	12-28°C	**TC-91a2-b551**	
		+/-3 K	**TC-91a2-b556**	
	2 x 2 Stage On/Off	12-28°C	**TC-91a2-b661**	
		+/-3 K	**TC-91a2-b666**	

Series TC-9102 Fan Coil Unit Controller (continued)

Easy DDC Controllers

Series TC-9102 Fan Coil Unit Controller Selection Table (cont)

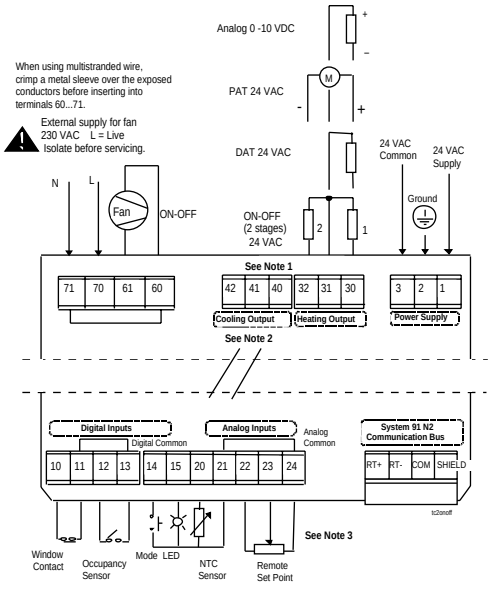
Outputs		Set point Range	Type-Model Number	
3-Speed Fan	2 x 0 to 10 VDC	12-28°C	**TC-91a2-b222**	
		+/-3 K	**TC-91a2-b227**	
	2 x DAT	12-28°C	**TC-91a2-b442**	
		+/-3 K	**TC-91a2-b447**	
	2 x PAT	12-28°C	**TC-91a2-b552**	
		+/-3 K	**TC-91a2-b557**	
	2 x 2 Stage On/Off	12-28°C	**TC-91a2-b662**	
		+/-3 K	**TC-91a2-b667**	
Controller for remote set point: a = 0, with integrated set point: a = 1				
Controller with standard terminals: b = 0, with separable terminals: b = 1				

Notes: 1. Ordering codes must be used in orders to the Lomagna factory.
2. Modules with PWM control signal outputs have been discontinued. Contact your local Johnson Controls office for details of replacement controllers.

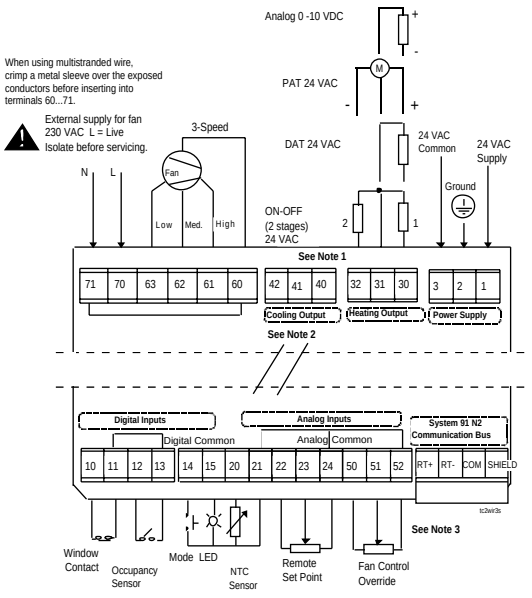
Software and Accessories Ordering Codes

Ordering Code	Description
TE-9100-8501	Unit Mount NTC Temperature Sensor (1.5-m cable)
TC-9100-TOOL	Commissioning Software for DOS (3.5" diskette)
WS-EURPRO-0	Configuration Tools Software for Windows®, New (3.5" diskettes)
WS-EURPRO-6	Configuration Tools Software for Windows®, Upgrade (3.5" diskettes)

Wiring



On/Off Fan Control



3-Speed Fan Control

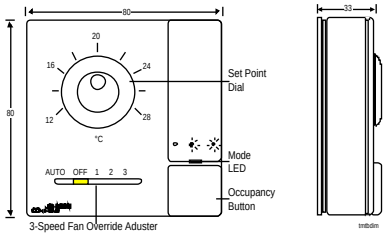
M

JOHNSON CONTROLS

Series TM-9100 Room Command Module

Easy DDC Controllers

Series TM-9100 Room Control Module

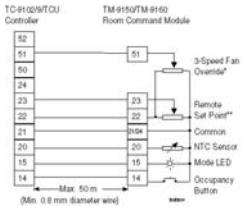


Dimensions

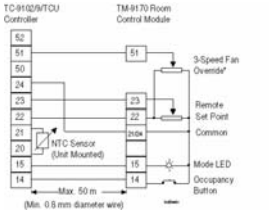
Description

The TM-9100 series of Room Command Modules are designed for use with the TC-9102 and TC-9109 series of DDC terminal unit controllers. The set point dial enables the room occupant to adjust the working set point of the controller within the range of 12 to 28°C or -3 to +3 K, according to the model number. The occupancy button enables the occupant to switch the mode of operation of the controller between COMFORT and STANDBY or to request a temporary COMFORT mode during NIGHT operation. The current operating mode is shown by an LED indicator.

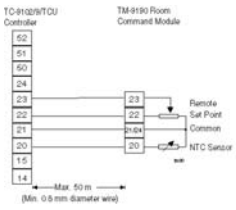
For TC-9102 Fan Coil Unit controllers, a Room Command Module with a 3-speed fan override adjuster is available, and models without a temperature sensor are provided for application where the room temperature sensor is mounted inside the Fan Coil Unit.



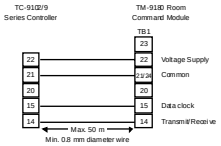
Room Command Module with NTC Sensor
***Only for TM-9160 modules with 3-speed fan override**
****Model TM-9160 only.**



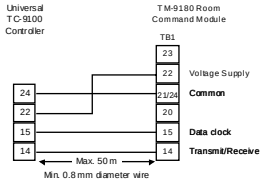
Room Command Module without NTC Sensor
***Only for modules with 3-speed fan override**



Room Command Module without 3-Speed Fan Override, Mode LED and Occupancy Button



Wiring TM-9180 to TC-9102 and TC-9109 Controller



Wiring TM-91809 to Universal TC-9100 Controller

Room Command Module Ordering Codes

Description				Type-Model Number	
Occupancy Button	NTC Sensor	w/o S.P. dial		**TM-9150-0000**	
		12-28°C		**TM-9160-0000**	
		+/- 3 K		**TM-9160-0005**	
		12-28°C	3-Speed Fan Override	**TM-9160-0002**	
		+/- 3 K	3-Speed Fan Override	**TM-9160-0007**	
	w/o Sensor	12-28°C		**TM-9170-0000**	
		+/- 3 K		**TM-9170-0005**	
		12-28°C	3-Speed Fan Override	**TM-9170-0002**	
		+/- 3 K	3-Speed Fan Override	**TM-9170-0007**	
No Occupancy Button	NTC Sensor	12-28°C	No Fan Override	**TM-9190-0000**	
		+/- 3 K		**TM-9190-0005**	
LCD Display	with View Mode and Clock Setting only			**TM-9180-0100**	
	with View Mode and Programming Mode			**TM-9180-0200**	

Note: All models above with off-white cover and grey base.
Add "-W" to code for white cover and white base, e.g., TM-9150-0000-W.
Add "-K" to code for set point dial with serrated edge (not for TM-9150 or TM-9180), e.g. TM-9160-0005-K, TM-9160-0005-WK.

Series TM-9100 Room Command Module (continued)

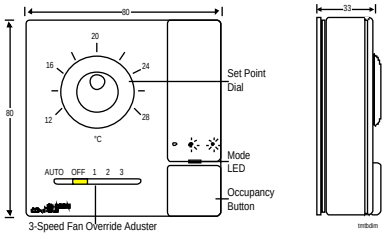
Easy DDC Controllers

Accessories (order separately)

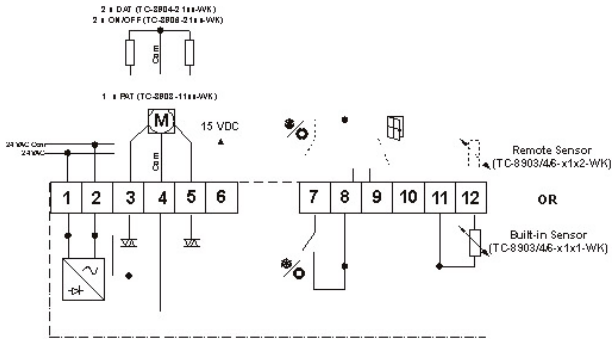
Description	Type-Model Number	
Plastic base for surface mount (grey)	**TM-9100-8930**	
Plastic base for surface mount (off-white)	**TM-9100-8931**	
Mounting kit for wall box (off-white)	**TM-9100-8941**	
Mounting kit for panel mount (off-white)	**TM-9100-8951**	
Mounting kit for panel mount (white)	**TM-9100-8951-W**	
Tool for opening module	**TM-9100-8900**	

Easy DDC Controllers

Series TC-8900 All-in-one Controller



Dimensions



Wiring

Description

TC-8900 is a family of analogue controllers, designed for the control of fan coils with 2 pipe, 2 pipe with change-over, 2 pipe with electrical coil, or 4 pipe configurations.

The family includes All-in-one Controller Units (TC-8900), a Remote Set point Module (ES-8930) and Built-in Controller Units (TC-8930).

The TC-8900 has been designed to be easy to use, while integrating the most common room air conditioning control functions.

Features

- All in one condensed package: sensor, direct/reverse input, window input, PI control, up to two valve outputs, mode (comfort/stand-by) push button and setpoint readjustment potentiometer
- Option to limit the setpoint adjustment range or to cancel the setpoint adjustment
- Active or passive input
- Modern and discreet cover which snaps onto a plug-in mounting base
- Electric terminals located on mounting base
- Standard range of mounting kits

Series TC-8900 All-in-one Controller Units Selection Table

NTC Sensor		Set point	Input	Output				Type-Model Number	
Internal	External		0…10 V	PAT	0…10 V	DAT	On/Off		
Yes		12…28 ° C		1				TC-8903-1131-WK	
					2			TC-8901-2131-WK	
						2		TC-8904-2131-WK	
							2	TC-8906-2131-WK	
	Yes			1				TC-8903-1132-WK	
					2			TC-8901-2132-WK	
						2		TC-8904-2132-WK	
							2	TC-8906-2132-WK	
Yes		0…40 ° C		1				TC-8903-1151-WK	
	Yes			1				TC-8903-1152-WK	
		0…100%	Yes	1				TC-8903-1183-WK	
					2			TC-8901-2183-WK	

M

Series TC-8900 Stand Alone Unit Controllers (continued)

Easy DDC Controllers

Series TC-8900 Local Controllers and ES-8900 Remote Setpoint Module Selection Table

NTC Sensor	Set point	Output				Type-Model Number	
		PAT	0…10 V	DAT	On/Off		
External	External	1				**TC-8933-1112-WK**	
			2			**TC-8931-2112-WK**	
				2		**TC-8934-2112-WK**	
					2	**TC-8936-2112-WK**	
Internal	12…28 ° C					**ES-8930-3031-WK**	

Series TC-8900 Local Controllers and ES-8940 Central Setpoint Module Selection Table

NTC Sensor		Set point	Output				Type-Model Number	
Internal	External		PAT	0…10 V	DAT	On/Off		
Yes		+/- 3K	1				**TC-8943-1141-WK**	
Yes				2			**TC-8941-2141-WK**	
Yes					2		**TC-8944-2141-WK**	
Yes						2	**TC-8946-2141-WK**	
		12…28 ° C					**ES-8940-4130-WK**	

Series TC-8900 All-in-One Controllers and PM-8900 Power Modules Selection Table

NTC Sensor		Set point	Number Output*	Module Number	Configuration	Type-Model Number	
Internal	External						
Yes		12…28 ° C	1	1, 2 or 3	2 pipe change over	**TC-8902-1031-WK**	
			1	4		**TC-8907-1031-WK**	
			2	1, 2 or 3	4 pipe system	**TC-8902-2031-WK**	
			2	4		**TC-8907-2031-WK**	
	Yes	12…28 ° C	1	1, 2 or 3	2 pipe change over	**TC-8902-1032-WK**	
			1	4		**TC-8907-1032-WK**	
			2	1, 2 or 3	4 pipe system	**TC-8902-2032-WK**	
			2	4		**TC-8907-2032-WK**	
Yes		+/- 3K	2	1, 2 or 4	4 pipe system	**TC-8942-2041-WK**	
			2	4		**TC-8947-2041-WK**	

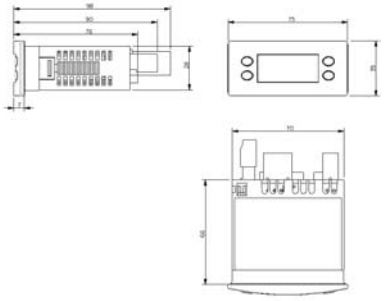
* Valve outputs in connection with Power Module

Module Number	Output	Combination	Type-Model Number	
1	0…10 V and 3 speed ventilator	TC-8902 and TC-8942	**PM-8902-0500**	
2	DAT 230V and 3 speed vantilator	TC-8902 and TC-8942	**PM-8905-0300**	
3	DAT 24 V and 3 speed ventilator	TC-8902 and TC-8942	**PM-8905-0500**	
4	Relais 3A 230 V/24 V and ventilator	TC-8907 and TC-8947	**PM-8907-0300**	

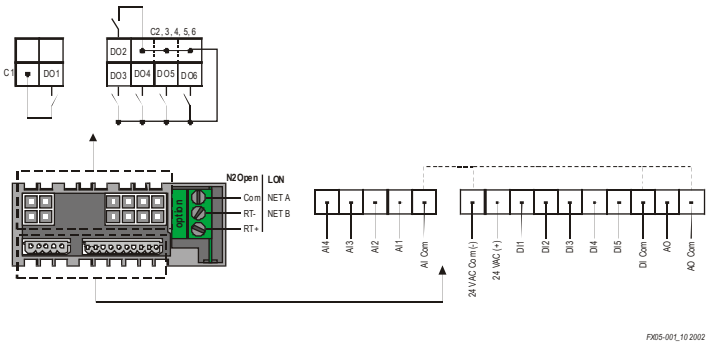
FX05 Compact programmable controller for Refrigeration and HVAC applications

Electronic Controllers

FX05 Series



Dimensions



Typical Wiring

Description

The FX05 is a compact programmable controller specifically designed for single compressor chillers and heat pumps. It includes all the functions usually provided by additional devices such as timers, end-of-defrost thermostats, etc.
Now they all are in a single device and this implies very easy wiring and limited cost of installation.

Moreover the controller is fully programmable, thanks to the FX Tools software, and can virtually adapt to any application, provided the right number of inputs and outputs is available.

Optionally the FX05 can be fitted with a serial communication card to be compatible with the LONMARK™ and N2Open worlds.

A Real Time Clock card is also available for energy saving and better management of the application.

Features

- LONWORKS™ and N2Open cards (option)
- Real Time Clock (option)
- Freely programmable
- A99 analogue input
- Optional converting modules
- Built-in LED User Interface

FX05 High Performance Controller Selection Table

Power Supply	Protection Class	I/0 Ratings: Analog Input (AI) (sensor not included)	Digital Input (DI)	Digital Output (DO)	AnalogOutput (AO)	Application	Type-Model Number	
24 V AC/DC ± 15%, 50/60 Hz	Overall IP20 Faceplate IP54	Pt1000 Range: -40 to 100 °C Accuracy: ± 0.3 °C at 20 °C ambient	Voltage free contacts, 3k3 pull-up resitors, not isolated	SPST 5A, 250 VAC power relay Double isolated between DO1 and the other relay group. Any combination of loads must not exceed 15A in total (the "commons" pins are internally connected) Max. 5A on each common	0…10 VDC, 5 mA, not isolated	Application less, Pt1000 inputs (object list 000)	**LP-FX05P00-000C**	
						Temperature monitoring application, Pt1000 inputs	**LP-FX05P00-800C**	
		A99 Range: -40 to 100 °C Accuracy: ± 0.3 °C at 20 °C ambient				Application less, A99 inputs (object list 000)	**LP-FX05P01-000C**	

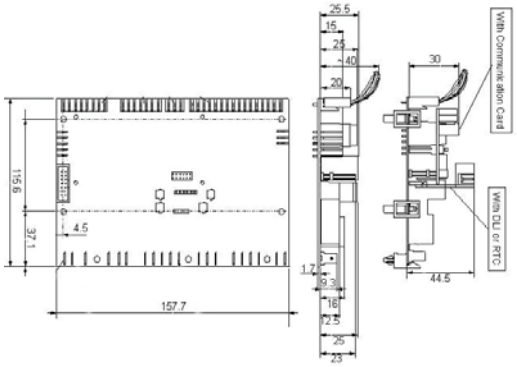
Accessories

Description	Type-Model Number	
Real Time Clock plug-in card	**LP-RTC05-000C**	
N2Open communication card	**LP-NET051-000C**	
LON communication card on-field commissioning	**LP-NET052-000C**	
Input Converter module: active input (4-20 mA) to A99	**LP-KIT001-000C**	
Input Converter module: active input (ratiometric) to A99	**LP-KIT002-000C**	
Input Converter module: active input (0-10 V) to A99	**LP-KIT004-000C**	
Pre-crimped set of cables and female connectors for number 5 FX05 controllers	**LP-KIT005-000C**	
Room Command Module for FX05 (triac + relay version) with +/- 3K setpoint dial, fan speed slide, occupancy button, A99 room sensor.	**LP-KIT006-000C**	
Room Command Module for FX05 with 12-28°C setpoint dial and A99 room sensor.	**LP-KIT006-001C**	
Room Command Module for FX05 with 12-28°C setpoint dial, A99 room sensor and occupancy button.	**LP-KIT006-002C**	
Condenser fan speed controller single-phase, 3Amps	**U215LR-9110**	

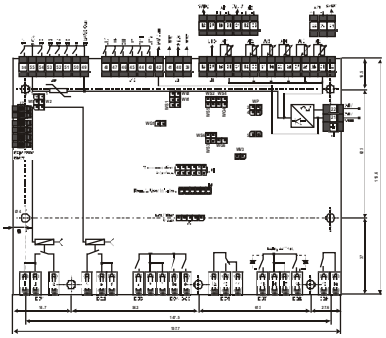
N

FX10 "Standard" Programmable Electronic Controller for HVAC and Refrigeration Applications.

Electronic Controllers



FX10 "Standard" Series **Dimensions**



Standard Wiring Diagram

Description

The FX10 is a high performance, programmable controller specifically designed for applications such as Scroll Compressor Chillers and Rooftops, Close Control Units, Indoor Packaged, Unit Vents, Water Source Heat Pump, etc..

The FX10 is a protocol independent controller and can adapt to protocols such as LONMARK™ and Johnson Controls N2Open.

The controller is freely configurable and can adapt to virtually any applications, thanks to its configuration software FX - Tools

The controller allows up to 29 I/O in several configuration of triacs / relays, active / passive inputs.

Features

- Protocol independent.
- LON and N2Open cards (optional)
- Free programmable
- A99
NTC K10
Ratiometric
- Real Time Clock (optional)
- Choice of connection terminals
- User Interface (optional)

FX10 "Standard" Programmable Electronic Controller Selection Table

Power Supply	I/0 Ratings			Configuration	Type-Model Number	
24 V AC/DC ± 15%, 50/60 Hz	Analog Input (AI)			MOLEX connectors, low power relays	**LP-FX10B11-000C**	
	AI1, AI2, AI3	A99	Range: -40 to 100°C Accuracy: ± 0.3°C @ 20°C ambient (sensor not included)			
		NTC (K10 or 2K2)	Range: 0 to 100°C Accuracy: ±0.5°C @ 20°C ambient (sensor not included)			
		Ratiometric	Range: 0.5 to 4.5 V Resolution: 10 mV			
	AI4, AI5, AI6	A99	Range: -40 to 100°C Accuracy: ± 0.5°C @ 20°C ambient (sensor error not included)			
	Digital Input (DI)					
	DI1,DI2	Voltage free contacts with safety control feature		MOLEX connectors, 2 triacs + low power relays	**LP-FX10B12-000C**	
	DI3, DI4, DI5, DI6	Voltage free contacts				
	DI7, DI8, DI9, DI10, DI11, DI12	24 VAC external powered contacts				
	Digital Output (DO)					
	DO1, DO2	SPST 8(3)A, 250VAC relays (low power relay version) or SPST 25A, 250VAC relays (high power relay version)		WAGO connectors, low power relays	**LP-FX10B13-000C**	
	DO3, DO4, DO5, DO9	SPST 8(3)A, 250VAC relays				
	DO6	SPST 5(2)A, 250VAC relays				
	DO7, DO8	SPST 5(2)A, 250Vac relays or 0.5A / 24VAC triacs				
	Outputs DO3 + DO9 can be freely specified either as relay or as triac. The specific hardware will be created upon minimum order.			WAGO connectors, 2 triacs + low power relays	**LP-FX10B14-000C**	
	Other Outputs					
	PWM	9V 9supplied by FX10), 50 mA max, 300 hz				
	LED	Signal to LED of a JC room command module 10 mA at 2V				

N

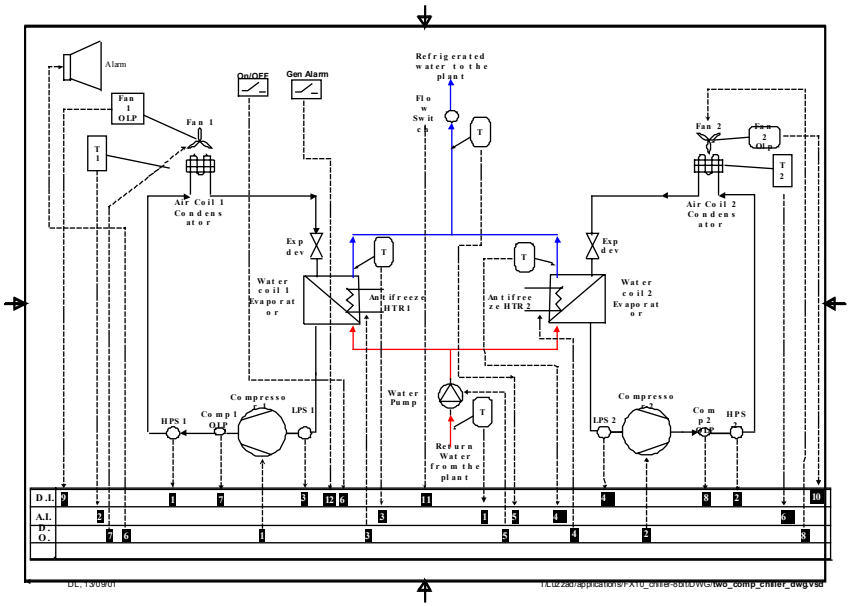
Electronic Controllers

Accessories

Description	Type-Model Number	
Real Time Clock plug-in card	**LP-RTC10-000C**	
N2Open communication card	**LP-NET101-000C**	
LON communication interface. On-field commissioning	**LP-NET102-000C**	
LON communication interface. Specific application profile	**LP-NET102-xxxC**	
Display Link Interface for display connection (SUI/MUI/LUI)	**LP-KIT000-000C**	
Input Converter 4 - 20 mA to A99	**LP-KIT001-000C**	
Converter module: PWM to 0 – 10 V output	**LP-KIT003-000C**	
Input Converter 0 – 10 V to A99	**LP-KIT004-000C**	
Pre-crimped set of cables and terminals for Molex connectors (complete set for 2 controllers in each kit)	**LP-KIT010-000C**	
Condenser fan speed controller single-phase, 3Amps	**U215LR-9110**	

Displays

Description	Type-Model Number	
Large size LCD (4x20) display (LUI with standard JCI front plate)	**LP-DIS65P00-0C**	
Medium size LCD (4x20) display, panel mount non-isolated version (MUI)	**LP-DIS60P00-0C**	
Medium size LCD (4x20) display, wall mount isolated version (MUI)	**LP-DIS60P01-0C**	
Small size LED (3 digits) display, panel mount (SUI)	**LP-DIS50P00-0C**	



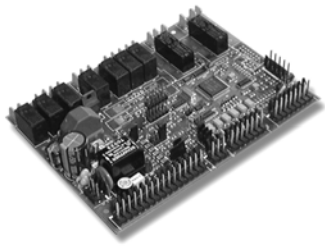
Example of standard application

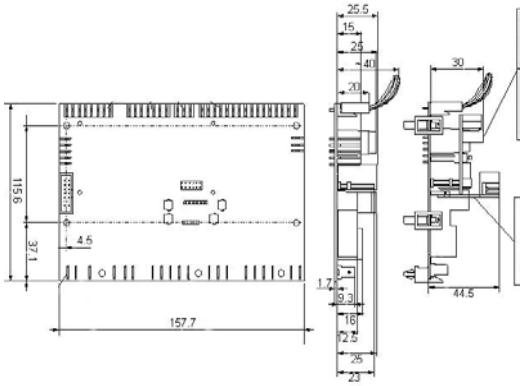
Air/Water Chiller, 2 compressors/2 cicuits (Application Code: 701FX1001-000BR)

N

FX10 "Advanced" Programmable Electronic Controller for HVAC and Refrigeration Applications.

Electronic Controllers





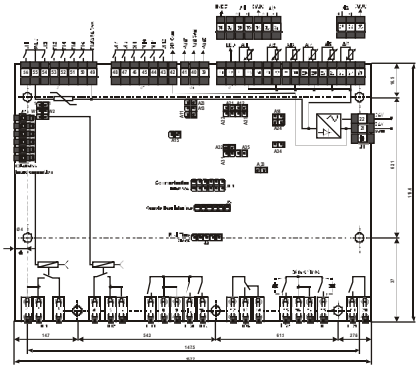
Description

The FX10 "Advanced" is a high performance, programmable controller specifically designed for applications such as Scroll Compressor Chillers and Rooftops, Close Control Units, Indoor Packaged,
Unit Vents, Water Source Heat Pump, etc..
The FX10 is a protocol independent controller and can adapt to protocols such as LONMARK™ and Johnson Controls N2Open.
The controller is freely configurable and can adapt to virtually any applications, thanks to its configuration software FX–Tools.
The controller allows up to 29 I/Os in the base + 12 I/Os in expansion board with several configuration of triacs / relays, active / passive inputs.

Features

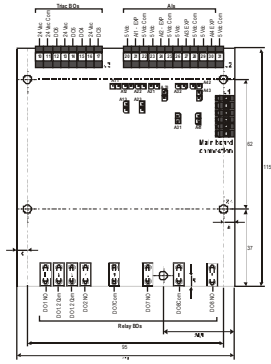
- Protocol independent
- LON, N2Open and BACnet MSTP communication cards (optional)
- Free programmable
- A99
  NTC K10, 2K2
  Ratiometric
  0-10 V
- Real Time Clock (optional)
- Expansion board (optional)
- Choice of connection terminals
- User Interface

FX10 "Advanced" Series



Wiring Diagram (Main Board)

Dimensions



(Expansion Board)

FX10 "Advanced" Programmable Electronic Controller Selection Table

Power Supply	I/0 Ratings			Configuration	Type-Model Number	
24 V AC/DC ± 15%, 50/60 Hz	Analog Input (AI) – Main Board			MOLEX connectors, low power relays	**LP-FX10B31-002C**	
	AI1, AI2, AI3	A99 NTC (K10, 2k2) Ratiometric	Range: -40 to 100°C Range: 0 ÷ 100°C Accuracy: ±0.5°C @ 20°C ambient (sensor error not included) Range: 0.5 to 4.5 V, Resolution: 10 mV			
	AI4, AI5, AI6	A99 Accuracy:	Range: -40 to 100°C ±0.5°C @ 20°C ambient (sensor error not included)			
	Analog Input (AI) – Expansion Board					
	AI1, AI2	A99 Accuracy: Ratiometric	Range: -40 to 100°C ±0.35°C @ 20°C ambient (sensor error not included) Range: 0.5 to 4.5 V, Resolution: 10 mV			
	AI3, AI4	A99 Accuracy: 0-10 V	Range: -40 to 100°C ±0.5°C @ 20°C ambient (sensor error not included) Range: 0 to 10 V, Resolution 10 mV			
	Digital Input (DI) – Main Board			MOLEX connectors, 2 triacs + low power relays	**LP-FX10B32-002C**	
	DI1,DI2	Voltage free contacts with safety control feature				
	DI3, DI4, DI5, DI6	Voltage free contacts				
	DI7, DI8, DI9, DI10, DI11, DI12	24 VAC external powered contacts				
	Digital Output (DO) – Main Board			WAGO connectors, low power relays	**LP-FX10B33-002C**	
	DO1, DO2	SPST 8(3)A, 250Vac relays (low power relay version) or SPST 25A, 250Vac relays (high power relay version)				
	DO3, DO4, DO5, DO9	SPST 8(3)A, 250Vac relays				
	DO6	SPST 5(2)A, 250Vac relays				
	DO7, DO8	SPST 5(2)A, 250Vac relays or 0.5A / 24Vac triacs				
Outputs DO3 + DO9 can be freely specified either as relay or as triac. The specific hardware code will be created upon minimum order.						

N

FX10 "Advanced" Programmable Electronic Controller for HVAC and Refrigeration Applications.

Electronic Controllers

FX10 "Advanced" Programmable Electronic Controller Selection Table (Cont.)

Power Supply	I/0 Ratings		Configuration	Type-Model Number	
24 V AC/DC ± 15%, 50/60 Hz	Digital Output (DO) – Expansion Board		WAGO connectors, 2 triacs + low power relays	LP-FX10B34-002C	
	DO1, DO2	SPST 5(2)A, 250Vac relays			
	DO7, DO8	SPST 8(3)A, 250Vac relays (low power relay version) or SPST 25A, 250Vac relays (high power relay version)			
	DO3, DO4, DO5, DO6	0.5A / 24Vac triacs			
	Other Outputs – Main Board				
	PWM	9V 9supplied by FX10), 50 mA max, 300 hz			
	LED	Signal to LED of a JCI room command module 10 mA at 2V			

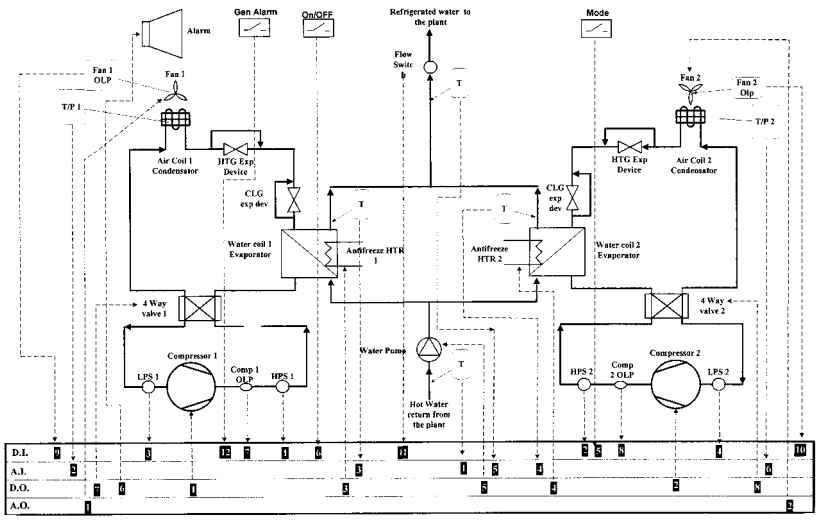
Accessories

Description	Type-Model Number	
Real Time Clock plug-in card	LP-RTC10-000C	
N2Open communication card	LP-NET101-000C	
LON communication interface. On-field commissioning	LP-NET102-000C	
LON communication interface. Specific application profile	LP-NET102-xxxC	
Display Link Interface for display connection (SUI/MUI/LUI)	LP-KIT000-000C	
Input Converter 4 - 20 mA to A99	LP-KIT001-000C	
Converter module: PWM to 0 – 10 V output	LP-KIT003-000C	
Input Converter 0 – 10 V to A99	LP-KIT004-000C	
Pre-crimped set of cables and terminals for Molex connectors (complete set for 2 controllers in each kit)	LP-KIT010-000C	
Condenser fan speed controller single-phase, 3Amps	U215LR-9110	
Expansion board, 4 relays, 4 triacs, a AI, Molex connectors	LP-XP10B10-000C	
Expansion board, 4 relays, 4 triacs, a AI, WAGO connectors	LP-XP10B11-000C	

Displays

Description	Type-Model Number	
Large size LCD (4x20) display (LUI with standard JCI front plate)	LP-DIS65P00-0C	
Medium size LCD (4x20) display, panel mount non-isolated version (MUI)	LP-DIS60P00-0C	
Medium size LCD (4x20) display, wall mount isolated version (MUI)	LP-DIS60P01-0C	
Small size LED (3 digits) display, panel mount (SUI)	LP-DIS50P00-0C	

N



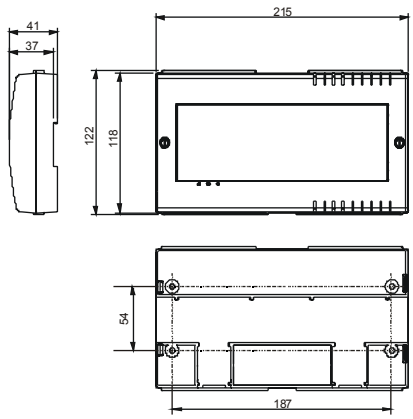
Example of Standard Application

Air / Water Chiller / HP, 2 compressors / 2 circuits – Application Code: 702FX1021-002AR

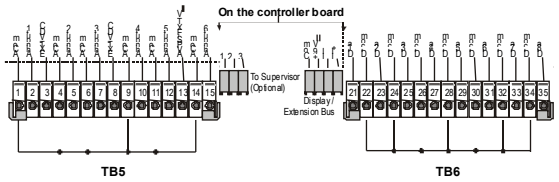
FX15 "Universal" High Performance Controller for Chillers and rooftops, indoor packaged air conditioning units, Air Handling Units, Close Control Units, etc

Electronic Controllers

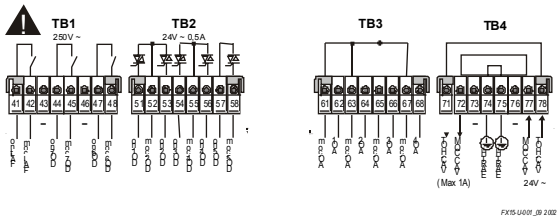
FX15 Controller with integrated MUI display



Dimensions



-20T50



Typical Wiring

Description

The FX15 "Universal" is a high performance controller intended for applications such as chillers and rooftops, indoor packaged air conditioning units, Air Handling Units, Close Control Units, etc…

The FX15 is a protocol independent controller and can adapt to protocols such as LONMARK™, Johnson Controls N2Open.

The controller is freely configurable and can adapt to virtually any applications, thanks to the FX-Tools configuration package.

The controller allows up to 26 inputs / outputs.

Features

- LON or N2open cards (optional)
- Freely programmable
- A99 / NTC k10, 2k2
  4-20 mA
  0-10 V
  0-5 V Ratiometric
- Real Time Clock
- User Interface, local or remote

N

FX15 High Performance Controller Selection Table

Power Supply	I/0 Ratings				Application	Type-Model Number	
24 V AC/DC ± 15%, 50/60 Hz	Analog Input (AI)		Sensor	Range	5 triacs + 3 relays	**LP-FX15D00-000C**	
	TB5	AI1, AI2, AI3, AI4, AI5, AI6	JCI Nickel Standard range	-45,4 to –121,5 °C	With N2 Open card pre-assembled	**LP-FX15D01-000C**	
			JCI Nickel Extended Range	21 to 287.8 °C			
			Siemens Nickel	-50 to 160 °C			
			DIN Nickel	-60 to 180 °C			
			DIN std Platinum 1000 Ohm	-50 to 605 °C			
			NTC 10K	-20 to 150 °C			
			NTC 2.2 K	-40 to 150 °C			
			A99	-45 to 126 °C			
			0 to 5 VDC ratio-matrix	10 % to 90% of votage supply			
			0 to 10 VDC				
			0 to 20 mA				
	3, 8, 13	EXT-VDC	+17 V, 80 mA		With LON card pre-assembled	**LP-FX15D02-000C**	
	13	AVPS	+5V, 20 mA		With integratedLCD Display	**LP-FX15D50-000C**	

FX15 "Universal" High Performance Controller (continued)

Electronic Controllers

FX05 High Performance Controller Selection Table

Power Supply	I/0 Ratings			Application	Type-Model Number	
24 V AC/DC ± 15%, 50/60 Hz	Digital Input (DI)			With integratedLCD Display and N2 Open card pre-assembled	**LP-FX15D51-000C**	
	TB6	DI1, DI2, DI3, DI4, DI5, DI6, DI7, DI*	Voltage free contacts	With integratedLCD Display and LON card pre-assembled	**LP-FX15D52-000C**	
	Digital Output (DO)					
	TB1	FAIL, DO7, DO6	SPST 8(3)A power relays			
	TB2	DO1, DO2, DO3, DO4, DO5	0.5A / 24 VAC triacs			
	Analog Outputs (AO)					
	TB3	AO1, AO2, AO3, AO4	0…10 VDC, 0…20 mA, 4…20 mA			

Accessories

Description	Type-Model Number	
N2Open communication interface	**LP-NET151-000C**	
Advanced LON communication interface. On-field commissioning	**LP-NET152-000C**	
Advanced LON communication interface. Specific application profile	**LP-NET152-xxxC**	
Pre-assembled link cable, FX15 to remote LUI/MUI display – 3 m	**LP-KIT007-000C**	
Programming key for easy application downloading	**LP-KIT100-000C**	
Condenser fan speed controller single-phase, 3Amps	**U215LR-9110**	

Displays

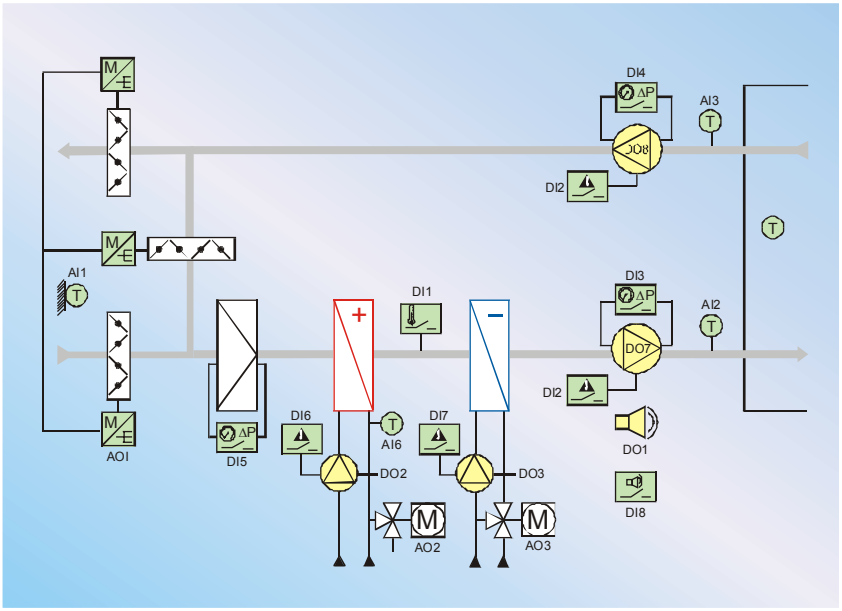
Description	Type-Model Number	
Large size LCD (4x20) display (LUI with standard JCI front plate)	**LP-DIS65P00-0C**	
Medium size LCD (4x20) display, panel mount non-isolated version (MUI)	**LP-DIS60P00-0C**	
Medium size LCD (4x20) display, wall mount isolated version (MUI)	**LP-DIS60P01-0C**	
Small size LED (3 digits) display, panel mount (SUI)	**LP-DIS50P00-0C**	

Expansion Boards

Description	Type-Model Number	
Extension module DX.	**XT-9100-8304**	
Expansion board: 6AI, 2AO.	**XP-9102-8304**	
Expansion board: 8DO (triacs).	**XP-9103-8304**	
Expansion board: 4DI, 4DO (triacs).	**XP-9104-8304**	
Expansion board: 8DI.	**XP-9105-8304**	
Expansion board: 4DO (relays).	**XP-9106-8304**	

FX15 “Universal” High Performance Controller (continued)

Electronic Controllers



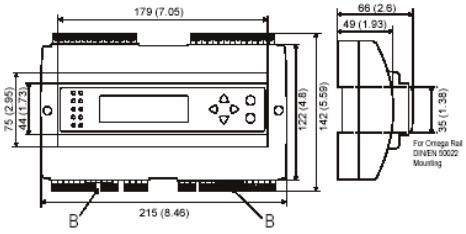
Example of Standard Application
General AHU – Application Code: 900FX1500-000AM

N

FX15 "Classic" High Performance Controller for Chillers and rooftops, indoor packaged air conditioning units, Air Handling Units, Close Control Units, etc

Electronic Controllers

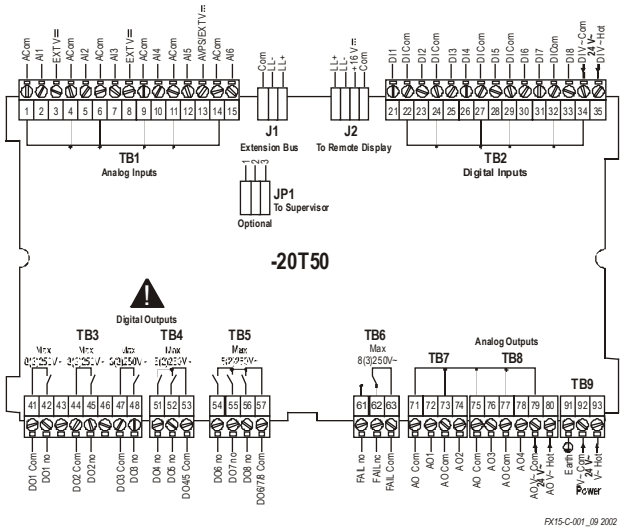
FX15 Controller with integrated MUI display



Dimensions

Description
The FX15 "Classic" is a high performance controller intended for applications such as chillers and rooftops, indoor packaged air conditioning units, Air Handling Units, Close Control Units, etc…
The FX15 is a protocol independent controller and can adapt to protocols such as LON, Johnson Controls N2Open. The controller is freely configurable and can adapt to virtually any applications, thanks to the FX-Tools configuration package. The controller allows up to 27 inputs / outputs with the additional possibility to expand its I/O count through the standard XT/XP modules.

Features
- LON or N2open cards (optional)
- Freely programmable
- A99 / NTC k10, 2k2
  4-20 mA
  0-10 V
  0-5 V Ratiometric
- Real Time Clock
- User Interface, local or remote



Typical Wiring

FX05 High Performance Controller Selection Table

Power Supply	I/0 Ratings				Application	Type-Model Number	
24 V AC/DC ± 15%, 50/60 Hz	Analog Input (AI)		Sensor	Range			
	TB1	AI1, AI2, AI3, AI4, AI5, AI6	JCI Nickel Standard range	-45,4 to –121,5 °C	5 triacs + 4 relays	**LP-FX15D10-000C**	
			JCI Nickel Extended Range	21 to 287.8 °C	With N2 Open card pre-assembled	**LP-FX15D11-000C**	
			Siemens Nickel	-50 to 160 °C			
			DIN Nickel	-60 to 180 °C			
			DIN std Platinum 1000 Ohm	-50 to 605 °C			
			NTC 10K	-20 to 150 °C			
			NTC 2.2 K	-40 to 150 °C			
			A99	-45 to 126 °C			
			0 to 5 VDC ratio-matrix	10 % to 90% of votage supply			
			0 to 10 VDC				
			0 to 20 mA				
	3, 8	EXT-VDC	+16 V, 80 mA		With LON card pre-assembled	**LP-FX15D12-000C**	
	13	AVPS / EXT-VDC	AVPS = +5V, 20 mA EXT-VDC = +16 V, 80 mA		With integratedMUI Display	**LP-FX15D60-000C**	

N

FX15 "Classic" High Performance Controller (continued on next page)

FX15 "Classic" High Performance Controller (continued)

Electronic Controllers

FX05 High Performance Controller Selection Table

Power Supply	I/0 Ratings			Application	Type-Model Number	
24 V AC/DC ± 15%, 50/60 Hz	Digital Input (DI)			With integratedMUI Display and N2 Open card pre-assembled	**LP-FX15D61-000C**	
	TB2	DI1, DI2, DI3, DI4, DI5, DI6,	Potential free contacts			
	Digital Output (DO)			With integratedMUI Display and LON card pre-assembled	**LP-FX15D62-000C**	
	TB3	DO1, DO2, DO3	SPST 8(3)A 250V power relays			
	TB4	DO4, DO5	SPST 5(3)A 250V power relays or 0.5A / 24 VAC triacs	9 relais	**LP-FX15D20-000C**	
	TB5	DO6, DO7, DO8		9 relais and N2 Open card pre-assembled	**LP-FX15D21-000C**	
	TB6	FAIL	SPST 8(3)A 250V power relays	9 relais and LON card pre-assembled	**LP-FX15D22-000C**	
	Analog Outputs (AO)			9 relais, with integratedMUI Display	**LP-FX15D70-000C**	
	TB7	AO1, AO2,	0…10 VDC, 16 bit resolution			
	TB8	AO3, AO4		9 relais, with integratedMUI Display and N2 Open card pre-assembled	**LP-FX15D71-000C**	
	Serial Ports			9 relais, with integratedMUI Display and LON card pre-assembled	**LP-FX15D72-000C**	
	J1	Com, LL-, LL+	RS485 downlink Extension Bus			
	J2	LL-, LL+, +16V, Com	RS485 downlink + power supply Remote Display Bus			
	JP1	RT+ RT- or NETA Com or NETB	Connection to supervisory system, either N2Open or LON			

Accessories

Description	Type-Model Number	
N2Open communication interface	**LP-NET151-010C**	
Advanced LON communication interface. On-field commissioning	**LP-NET152-010C**	
Advanced LON communication interface. Specific application profile	**LP-NET152-xxxC**	
Pre-assembled link cable, FX15 to remote LUI/MUI display – 3 m	**LP-KIT007-000C**	
Kit of female screw connectors	**LP-KIT015-000C**	
Kit of female cage clamp connectors	**LP-KIT015-001C**	
Programming key for easy application downloading	**LP-KIT100-000C**	
Condenser fan speed controller single-phase, 3Amps	**U215LR-9110**	

Displays

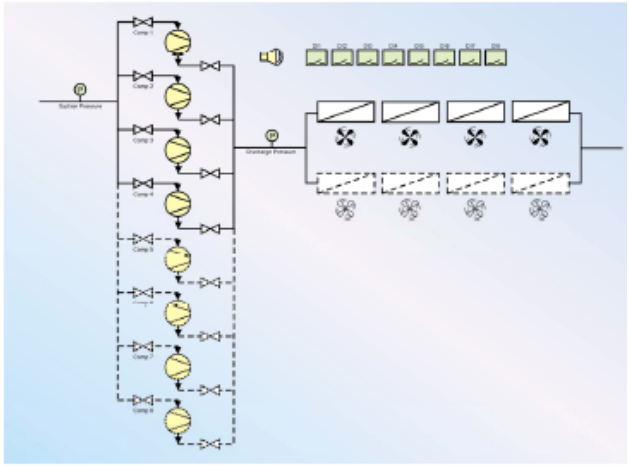
Description	Type-Model Number	
Large size LCD (4x20) display (LUI with standard JCI front plate)	**LP-DIS65P00-0C**	
Medium size LCD (4x20) display, panel mount non-isolated version (MUI)	**LP-DIS60P00-0C**	
Medium size LCD (4x20) display, wall mount isolated version (MUI) for FX15 "classic	**LP-DIS60P01-0C**	
Small size LED (3 digits) display, panel mount (SUI)	**LP-DIS50P00-0C**	

Expansion Boards

Description	Type-Model Number	
Extension module DX.	**XT-9100-8304**	
Expansion board: 6AI, 2AO.	**XP-9102-8304**	
Expansion board: 8DO (triacs).	**XP-9103-8304**	
Expansion board: 4DI, 4DO (triacs).	**XP-9104-8304**	
Expansion board: 8DI.	**XP-9105-8304**	
Expansion board: 4DO (relays).	**XP-9106-8304**	

FX15 "Classic" High Performance Controller (continued)

Electronic Controllers



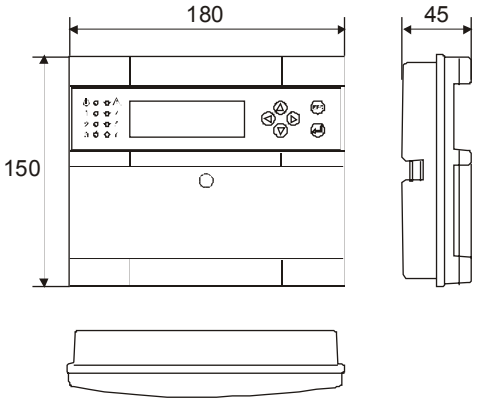
I/O Code	Description
AI1	Suction Pressure
AI2	Discharge Pressure
DI1	Alarm stop relative Compressor / Fan
DI2	Alarm stop relative Compressor / Fan
DI3	Alarm stop relative Compressor / Fan
DI4	Alarm stop relative Compressor / Fan
DI5	Alarm stop relative Compressor / Fan
DI6	Alarm stop relative Compressor / Fan
DI7	Alarm stop relative Compressor / Fan
DI8	Alarm stop relative Compressor / Fan
DO1	Fan / Compressor 1 output
DO2	Fan / Compressor 2 output
DO3	Fan / Compressor 3 output
DO4	Fan / Compressor 4 output
DO5	Fan / Compressor 5 output
DO6	Fan / Compressor 6 output
DO7	Fan / Compressor 7 output
DO8	Fan / Compressor 8 output
DO9	Alarm

Example of Standard Application
Standard Compressor Rack – Application Code: 901FX1500-510AM
For more information about this standard application please refer to the related Application Note.

LUI Large User Interface

Electronic Controllers

LUI Large User Interface



Dimensions

Description

The Large User Interface (LUI) is a local display for the FX10 and FX15 controller series.
It is designed for the end user, the operator or the maintenance people who needs a straightforward way to monitor and adjust controller points. Information are presented in a textual format on the 4x20 LCD backlit display. The display can be used as a portable, hand-held unit, or permanently mounted in a panel or on the wall.

Features

- Menu Operations
- Alarm Summary
- Password Access
- Shortcuts to Specific Pages
- Hardware Customisation
- Software Customisation

LUI Large User Interface Selection Table

Power Supply	Protection Class	Description	Type-Model Number	
9 – 12 Vdc from AC/DC converter or directly powered from the controller for installations up to 3 m.	Hand-held and Wallmounting applications IP30 Panel mount applications IP54	LUI Display, JCI standard front-plate	**LP-DIS65P00-000C**	
		LUI Wall mounting kit	**DT-9100-8902**	
		230 VAC,/ 9 VDC converter,isolated	**DT-9100-8901**	
		120 VAC / 9 VDC converter, isolated	**NP-PWR1209**	
		Display Lnk Interface for FX10	**LP-KIT000-000C**	
		3 m, pre-assembled, connection cable for FX15	**LP-KIT007-000C**	

N

MUI Medium User Interface

Electronic Controllers

MUI Medium User Interface

Description

The Medium User Interface, is a local / remote display for the FX10 and FX15 controllers. It designed for the end user or for the maintenance people who needs a clear and straightforward way to monitor and adjust data. Informations are presented in textual format in the 4x20 backlit LCD display. The display is IP54, it has an extended temperature range: -20°C to +50°C and can be hand held or permanently mounted on a panel or on a wall.

Features

- Menu operations
- Alarm summary page
- Password access
- Software customisation
- Universal power supply

MUI Medium User Interface Selection Table

Power Supply	Protection Class	Description	Type-Model Number	
9 – 48 VDC ± 10% 12 – 24 VAC ± 10%	Hand-held and Wallmounting applications IP30 Panel mount applications IP54	MUI Display, Panel mount version	**LP-DIS60P00-000C**	
		MUI Display, Wall mount isolated version	**LP-DIS60P01-000C**	
		Display Lnk Interface for FX10 (DLI card)	**LP-KIT000-000C**	
		3 m connection cable for FX15	**LP-KIT007-000C**	

N

SUI Small User Interface

Electronic Controllers

SUI Medium User Interface

Description

The Small User Interface, is a remote display for the FX10 and FX15 controllers. It designed to provide an easy and cost effective way to monitor and adjust data. Informations are presented in the 3 digit LED display. The display has the standards 32x72 enclosure, it is IP54 and it can be permanently mounted on a panel

Features

- Menu operations
- Alarm summary page
- Password access
- Software customisation

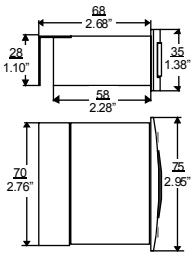
SUI Medium User Interface Selection Table

Power Supply	Protection Class	Description	Type-Model Number	
24 VAC ± 10%	Panel mount applications IP54	SUI Display, Panel mount version	**LP-DIS50P00-000C**	
		Display Lnk Interface for FX10 (DLI card)	**LP-KIT000-000C**	

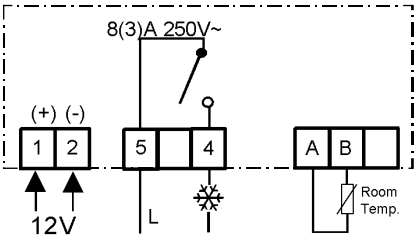
N

MR10 Series Thermostats for Compressor and Defrost Management

Electronic Refrigeration Controls

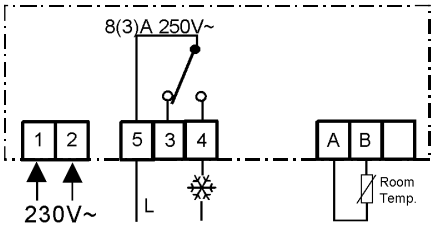


MR10 Series



Wiring MR11PM12R-1C

Dimensions



Wiring MR11PM230-1C

Description

The MR10 range of controllers has been specifically designed for 'static' or 'ventilated' refrigeration units working at positive or negative temperatures. It incorporates all the features needed by modern units such as compressor and evaporator fan full management, 'off-cycle' or 'active' defrost control.

Particular emphasis has been given to the cost, the MR10 offers the basic features for a complete solution maintaining the cost at a very competitive level.

Its style has been particularly studied in order to better suit your machine design.

Features

- Attractive Panel mount enclosure
- Up to 4 relays in a single package
- Up to 16A thermostat output
- 230Volt power supply models available
- Accurate and interchangeable IP 68 sensor
- Wide range of sensors with various enclosures available
- SMD technology
- Keyboard lock

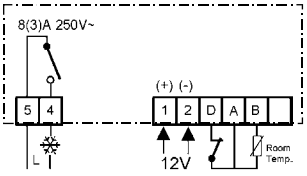
MR11 Thermostats for Compressor Management Selection Table

Range (° C)	Enclosure	Power Supply	Display	Output Rating	Protection Class	Additional features	Type-Model Number	
-40 to +70	Panel	12 V AC/DC	3 digits	SPST 8(3)A	Overall IP20 Faceplate IP54	Accuracy ± 1° C Power consumption 2 VA 50/60 Hz	**MR11PM12R-1C**	
		230 V AC	3 digits				**MR11PM230-1C**	

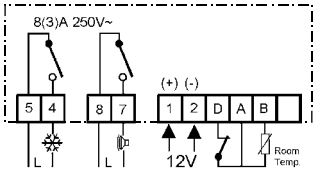
MR12 Thermostats with "off cycle" Defrost Control Selection Table

-40 to +70	Panel	12 V AC/DC	3 digits	SPST 8(3)A	Overall IP20 Faceplate IP54	Accuracy ± 1° C Power consumption 2 VA 50/60 Hz	**MR12PM12R-1C**	
							MR12PM12R-A1C	
		230 V AC					**MR12PM230-Z1C**	
		12 V AC/DC		SPST 16(12)A			**MR12PM12H-1C**	

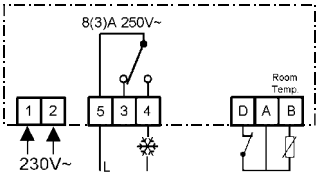
For accessories, see Section Accessories



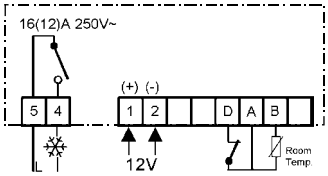
Wiring MR12PM12R-1C



Wiring MR12PM12R-A1C



Wiring MR12PM230-Z1C



Wiring MR12PM12H-1C

O

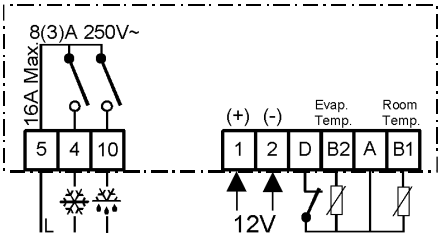
MR10 Series Thermostats for Compressor and Defrost Management (cont.)

Electronic Refrigeration Controls

MR13 Thermostats with Active Defrost Management Selection Table

Range (° C)	Enclosure	Power Supply	Display	Output Rating 250 V AC			Protection Class	Additional features	Type-Model Number	
				Compressor	Alarm	Defrost				
-40 to +70	Panel	12 V AC/DC	3 digits	SPST 8(3)A		SPST 8(3)A	Overall IP20 Faceplate IP54	Accuracy ± 1° C Power consumption 2 VA 50/60 Hz	**MR13PM12R-2C**	

For accessories, see Section Accessories

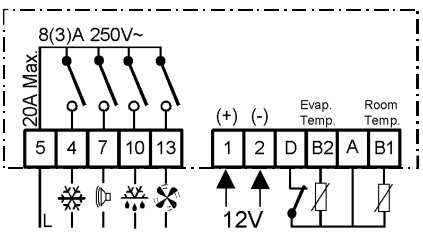


Wiring MR13PM12R-2C

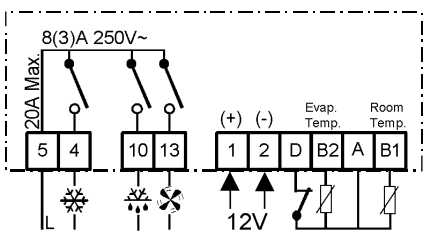
MR14 Thermostats with Defrost and Fan Management Selection Table

Range (° C)	Enclosure	Power Supply	Display	Output Rating 250 V AC				Protection Class	Additional features	Type-Model Number	
				Compressor	Alarm	Defrost	Fan				
-40 to +70	Panel	12 V AC/DC	3 digits	SPST 8(3)A		SPST 8(3)A	SPST 8(3)A	Overall IP20 Faceplate IP54	Accuracy ± 1° C Power consumption 2 VA 50/60 Hz	MR14PM12R-A2C	
				SPST 8(3)A	SPST 8(3)A	SPST 8(3)A	SPST 8(3)A			MR14PM12R-2C	

For accessories, see Section Accessories



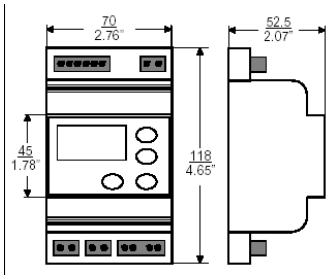
Wiring MR14PM12R-A2C



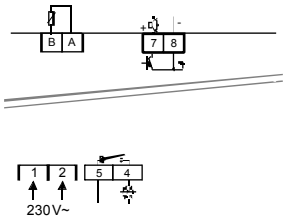
Wiring MR14PM12R-2C

MR10 Series Thermostats for Compressor and Defrost Management (cont.)

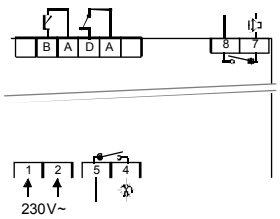
Electronic Refrigeration Controls



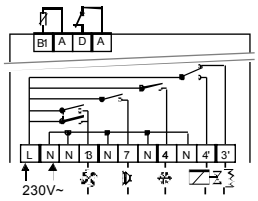
Dimensions DIN-Rail enclosure



Wiring MR1DR230-1C



MR2DR230-1C



MR12DR230-1C

MR11 Thermostats for Compressor Management Selection Table

Range (° C)	Enclosure	Power Supply	Display	Output Rating 250 V AC		Protection Class	Additional features	Type-Model Number	
				Compressor	Alarm				
-40 to +70	DIN Rail (4 models)	230 VAC ± 10%, 2 VA 50/60 Hz	3 digits	SPST 8(3)A	Open Collector	IP20	Accuracy ± 1° C	**MR1DR230-1C**	

For accessories, see Section Accessories

MR2 Thermostat for Compressor Management with 'Off Cycle' Defrost Control Selection Table

Range (°C)	Enclosure	Power Supply	Protection class	Additional Features	Display	Output Rating 250Vac					Type-Model Number	
						Compressor	Defrost	Fan	Alarm	Pump Down		
-40 to +70	DIN Rail (4 modules)	230Vac ±10% 2VA 50/60 Hz	IP 20	Accuracy ±1°C	3 digits	SPST 8(3)A			SPST 8(3)A		**MR2DR230-1C**	
						SPST 8(3)A		SPST 16(6)A	SPST 8(3)A	SPST 8(3)A	**MR12DR230-1C**	

MR4 Thermostat with Active Defrost and Fan Management Selection Table

Range (°C)	Enclosure	Power Supply	Protection class	Additional Features	Display	Output Rating 250Vac					Type-Model Number	
						Compressor	Defrost	Fan	Alarm	Pump Down		
-40 to +70	DIN Rail (4 modules)	230Vac ±10% 2VA 50/60 Hz	IP 20	Accuracy ±1°C	3 digits	SPST 8(3)A			SPST 8(3)A		**MR2DR230-1C**	
						SPST 8(3)A		SPST 16(6)A	SPST 8(3)A	SPST 8(3)A	**MR12DR230-1C**	

O

MR10 Series Thermostats for Compressor and Defrost Management (cont.)

Electronic Refrigeration Controls

Parameters :

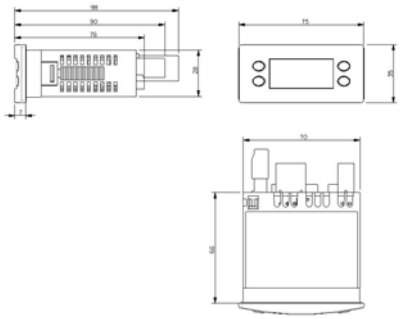
	Parameter	Setting Range	Default	MR11 and MR1	MR12 and MR2	MR13	MR14 MR4 and MR15
Temperature control parameters							
Hy	Hysteresis (HY)	1 to 9 K	2	•	•	•	•
LL	Lower setpoint limit (LL)	-40°C to higher limit	-40	•	•	•	•
HL	Higher setpoint limit (HL)	lower limit to 70°C	70	•	•	•	•
CC	Anti short cycling (CC)	0 to 9 min	2	•	•	•	•
Co	Deep freezing time (Co)	0 to 99 min	60	•	•	•	•
Alarm parameters							
AH	High. temperature alarm	0 to 50°C related to setpoint	10	•	•	•	•
AL	Low temperature alarm	-50 to 0°C related to setpoint	-10	•	•	•	•
Ad	Alarm differential	1 to 9 K	1	•	•	•	•
At	Alarm time delay	0 to 99 min	30	•	•	•	•
Defrost parameters							
dF	Defrost function	0 = Electric heater 1 = Hot gas	0			•	•
dE	Defrost end function	0= by time 1= by temperature	1			•	•
dt	Defrost termination temp	0 to 20°C	7			•	•
di	Defrost interval time	0 to 99 hours	6		•	•	•
dd	Max. defrost duration	0 to 99 min	40		•	•	•
dC	Dripping time	0 to 99 min	5		•	•	•
dU	First defrost after power on	OFF, 0 to 99 min	OF		•	•	•
dP	Display during defrost	0 = Last value before defrost 1 = Set point	0		•	•	•
dr	Delay displayed temp after defrost	1 to 99 min	20		•	•	•
Digital input parameters							
iF	Digital input function	0= not connected 1= High Level Al. 2= Delayed Alarm 3= door switch	0		•	•	•
id	Digital input time delay	0 to 99 min	5		•	•	•
Fan control parameters							
FF	Fan operating function	0 = Parallel with compressor 1 = Continuous *Always OFF during defrost*	0				•
Fd	Fan start-up delay after defrost end and power up	0 to 99 min.	5				•
Fr	Fan start-up temperature after defrost end and power up	-30 to +5 °C	-5				•
Other parameters							
SF	Thermostat operating function if sensor failure	0 = Always ON 1 = Always OFF 2 = Automatic	2	•	•	•	•
So	Sensor offset	-20 to +20 k	0	•	•	•	•
Un	Temperature units	0 = °C 1 = °F	0	•	•	•	•
PU	Display updating time	1 to 99 sec	1	•	•	•	•

O

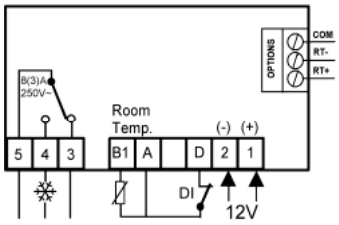
MR40 Series Advanced Thermostats for Compressor and Defrost Management

Electronic Refrigeration Controls

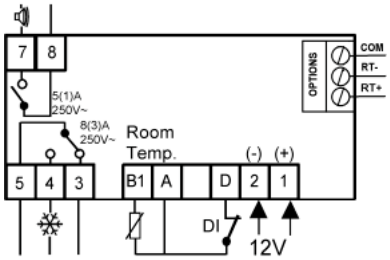
MR40 Series



Dimensions



Wiring MR42PM12R-1C



Wiring MR42PM12R-A1C

Description

The MR40 is a digital controller for “static” or “ventilated” refrigeration units working at positive or negative temperatures. It incorporates all the features needed by modern units such as compressor and evaporator fan full management, “off-cycle” or “active” defrost control, additional auxiliary output for alarm signalling or light control.

The MR40 functions can be further expanded through other elements such as the LON or Johnson Controls N2Open serial communication card. It is also optionally equipped with a Real Time Clock card for energy saving and real time scheduling of events such as defrost cycles.

Features

- Attractive Panel mount enclosure
- Up to 4 relays in the standard 35 x 72 mm enclosure
- Temperature display with “decimal” accuracy
- Decimal Point Visualisation
- Accurate and interchangeable IP 68 sensor
- Wide range of sensors with various enclosures available
- SMD technology
- LON and N2Open™ serial communication cards (optional)
- Real Time Clock (optional)

MR42 Advanced Thermostats with “off cycle” Defrost Selection Table

Range (° C)	Enclosure	Power Supply	Display	Output Rating 250 V AC				Protection Class	Additional features	Type-Model Number	
				Compressor	Alarm	Defrost	Fan				
-40 to +70	Panel	12 V AC/DC	3 digits	SPDT 8(3)A				Overall IP20 Faceplate IP54	Accuracy ± 0.3° C Power consumption 2.5 VA 50/60 Hz	**MR42PM12R-1C**	
				SPDT 8(3)A	SPDT 8(3)A		SPST 8(3)A			**MR42PM12R-A1C**	

O

MR40 Series Advanced Thermostats for Compressor and Defrost Management (cont.)

Electronic Refrigeration Controls

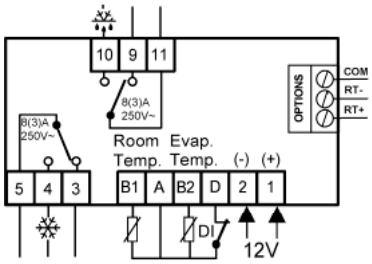
MR43 Advanced Thermostats with Active Defrost Management Selection Table

Range (° C)	Enclosure	Power Supply	Display	Output Rating 250 V AC				Protection Class	Additional features	Type-Model Number	
				Compressor	Alarm	Defrost	Fan				
-40 to +70	Panel	12 V AC/DC	3 digits	SPDT 8(3)A		SPDT 8(3)A		Overall IP20 Faceplate IP54	Accuracy ± 0.3° C Power consumption 2.5 VA 50/60 Hz	**MR43PM12R-2C**	

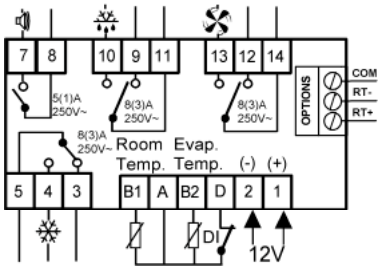
MR44 Advanced Thermostats with Defrost and Fan Management Selection Table

-40 to +70	Panel	12 V AC/DC	3 digits	SPDT 8(3)A	SPST 8(3)A	SPDT 8(3)A	SPDT 8(3)A	Overall IP20 Faceplate IP54	Accuracy ± 0.3° C Power consumption 2.5 VA 50/60 Hz	**MR44PM12R-A2C**	

For accessories, see Section Accessories



Wiring MR43PM12R-2C



Wiring MR44PM12R-A2C

O

MR40 Series Advanced Thermostats for Compressor and Defrost Management (cont.)

Electronic Refrigeration Controls

Display parameters

Display code	Parameter	Setting Range	Default	MR42	MR43	MR44
Temperature control parameters						
Hy	Hysteresis	1 to 9 K	2	•	•	•
LL	Lower setpoint limit	-40°C to 70°C	-40	•	•	•
HL	Higher setpoint limit	-40°C to 70°C	70	•	•	•
CC	Anti short cycling	0 to 9 min	2	•	•	•
Co	Deep freezing time	0 to 99 min	60	•	•	•
Alarm parameters						
AH	Higher temperature alarm	0 to 50°C	10	•	•	•
AL	Low temperature alarm	-50 to 0°C	-10	•	•	•
Ad	Alarm differential	1 to 9 K	1	•	•	•
At	Alarm time delay	0 to 99 min	30	•	•	•
AC	Alarm delay after power-up and defrost	0 to 99 min	20	•	•	•
Defrost parameters						
dF	Defrost function	oFF(0) = "Off-Cycle" ELE(1) = Electric heater HGA(2) = Hot gas	ELE		•	•
dn	Defrost initiation mode	0 = Internal timer 1 = Real Time Clock	0	•	•	•
dE	Defrost end function	0 = by temperature 1 = by time 2 = first occurrence 3 = last occurrence	0		•	•
dt	Defrost termination temp	0 to 20°C	7		•	•
di	Defrost interval time	0 to 99 hours	6	•	•	•
dd	Max. defrost duration	0 to 99 min	40	•	•	•
dC	Dripping time	0 to 99 min	5	•	•	•
dU	First defrost after power on	oFF, 0 to 99 min	oFF	•	•	•
dP	Display during defrost	0 = Last value before defrost 1 = Set point	0	•	•	•
dr	Delay displayed temp after defrost	1 to 99 min	20	•	•	•
Digital input parameters						
iF	Digital input function	0 = Not connected 1 = General alarm 2 = Delayed alarm 3 = Door switch 4 = Setpoint bias 5 = Defrost start 6 = oFF mode 7 = AUX output control 8 = Fan only mode	0	•	•	•
id	Digital input time delay	0 to 99 min	5	•	•	•
ib	Set point bias	-10 to +10k	3	•	•	•
Fan control parameters						
FF	Fan operating function	0 = Parallel to compressor 1 = Always ON 2 = by temperature *Fan always OFF during defrost*	0			•
Fd	Fan start-up delay after defrost end and power-up	0 to 99 min.	5			•
Fr	Fan start-up temperature after defrost end and after power-up	-30 to +5 °C	5			•
FS	Fan differential	-30 to +5 °C	-5			•
FH	Fan hysteresis	0 to 20 °C	2			•

O

MR40 Series Advanced Thermostats for Compressor and Defrost Management (cont.)

Electronic Refrigeration Controls

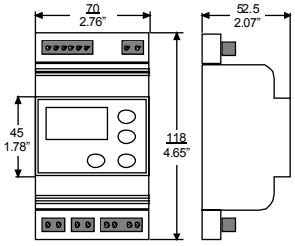
Display code	Parameter	Setting Range	Default	MR42	MR43	MR44
Other parameters						
SF	Thermostat functioning if sensor failure	on(1) = Always ON oFF(0)= Always OFF AUt(2) = Automatic	AUt	•	•	•
So	Sensor offset	-20 to +20 units	0	•	•	•
Un	Temperature units	0 = °C 1 = °F	0	•	•	•
Pd	Virtual temperature weight	0 to 100 %	0	•	•	•
AA	Programmable digital output	0 = alarm 1 = auxiliary	0	•		•
Add	Serial address	1 to 255	255	•	•	•
Real Time Clock parameters						
HH	Hour setting	0 to 23	0	•	•	•
nn	Minute setting	0 to 59	0	•	•	•
dAy	Day of the week setting	0 = Sunday 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday	0	•	•	•
dHx x=1 to 6	Event No. x Hour setting	0 to 23	8	•	•	•
dnx x=1 to 6	Event No. x Minute setting	0 to 59	0	•	•	•
ddx x=1 to 6	Event No. x weekday setting	0 = Never 1 = all days 2 = from Monday to Friday 3 = Saturdays & Sundays 4 = from Monday to Saturday 5 = Sundays only	0	•	•	•
biH	Bias Start Hour	0 to 23	20	•	•	•
bin	Bias Start Minute	0 to 59	0	•	•	•
bi	Bias Status	on / oFF	oFF	•	•	•
bSH	Bias Stop Hour	0 to 23	0	•	•	•
bSn	Bias Stop Minute	0 to 59	0	•	•	•

O

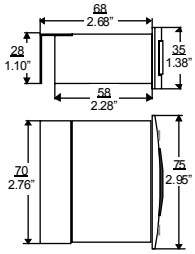
MS Series Elecronic Refrigeration Control

Electronic Refrigeration Controls

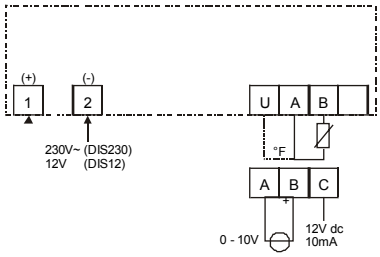
MS Series



Dimensions DIN Rail



Dimensions Panel



Wiring DISxx

Description

This range of versatile controls is intended for single or multistage (2 or 4 stages) applications such as heating, cooling but also humidity or pressure depending on the input type.

This range incorporates all control functions as required by modern applications and it exists in both panel mount and DIN rail enclosures. Particular attention has been given to its style in order to better suit your machine design.

This complete range of microprocessor based controls offers innovative features and “state of the art” technology.

Features

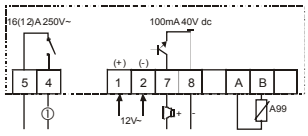
- Attractive Panel mount and DIN rail mount enclosure
- Up to 4 relays in panel mount enclosure
- 230 Volt power supply models available
- Accept A99 and 0-10 Volts sensor signal depending on models
- Power supply to sensors on 0-10 Volts models available from controller
- Accurate and interchangeable IP 68 sensor
- Wide range of enclosures for sensors available
- Keyboard lock
- SMD technology

MS Display Selection Table

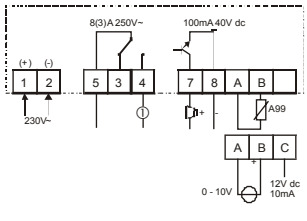
Range (° C)	Power Supply	Enclosure	Input	Protection Class	Additional features	Type-Model Number	
-40 to +70	12 V AC/DC	Panel	A99 sensor (incl.)	Overall IP20 Front IP54	Accuracy ± 1° C Power cons. 1.5 VA 50/60 Hz	**DIS12T-1C**	
	230 V AC					**DIS230T-1C**	
0 to +100	12 V AC		0-10 V from humidity sensor (not Incl.)			**DIS12V-1C**	
	230 V AC					**DIS230V-1C**	

MS1 One-stage Control Selection Table

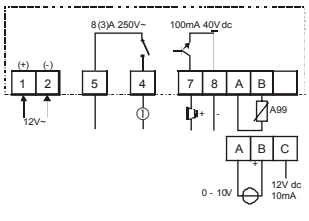
Range (° C)	Power Supply	Enclosure	Input	Output Rating 250 VAC	Alarm Output	Protection Class	Additional features	Type-Model Number	
-40 to +70	12 V AC/DC	Panel	A99 sensor (incl.)	SPST 8(3)A	Open Collector 40 VDC/ 100mA	Overall IP20 Front IP54	Accuracy ± 1° C Power consumption 2 VA 50/60 Hz	**MS1PM12RT-1C**	
	230 V AC			SPDT 8(3)A				**MS1PM230T-1C**	
	12 V AC			SPST 16(12)A		IP20		**MS21PM12RT-1C**	
	230 V AC	DIN rail		SPST 8(3)A				**MS1DR230T-1C**	
-40 to +100	12 V AC		0-10 V	SPST 8(3)A		Overall IP20 Front IP54		**MS1PM12RV-1C**	
	230 V AC			SPDT 8(3)A				**MS1PM230V-1C**	
	230 V AC			SPST 8(3)A		IP20		**MS1DR230V-1C**	



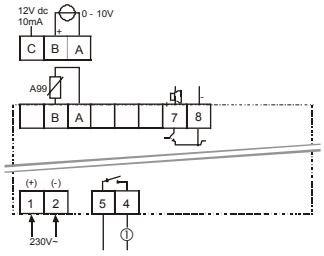
Wiring MS1PM12RT-1C/ MS1PM12RV-1C



Wiring MS1PM230T-1C/ MS1PM230V-1C



Wiring MS21PM12RT-1C



Wiring MS1DR230T-1C/ MS1DR230V-1C

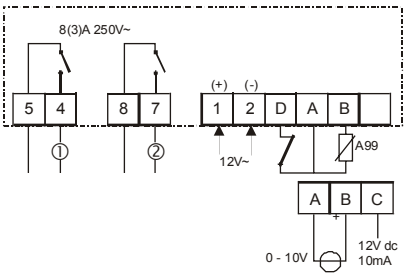
O

MS Series Elecronic Refrigeration Control (cont.)

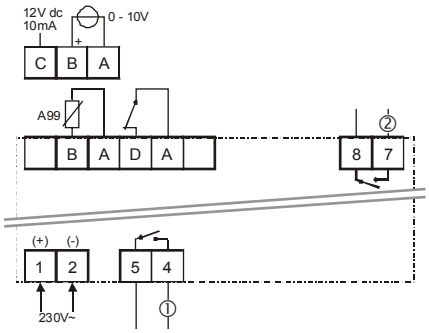
Electronic Refrigeration Controls

MS2 Two-stage Control Selection Table

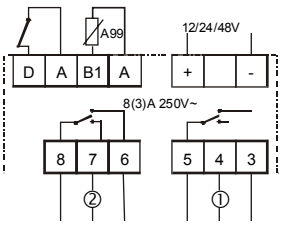
Range (° C)	Power Supply	Enclosure	Input	Output Rating 250 VAC		Alarm Output	Protection Class	Additional features	Type-Model Number	
				stage1	stage2					
-40 to +70	12 V AC/DC	Panel	A99 sensor (incl.)	SPST 8(3)A	SPST 8(3)A	40 VDC/ 100mA Open Collectors	Overall IP20 Front IP54	Accuracy ±1° C Power consumption 2 VA 50/60 Hz	**MS2PM12RT-1C**	
	230 V AC	DIN rail		SPST 8(3)A	SPST 8(3)A		IP20		**MS2DR230T-1C**	
-40 to +100	12 V AC	Panel	0-10 V	SPST 8(3)A	SPST 8(3)A		Overall IP20 Front IP54		**MS2PM12RV-1C**	
	230 V AC	DIN rail		SPST 8(3)A	SPST 8(3)A		IP20		**MS2DR230V-1C**	
-40 to +70	12-24 V AC/DC 48 VDC		A99 sensor (incl.)	SPDT 8(3)A	SPDT 8(3)A				**MS2DR48DT-1C**	



Wiring MR2PM12RT-1C / MS2PM12RV-1C



Wiring MS2DR230T-1C / MS2DR230V-1C



Wiring MS2DR48DT-1C

O

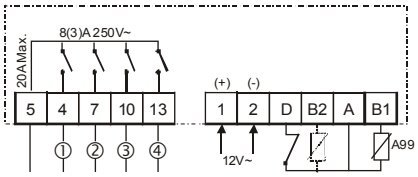
MS Series Elecronic Refrigeration Control (cont.)

Electronic Refrigeration Controls

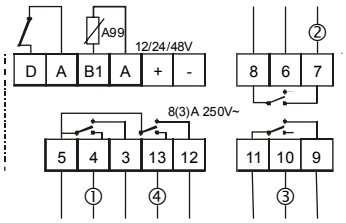
MS4 Four-stage Control Selection Table

Range (° C)	Power Supply	Enclosure	Input	Output Rating 250 VAC 8(3)A			Open Collectors	Protection Class	Additional features	Type-Model Number	
				Stage 1	Stage 2	Stage 3 and 4					
-40 to +70	12 V AC/DC	Panel	A99 sensor (incl.)	SPST	SPST	SPST	40 VDC/ 100mA	Overall IP20 Front IP54	Accuracy ±1° C Power consumption 2 VA 50/60 Hz	**MS4PM12RT-1C**	
	230 V AC	DIN rail		SPST	SPST	SPST				**MS4DR230T-1C**	
	12-24 V AC/DC 48 VDC	Panel		SPDT	SPDT	SPDT		IP20		**MS4DR48T-1C**	

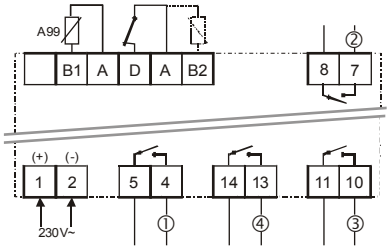
For accessories, see Section Accessories



Wiring MS4PM12RT-1C



Wiring MS4DR230T-1C



Wiring MS4DR48T-1C

O

MS Series Elecronic Refrigeration Control (cont.)

Electronic Refrigeration Controls

Parameters

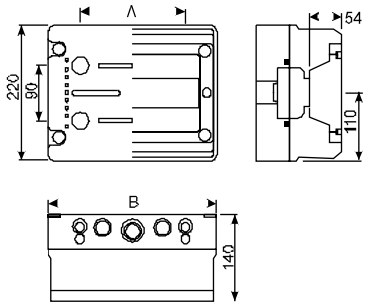
	Parameter	Setting Range	Default	MS1 MSx1	MS2	MS4
Temperature control parameters						
H1	Hysteresis (HY)	1 to 9 K	2	•	•	•
S2	□ Setpoint 2	Direct/Reverse = 1 to 40 units Deadband = 2 to 40 units Indip. setpoint = Low to high limit	3		•	•
H2	Hysteresis (HY)	1 to 9 K	-40		•	•
S3	□ Setpoint 3	1 to 40 units	-40			•
H3	Hysteresis (HY)	1 to 9 K	-40			•
S4	□ Setpoint 4	1 to 40 units	-40			•
H4	Hysteresis (HY)	1 to 9 K	-40			•
LL	Lower setpoint limit (LL)	-40°C to higher limit	-40	•	•	•
HL	Higher setpoint limit (HL)	lower limit to 125 units	70	•	•	•
CC	Anti short cycling cooling (CC)	0 to 9 min	2	•	•	•
CH	Anti short cycling heating (CH)	0 to 99 min	60	•	•	•
rt	Soft start	0 to 99 min / units	3	•	•	•
Alarm parameters						
AH	High. temperature alarm	0 to 50 units related to setpoint	10	•	•	•
AL	Low temperature alarm	-50 to 0 units related to setpoint	-10	•	•	•
Ad	Alarm differential	1 to 9 units	1	•	•	•
At	Alarm time delay	0 to 99 min	30	•	•	•
Temperature parameters						
Lc	Non compensated band	0 to 20 K	OF			•
Uc	Heating compensation	0 to 6 K/K	0			•
nc	Cooling compensation	0 to 6 K/K	20			•
Other parameters						
So	Sensor offset	-20 to +20 units	0	•	•	•
Un	Temperature units	0 = Celsius degrees 1 = Fahrenheit degrees	0	•	•	•
PU	Display updating time delay	1 to 99 sec	7	•	•	•
iF	Digital input function	0 = Not used 1 = Shut off and alarm signalling 2 = Stand by mode 3 = Remote switch off	6		•	•
Sb	Stand-by bias	0 to 20 units	40		•	•
Id	Digital input time delay	0 to 99 sec	5		•	•
IS	Interstage delay	3 to 99 sec	20		•	•
Lr	Low range analog input 1	-40 to high range	20	•	•	
Hr	High range analog input 1	Low range to 100	20	•	•	

* When there are 2 setpoints (MS2 or MS4 is configured for independent setpoint mode), the low alarm is linked to the lowest setpoint and the high alarm is linked to the highest setpoint.

O

CR Series Positive Temperature Cold Room Control Cabinets

Electronic Refrigeration Controls



CR Series

	A	B
12 modules	164	275
18 modules	269	380

Description

Designed to facilitate installers work, this range of electrical cabinet is intended for use in cold rooms working at positive or negative temperatures and powered either with single phase or three phase power supply.

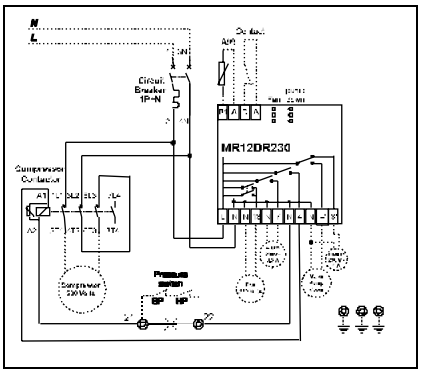
Based on specifically designed controllers, it incorporates all control functions as required by modern cold room units, such as compressor control, defrost management, fan management, alarm function and solenoid valve for “pump down”.

It also includes all the safety equipment needed such as circuit breakers for the compressor and for the controller.

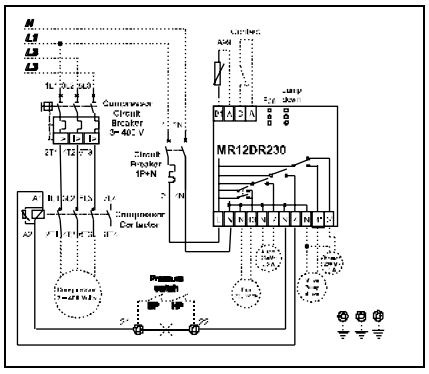
Particular attention has been given to the accessibility so that the installation time will be reduced to a minimum. Space has been left available for customisation.

Features

- Power rating from :
- 0,37 to 1,5 kW in single phase
- 1,5 to 7,5 kW in three phases
- Standard DIN rail components
- Most wiring integrated on the controller
- Specifically designed controller to
- manage Pump Down
- Accurate and interchangeable
- IP 68 sensor
- IP 65 standard DIN polycarbonate cabinets
- Integrate circuit breaker for motor and controller
- In field extension
- Main Switch



Positive temperature cold room single phase model



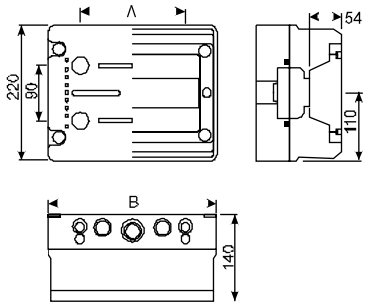
Positive temperature cold room three phase mode

Positive temperature cold room cabinets Selection Table

Cabinet Size	Power supply		Compressor		Evaporator Fan	Type-Model Number	
Modules	V ac	Φ	Power AC-3	Amps	Amps		
12	230	1	0,37 kW	5	1,6	**CR-PS037-1**	
12	230	1	0,75 kW	8	1,6	**CR-PS075-1**	
12	230	1	1,1 kW	10	3,2	**CR-PS110-1**	
12	230	1	1,5 kW	12	3,2	**CR-PS150-1**	
18	400	3	1,5 kW	3,5	3,2	**CR-PT150-1**	
18	400	3	2,5 kW	5,7	3,2	**CR-PT250-1**	
18	400	3	4,0 kW	8,5	4,8	**CR-PT400-1**	
18	400	3	5,5 kW	11,5	4,8	**CR-PT550-1**	
18	400	3	7,5 kW	15,5	4,8	**CR-PT750-1**	

CR Series Negative Temperature Cold Room Control Cabinets

Electronic Refrigeration Controls



CR Series

	A	B
12 modules	164	275
18 modules	269	380

Description

Designed to facilitate installers work, this range of electrical cabinet is intended for use in cold rooms working at positive or negative temperatures and powered either with single phase or three phase power supply.

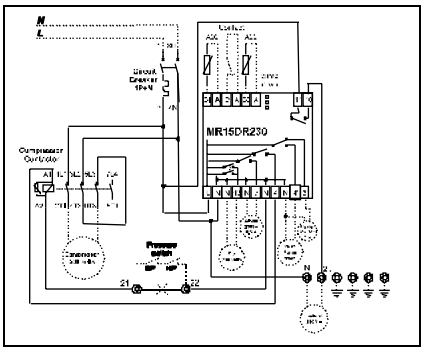
Based on specifically designed controllers, it incorporates all control functions as required by modern cold room units, such as compressor control, defrost management, fan management, alarm function and solenoid valve for “pump down”.

It also includes all the safety equipment needed such as circuit breakers for the compressor and for the controller.

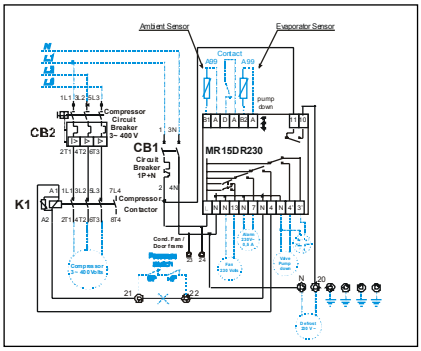
Particular attention has been given to the accessibility so that the installation time will be reduced to a minimum. Space has been left available for customisation.

Features

- Power rating from :
- 0,37 to 1,5 kW in single phase
- 1,5 to 7,5 kW in three phases
- Standard DIN rail components
- Most wiring integrated on the controller
- Specifically designed controller to
- manage Pump Down
- Accurate and interchangeable
- IP 68 sensor
- IP 65 standard DIN polycarbonate cabinets
- Integrate circuit breaker for motor and controller
- In field extension
- Main Switch



Negative temperature cold room single phase model



Negative temperature cold room three phase mode

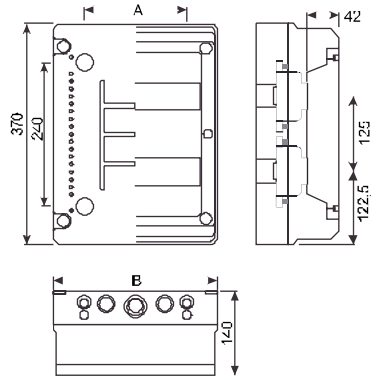
Negative temperature cold room cabinets Selection Table

Cabinet Size	Power supply		Compressor		Evaporator Fan	Cond. Fan/ Door frame heater	Defrost	Type-Model Number	
Modules	V ac	Φ	Power AC-3	Amps	Amps	Amps	Amps		
12	230	1	0,37 kW	5	1,6	-	8	**CR-NS037-1**	
12	230	1	0,75 kW	8	1,6	-	12	**CR-NS075-1**	
12	230	1	1,1 kW	10	3,2	-	12	**CR-NS110-1**	
12	230	1	1,5 kW	12	4,8	-	16	**CR-NS150-1**	
18	400	3	1,5 kW	3,5	3,2	3	12	**CR-NT150-1**	
18	400	3	2,5 kW	5,7	3,2	3	12	**CR-NT250-1**	
18	400	3	4,0 kW	8,5	4,8	3	15	**CR-NT400-1**	
18	400	3	5,5 kW	11,5	4,8	3	15	**CR-NT550-1**	
18	400	3	7,5 kW	15,5	4,8	3	15	**CR-NT750-1**	

O

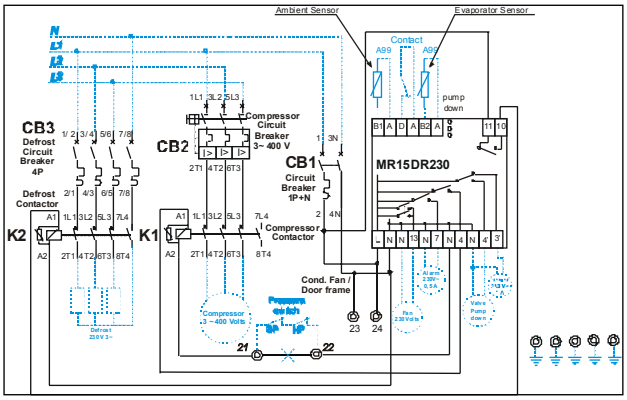
CR Series Cold Room Cabinets with three fase defrost

Electronic Refrigeration Controls



CR Series

	A	B
24 modules	164	275



Negative temperature cold room three phase Compressor and three phase Defrost models

Description

Designed to facilitate installers work, this range of electrical cabinet is intended for use in cold rooms working at positive or negative temperatures and powered either with single phase or three phase power supply.

Based on specifically designed controllers, it incorporates all control functions as required by modern cold room units, such as compressor control, defrost management, fan management, alarm function and solenoid valve for “pump down”.

It also includes all the safety equipment needed such as circuit breakers for the compressor and for the controller.

Particular attention has been given to the accessibility so that the installation time will be reduced to a minimum. Space has been left available for customisation.

Features

- Power rating from :
- 1,5 to 7,5 kW in three phases
- Standard DIN rail components
- Most wiring integrated on the controller
- Specifically designed controller to
- manage Pump Down
- Accurate and interchangeable
- IP 68 sensor
- IP 65 standard DIN polycarbonate cabinets
- Integrate circuit breaker for motor and controller
- In field extension
- Main Switch

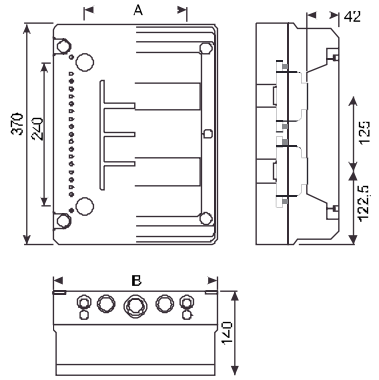
Negative temperature cold room with three fase defrost Selection Table

Cabinet Size	Power supply		Compressor		Evaporator Fan	Defrost	Type-Model Number	
Modules	V ac	Φ	Power AC-3	Amps	Amps	Amps		
24	400	3	1,5 kW	3,5	3,2	3 x 5	**CR-NDT150-1**	
24	400	3	2,5 kW	5,7	3,2	3 x 9	**CR-NDT250-1**	
24	400	3	4,0 kW	8,5	4,8	3 x 10	**CR-NDT400-1**	
24	400	3	5,5 kW	11,5	4,8	3 x 12	**CR-NDT550-1**	
24	400	3	7,5 kW	15,5	4,8	3 x 16	**CR-NDT750-1**	

O

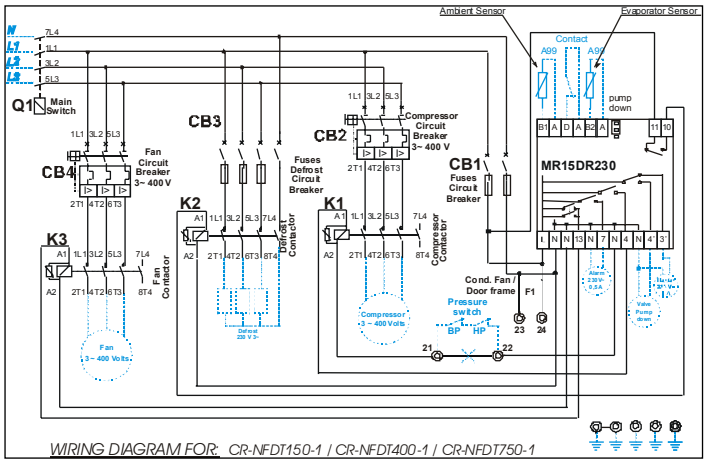
CR Series Negative Temperature Cold Room Cabinets with Three Phase Defrost and Evapoator Fan Control

Electronic Refrigeration Controls



CR Series

	A	B
36 modules	-	380



Negative temperature cold room- three phase Compressor, Defrost and Evaporator Fan

Description

Designed to facilitate installers work, this range of electrical cabinet is intended for use in cold rooms working at positive or negative temperatures and powered either with single phase or three phase power supply.

Based on specifically designed controllers, it incorporates all control functions as required by modern cold room units, such as compressor control, defrost management, fan management, alarm function and solenoid valve for “pump down”.

It also includes all the safety equipment needed such as circuit breakers for the compressor and for the controller.

Particular attention has been given to the accessibility so that the installation time will be reduced to a minimum. Space has been left available for customisation.

Features

- Power rating from :
- 1,5 to 7,5 kW in three phases
- Standard DIN rail components
- Most wiring integrated on the controller
- Specifically designed controller to
- manage Pump Down
- Accurate and interchangeable
- IP 68 sensor
- IP 65 standard DIN polycarbonate cabinets
- Integrate circuit breaker for motor and controller
- In field extension
- Main Switch

O

Negative temperature cold room cabinets with three phase defrost and evaporator fan Selection Table

Cabinet Size	Power supply		Compressor		Evaporator Fan	Cond. Fan/ Door frame heater	Defrost	Type-Model Number	
Modules	V ac	Φ	Power AC-3	Amps	Amps		Amps		
36	400	3	1,5 kW	3,5	3 x 2	3	3 x 5	**CR-NFDT150-1**	
36	400	3	4,0 kW	8,5	3 x 2	3	3 x 10	**CR-NFDT400-1**	
36	400	3	7,5 kW	15,5	3 x 2	3	3 x 16	**CR-NFDT750-1**	

CR Series Temperature Cold Room Cabinets Parameters

Electronic Refrigeration Controls

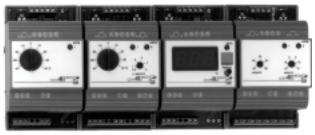
Parameters :

	Parameter	Setting Range	Default	MR12DR	MR15DR
Temperature control parameters					
	Setpoint	-40 to 70°C		•	•
Hy	Hysteresis (HY)	1 to 9 K	2	•	•
LL	Lower setpoint limit (LL)	-40°C to higher limit	-40	•	•
HL	Higher setpoint limit (HL)	lower limit to 70°C	70	•	•
CC	Anti short cycling (CC)	0 to 9 min	2	•	•
Co	Deep freezing time (Co)	0 to 99 min	60	•	•
Alarm parameters					
AH	High. temperature alarm	0 to 50°C related to setpoint	10	•	•
AL	Low temperature alarm	-50 to 0°C related to setpoint	-10	•	•
Ad	Alarm differential	1 to 9 K	1	•	•
At	Alarm time delay	0 to 99 min	30	•	•
Defrost parameters					
dF	Defrost function	0 = Electric heater 1 = Hot gas	0		•
dE	Defrost end function	0= by time 1= by temperature	1		•
dt	Defrost termination temp	0 to 20°C	7		•
di	Defrost interval time	0 to 99 hours	12	•	•
dd	Max. defrost duration	0 to 99 min	40	•	•
dC	Dripping time	0 to 99 min	5	•	•
dU	First defrost after power on	OFF, 0 to 99 min	OF	•	•
dP	Display during defrost	0 = Last value before defrost 1 = Set point	0	•	•
dr	Delay displayed temp after defrost	1 to 99 min	20	•	•
Digital input parameters					
iF	Digital input function	0 = Instrument OFF 1 = Alarm signalling 2 = Alarm reset 3 = Alarm reset and fan cut- off	0	•	•
id	Digital input time delay	0 to 99 sec	5	•	•
Fan control parameters					
FF	Fan operating function	0 = Parallel with compressor 1 = Continuous running	0		•
Fd	Fan start-up delay after defrost end and power up	0 to 99 min.	5		•
Fr	Fan start-up temperature after defrost end and power up	-30 to +5 °C/-22 to 41°F	2		•
Other parameters					
SF	Thermostat operating function when sensor failure	0 = Always ON 1 = Always OFF 2 = Automatic	2	•	•
So	Offset thermostat sensor	-20 to +20 units	0	•	•
Un	Temperature units	0 = °C 1 = °F	0	•	•
PU	Display updating time delay	1 to 99 sec	1	•	•

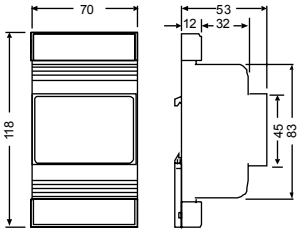
O

System 27 NOVA, One- and Two-stage Thermostat, without Sensor

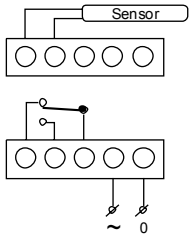
General Electronic Controls



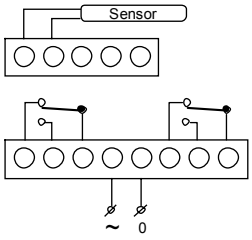
System 27 NOVA



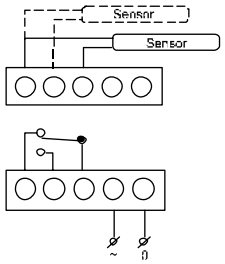
Dimensions



Wiring One -stage



Wiring Two-stage



Wiring Differential Thermostat

Description

System 27 NOVA is a family of modern modular electronic modules designed for a wide variety of control configurations in refrigeration, heating, ventilation, air-conditioning and other related fields.

The modular concept was specially designed to make control configuration easier and still offer the flexibility necessary to answer the many individual control requirements encountered today.

The temperature control modules can be used as a stand alone device or together with other modules, such as, stage modules, display modules, time switch modules, etc., to achieve a diverse number of single or multistage applications.

Features

- Modular design
- "Plug-in" quick connector wiring system
- Adjustable differential and heating/cooling setting
- Wide range of enclosures for sensing elements
- Attractive DIN-rail mount housing
- Setpoint shift output function

Application

Typical applications are:

- refrigerated/freezer display cases
- beverage coolers
- liquid chillers
- cold-room storage.

One-stage Thermostat, without Sensor Selection Table

Setpoint range (°C)	Supply voltage (-15/+10 %) 50/60 Hz	Additional Features	Type-Model Number	
-40 to +40	24 V ac/dc	Mode : Field adjustable Output : SPDT contact 10(5)A 250 V ac Switch action : Automatic reset Differential : 0,5 to 15 K Power consumption : 230 V ac models:4 VA 24V ac/dc models:2 VA Input signal : from A99 temp.sensor Enclosure : DIN RAIL mount (35 mm), IP20	**A27A1N11**	
10 to 100	24 V ac/dc		**A27A1N12**	
-40 to +40	230 V ac		**A27A2N11**	
10 to 100	230 V ac		**A27A2N12**	
0 to 30	230 V ac		**A27A2N14**	
-20 to 60	230 V ac		**A27A2N15**	

Two-stage Thermostat, without Sensors Selection Table

-40 to +40	24 V ac/dc	Mode : Field adjustable Output : two SPDT contacts 10(5)A 250 V ac Switch action : Automatic reset Input signal : from A99*-91** temp.sensor Enclosure : DIN RAIL mount (35 mm), IP20 Differential : 0,5 to 5 K Delta setpoint : 0,5 to 5 K Power consumption : 230 V ac models:4,5 VA 24 V ac/dc models: 3 VA	**A27A1N21**	
10 to 100	24 V ac/dc		**A27A1N22**	
-40 to +40	230 V ac		**A27A2N21**	
10 to 100	230 V ac		**A27A2N22**	
-20 to +60	230 V ac		**A27A2N25**	
20 to 60	230 V ac		**A27A2N26**	
-20 to +20	230 V ac		**A27A2N27**	

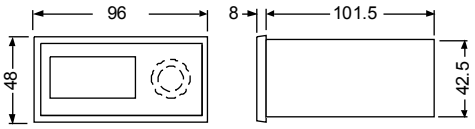
Differential Thermostat, without Sensors Selection Table

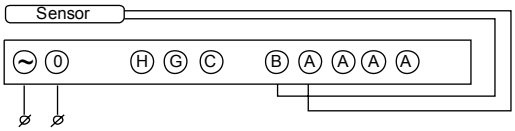
Differential (K)				
0 to 10	230 V ac	Hysteresis : 0.5 to 10 K Output : SPDT contact 10(5)A 250 V ac Input signal : from A99x-91xx Temperature sensor Power consumption : 230 V ac Models:4 VA 24 V ac/dc Models:2 VA	**A27D2N11**	

For accessories, see Section Accessories

System 27 NOVA, Panel mount Display Modules

General Electronic Controls



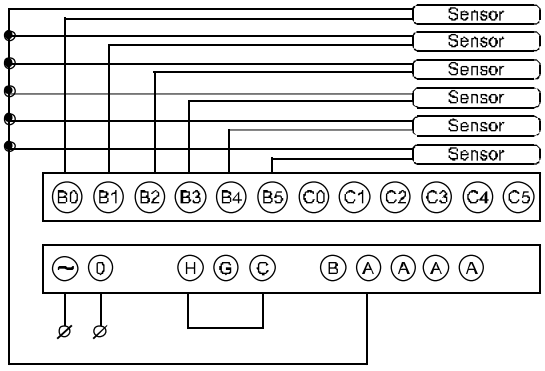


D27 Panel mount **Dimensions** **Wiring diagram**

Panel mount Display Modules Selection Table

Range	Supply voltage (-10/+10 %) 50 /60Hz	Additional features	Type-Model Number	
-40 to +99 °C	230 V ac	Power consumption : 230 V ac models: 3 VA 24 V ac models: 1.5 VA Enclosure : panel mount (48x96 mm), IP20 Noryl ™	**D27AF-9100**	

System 27, Display/Selector Modules



Wiring Diagram

Panel mount Display/Selector Modules Selection Table

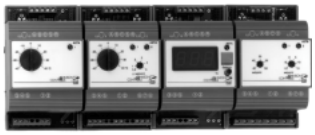
Range	Supply voltage (-10/+10 %) 50 /60Hz	Additional features	Type-Model Number	
-40 to +99 °C	230 V ac	These display to selectors can accept up to 6 sensor Power consumption : 230 V ac models: 3 VA Enclosure : panel mount (48x96 mm), IP20 Noryl ™ Input : A99x-91xx temperatuur sensor	**D27AG -9100**	

For accessories, see Section Accessories

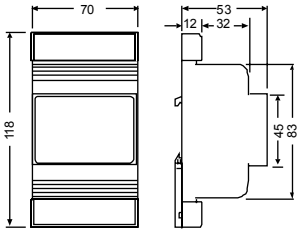
O

System 27 NOVA, One- and Two-stage Humidistat, without Sensor

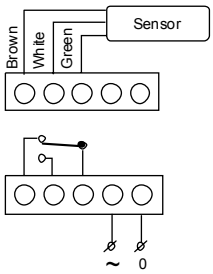
General Electronic Controls



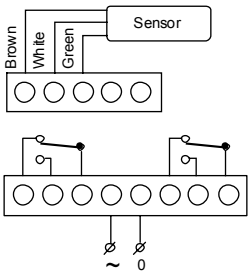
System 27 NOVA



Dimensions



Wiring One -stage



Wiring Two -stage

Description

System 27 NOVA is a family of modern modular electronic modules designed for a wide variety of control configurations in refrigeration, heating, ventilation, air-conditioning and other related fields.

The modular concept was specially designed to make control configuration easier and still offer the flexibility necessary to answer the many individual control requirements encountered today.

The humidity control modules can be used as a stand alone device or in conjunction with other modules such as display modules, signal converter modules etc. to achieve a wide variety of single or multiple stage applications.

Features

- Modular design
- "Plug-in" quick connector wiring system
- Adjustable differential and humidification/dehumidification setting
- Interchangeable humidity transmitters with different housings
- Attractive DIN-rail mount housing
- Setpoint shift output function

Application

Typical applications are:

- computer rooms;
- clean rooms;
- fruit storage/ripening;
- food processing;
- industrial processes.

One-stage Humidistat Selection Table

Setpoint range	Supply voltage (-15/+10 %) 50/60 Hz	Additional Features		Type-Model Number	
10 to 100 % R.H.	24 V ac/dc	Mode:	Field adjustable	**W27N11**	
	230 V ac	Output:	SPDT contacts 10(5)A 250 V ac	**W27N21**	
		Input signal:	Room HT-9000 humidity sensor		
		Enclosure:	DIN RAIL mount (35 mm), IP20		
		Differential:	2 to 10 % R.H.		
		Delta setpoint:	0 to 30 % R.H.		
		Power consumption:	230 V ac models: 4,5 VA 24 V ac/dc models: 3 VA		

Two-stage Humidistat Selection Table

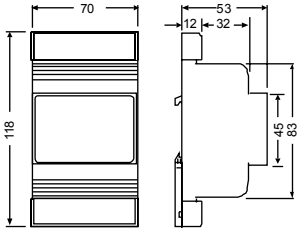
Setpoint range	Supply voltage (-15/+10 %) 50/60 Hz	Additional Features		Type-Model Number	
10 to 100 % R.H.	24 V ac/dc	Mode:	Field adjustable	**W27N12**	
	230 V ac	Output:	Two SPDT contacts 10(5)A 250 V ac	**W27N22**	
		Input signal:	Room HT-9000 humidity sensor		
		Enclosure:	DIN RAIL mount (35 mm), IP20		
		Differential:	2 to 10 % R.H.		
		Delta setpoint:	0 to 30 % R.H.		
		Power consumption:	230 V ac models: 4,5 VA 24 V ac/dc models: 3 VA		

O

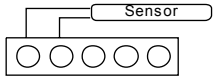
System 27 NOVA, Display Modules, without Sensors

General Electronic Controls

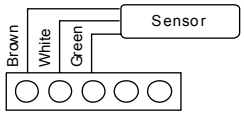
System 27 NOVA Display Module



Dimensions



Temperature



Pressure /Humidity

Wiring

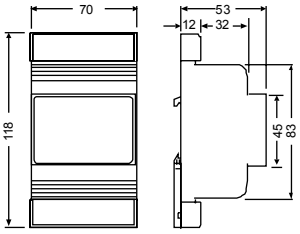
Display Modules Selection Table

Setpoint range	Supply voltage (-15/+10 %) 50/60 Hz	Quick connector	Additional Features	Type-Model Number	
-40 to +100°C	24 V ac	no	Enclosure : DIN RAIL mount (35 mm) Power consumption : 3.5 VA Input temp. displays : from A99x-91xx temp.sensor	**D27A1N1**	
	230 V ac			**D27A2N1**	
0 to 99% RH				**D27W2N4**	
-40 to +100°C		included		**D27A2N1Q**	

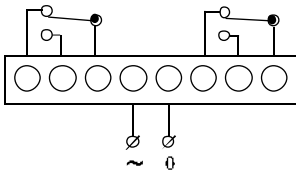
System 27 NOVA Stage Modules, Incl. quick connector

General Electronic Controls

System 27 NOVA Stage Modules



Dimensions



Wiring

Mode: field adjustable,
Input signal: from other System 27 NOVA control modules
Enclosure: DIN RAIL mount (35 mm), IP20
Relay rating: 10 (5) A 250V ac
Power cons: 230 V ac models: 4,5 VA
24V ac/dc models: 3 VA

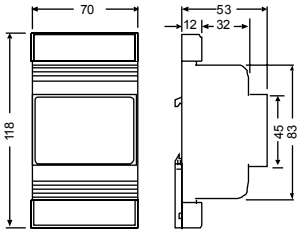
O

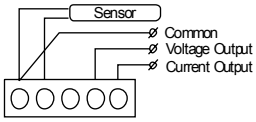
Stage Modules Selection Table

Number of outputs	Supply voltage (-15/+10 %) 50/60 Hz	Differential (K)	Additional Features	Type-Model Number	
2 x SPDT	24 V ac	0.5 to 5	Can be connected only to 1-stage or 2-stage thermostats. Setpoint stage module is related to setpoint thermostat Delta setpoint range: 0,5 to 15 K Max. number of stages connected to a thermostat: 4	**S27A1**	
2 x SPDT	230 V ac			**S27A2**	
1 x SPDT		0.5 to 10 K	Can be connected only to 1-stage or 2-stage thermostats. Setpoint stage module is independent to setpoint thermostat.	**S27A3**	
2 x SPDT		0,1 to 3,5 bar	Can be connected only to 1-stage or 2-stage pressure switch. Setpoint stage module is related to setpoint pressure switch Delta setpoint range: 0 to 4 bar Max. number of stages connected to a pressure switch: 4	**S27P2**	

System 27 NOVA Signal Converter

General Electronic Controls





This converter can be used to transfer an input signal (or part of an input signal) to an output signal of 0 to 10 V or 4 to 20 V

System 27 NOVA Signal Converter **Dimensions** **Wiring**

Signal Converter Selection Table

Supply voltage (-10/+10 %) 50/60 Hz	Setpoint Range	Span Range	Additional Features	Type-Model Number	
24 V ac	-50/+100 °C	2 / 200 °C	Housing: DIN rail mount Output load: voltage output Rmin = 1k Ohm current output Rmax = 500 Ohm Power consumption: 230 V ac models: 2 VA 24 V ac/dc models: 1 VA	**Y27L1**	
230 Vac				**Y27L2**	
	Voltage	**Voltage**			
24 V ac	0 to 10 V	1 to 10 V		**Y27M1**	
230 Vac				**Y27M2**	

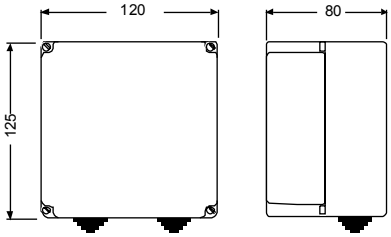
Staging Relay Selection Table

Supply voltage (-10/+15 %) 50/60 Hz	Additional Features		Type-Model Number	
24 V ac	Input signal:	0 to 10Vdc	**SR-9100-1**	
230 Vac	Setpoint range:	5 to 95% (0,5 to 9,5Vdc)	**SR-9100-2**	
	Differential range:	5 to 60% (0,5 to 6Vdc) Automatic reset		
	Mode:	field adjustable		
	Enclosure:	DIN RAIL mount (35 mm)		
	Output:	Two SPDT contacts 10(5)A 250 V ac		
	Power consumption;	230 V ac models: 4,5 VA		
	Time delay:	Stage 1: 1 second Stage 2: 2 seconds		

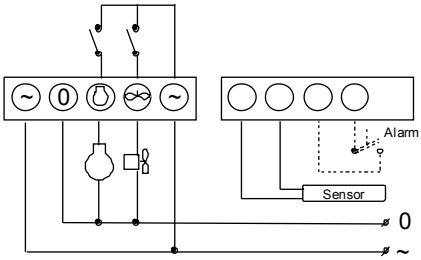
O

Milkcool Tank Controllers

R78 Controller for cooling and agitation of direct expansion milkcooltanks



Dimensions



Wiring

Description

This electronic controller is designed to control the cooling and agitation of direct expansion milkcooltanks.

The combination of microcomputer based electronics and a durable, IP54, splashproof enclosure, makes this instrument excellent suited for harsh environments. The front is easy to clean due to the absence of protruding parts and its IP68 protection class.

The program selection possibilities and “set up” mode makes this instrument versatile and suited for almost every milktank application.

Features

- Microcomputer based electronics.
- Splashproof IP54 enclosure.
- IP68 frontplate (without protruding parts)
- A selection of 5 control programs.
- Defect sensor detection.
- "Set up" mode.
- LED indication for status output relays and selected program.
- Digital alarm input
- Defect sensor detection

R78 Controller for cooling and agitation of direct expansion milkcooltanks Selection Table

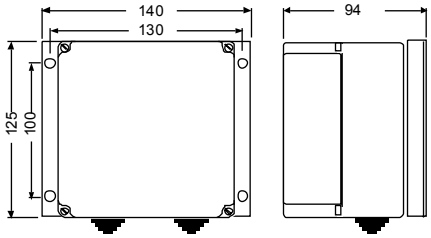
Supply voltage (V ac) -15/+10%	Output relays	Aditional Features A99B-9100 temperature sensor included. "Set up" mode, Digital alarm input, Selection possibility for 5 programs	Type-Model Number	
230	2 x SPST 1800 VA	Wall mount IP54 splashproof enclosure	**R78RAD-9100**	
		Special OEM model for build in applications. Please contact Johnson Controls Nederland B.V. !	**R78CS-900x**	

P

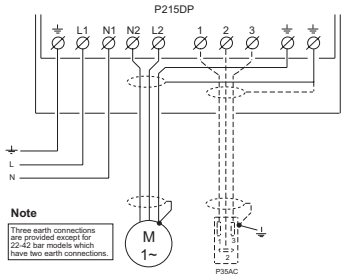
P215 Pressure Actuated Single Phase Fan Speed Controllers

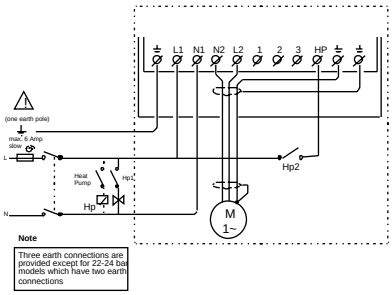
Fan Speed Controllers

P215DP/SH/ST



Dimensions





No other connections are allowed within this area. The Hp2 contact must be a separate contact of the Heatpump relay

Wiring (Second Input only for P215DP) **Wiring (Heatpump input P215SH only)**

Description

These controllers are designed for speed variation of single phase motors, especially for fan speed control on air cooled condensers.

Head pressure control of a refrigeration system, through speed variation of the fan on an air-cooled condenser, results in optimum performance throughout the year.

Using a pressure transducer as the input device to the fan speed controller, gives the most direct and fastest response to pressure variations in the refrigerant system. The controller varies the supply voltage to the motor from 45 % to at least 95 % over the proportional band using the phase cutting principle. *It is recommended to confirm with the electric motor manufacturer if a controller using the phase cutting principle for speed variation can be used.*

The controller used for dual pressure input varies the fan speed by directly sensing the pressure changes of two separate refrigerant circuits.

The setpoint of each pressure transducer can be separately adjusted. The controller selects the input with the greatest cooling demand to control the fan speed. The transducers can be used in non-corrosive refrigerant systems.

Features

- Condenser pressure control by fan speed variation.
- Pressure input.
- Transducers with proven reliability.
- Easy accessible setpoint screw.
- Adjustable minimum speed or cut-off selection.
- Dual input possibility (P215DP only)
- Heatpump input available (P215SH)
- IP54 enclosure.

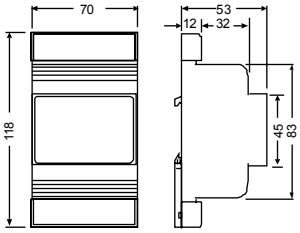
P215 Pressure Actuated Single Phase Fan Speed Controllers Selection Table

Range (bar)	Prop. band (bar)	Setpoint (bar)	Pressure Connection	Supply voltage 50/60 Hz	Rating	Additional features Note: Style 50 is allowed on the Dutch market !	Type-Model Number	
14 to 24	4	16	90 cm cap. st. 50	230 V ac	8 Amp	Single/dual input. For dual input a second separate transducer has to be ordered !	**P215DP-9100**	
8 to 14	2.5	10					**P215DP-9101**	
14 to 24	4	16	90 cm cap. st. 51				**P215DP-9600**	
8 to 14	2.5	10					**P215DP-9601**	
14 to 24	4	16	Braze con. st. 28				**P215DP-9800**	
22 to 42	6	30	90 cm cap. st. 50			For use on R410A applications	**P215DP-9102**	
14 to 24	4	16	90 cm cap. st. 50		4 Amp	Single input	**P215SH-9100**	
8 to 14	2.5	10					**P215SH-9101**	
22 to 42	6	30				For use on R410A applications	**P215SH-9102**	
14 to 24	4	16	Braze con. st. 28			Single input	**P215SH-9800**	
14 to 24	4	16	90 cm cap. st. 50		6 Amp	Single input	**P215ST-9100**	
8 to 14	2.5	10					**P215ST-9101**	
14 to 24	4	16	90 cm cap. st. 51				**P215ST-9600**	
8 to 14	2.5	10					**P215ST-9601**	
22 to 42	6	30	90 cm cap. st. 50			For use on R410A applications	**P215ST-9102**	

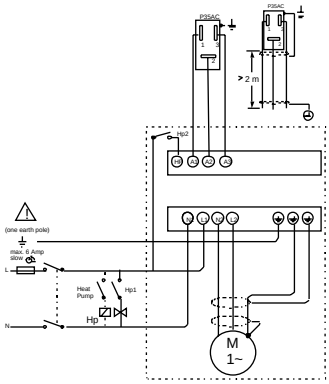
For accessories, see Section Accessories. For replacement parts see Section Replacements

P215 Pressure Actuated Single Phase Fan Speed Controllers

Fan Speed Controllers

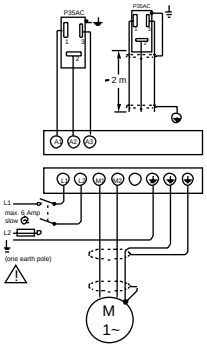


P215LR/BR/TR **Dimensions**

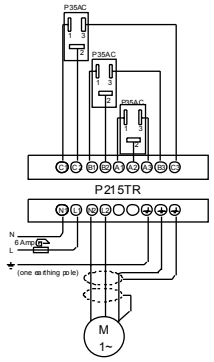


No other connections are allowed within this area.
The Hp2 contact must be a separate contact of the Heatpump relay.

Wiring P215LR/BR 230 V



P215LR 400 V



P215TR

Description

The P215LR is a single pressure input, the P215BR is a dual pressure input and the P215TR is a triple pressure input fan speed controller for air cooled condensers with respectively single, dual and triple refrigerant circuits. The controller varies the fan speed by directly sensing the pressure changes of one, two or three separate refrigerant circuits. The setpoint of each pressure transducer can be separately adjusted. The controller selects the input with the greatest cooling demand to control the fan speed.

The controllers can be used in non corrosive refrigerant systems and vary the supply voltage to the motor from 45 % to ≥95% of the supplied voltage using the phase cutting principle. *It is recommended to confirm with the electric motor manufacturer if a controller using the phase cutting principle for speed variation can be used.* If the pressure drops below the adjusted setpoint minus the proportional band, the output to the motor is zero volt or the adjusted min. speed setting.

Features

- Condenser pressure control by fan speed variation.
- Pressure input.
- Model with heatpump input available
- Transducers with proven reliability.
- Easy accessible setpoint screw.
- Adjustable minimum speed or cut-off selection. (only on LR and BR models)
- Motor speed action can be reversed by interchanging only two wires.
- Dual pressure input (BR models).
- Triple pressure input (TR models)
- Small dimensions.
- DIN rail mounted

P215 Pressure Actuated Single Phase Fan Speed Controllers Selection Table

Range (bar)	Prop. band (bar)	Setpoint (bar)	Pressure Connection/Style	Supply voltage 50/60 Hz	Rating	Additional features Note: Style 50 is allowed on the Dutch market !	Type-Model Number	
14 to 24	4	16	90 cm cap. / 50	230 VAC	3 Amp	Minimum speed adjustable Single pressure input	**P215LR -9110**	
8 to 14	2.5	10					**P215LR -9111**	
Bulk pack version of type P215LR-9110 (15 pcs)							**P215LR -9130***	
14 to 24	4	16	direct mount / 47				**P215LR -9210**	
8 to 14	2.5	10	direct mount / 47				**P215LR -9211**	
14 to 24	4	16	direct mount / 51				**P215LR -9610**	
8 to 14	2.5	10					**P215LR -9611**	
22 to 42	6	30	90 cm cap. / 50			For R410A applications	**P215LR -9114**	
14 to 24	4	16				230 V heatpump input	**P215LR -9140**	
14 to 24	4	16				400V version	**P215LR -9120**	
14 to 24	4	16				Minimum speed adjustable Dual pressure input	**P215BR -9110**	
8 to 14	2.5	10					**P215BR -9111**	
14 to 24	4	16	direct mount / 47				**P215BR -9210**	
8 to 14	2.5	10					**P215BR -9211**	
14 to 24	4	16	90 cm cap. / 50			Tripple pressure input	**P215TR -9110**	
8 to 14	2.5	10					**P215TR -9111**	
14 to 24	4	16	direct mount / 47				**P215TR -9210**	
8 to 14	2.5	10					**P215TR -9211**	

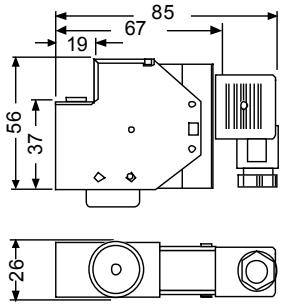
For accessories, see Section Accessories. For replacement parts see Section Replacements
* Quantity orders only

Q

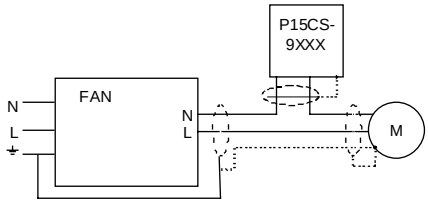
P15CS Pressure Actuated Single Phase Fan Speed Controllers

Fan Speed Controllers

P15CS



Dimensions



Wiring

Description

The P15CS is a single pressure input fan speed controller for air cooled condensers. The controller varies the fan speed by directly sensing the pressure changes in the refrigerant circuits.

The controllers can be used in non corrosive refrigerant systems and vary the supply voltage to the motor using the phase cutting principle. *It is recommended to confirm with the electric motor manufacturer if a controller using the phase cutting principle for speed variation can be used.* If the pressure drops below the adjusted setpoint minus the proportional band, the output to the motor is zero volt or the adjusted min. speed setting.

Features

- Condenser pressure control by fan speed variation.
- Pressure input.
- Transducers with proven reliability.
- Easy accessible setpoint screw.
- Small dimensions.

P15CS Pressure Actuated Single Phase Fan Speed Controllers Selection Table

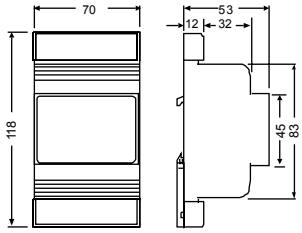
Range (bar)	Setpoint (bar)	Pressure Connection/Style	Supply voltage 50 Hz	Rating	Additional features Note: Style 50 is allowed on the Dutch market !	Type-Model Number *	
14 to 24	16	90 cm cap. / 45A	230 VAC	1 Amp	90 cm shielded cable, 45% cut-off and Pb of 4 bar	**P15CS-9000**	
					60 cm shielded cable, 35% cut-off and Pb of 3.5 bar	P15CS-9000	
		90 cm cap. / 50			90 cm shielded cable, 45% cut-off and Pb of 4 bar	P15CS-9500	
		90 cm cap. / 34			90 cm shielded cable, 45% cut-off and Pb of 4 bar (Bracket incl.)	P15CS-9900	
22 to 42	30	90 cm cap. / 50			90 cm shielded cable, 45% cut-off and Pb of 5 bar. For R410A applications	P15CS-9501	

For accessories, see Section Accessories. For replacement parts see Section Replacements
* Quantity orders only

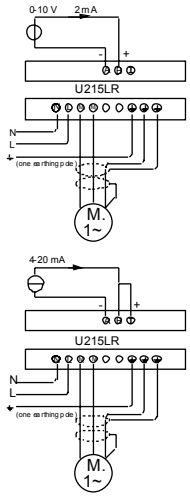
U215LR 0-10 Vdc/4-20 mA Input Single Phase Fan Speed Controllers

Fan Speed Controllers

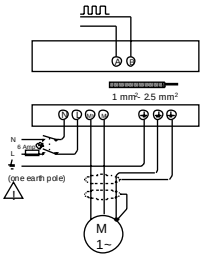
U215LR



Dimensions



Wiring U215



Wiring U215PWM

Description

These controls can be used to modulate the fan speed in response to the demand of a control system in ventilation applications and VAV systems. A 0-10 Vdc or 4-20 mA signal coming from a (e.g. temperature/ pressure/ humidity/ flow) control loop is used as input while the U215 fan speed controller acts like an actuator.

The controller modulates the speed of single phase permanent split-capacitor or shaded pole motors which do not draw more than 3 A (rms) full load current. The device varies the supply voltage to the motor from 45 % to ≥ 95 % of the supplied voltage using the phase cutting principle. *It is recommended to confirm with the electric motor manufacturer if a controller using the phase cutting principle for speed variation can be used.*

Features

- Built-in suppression filter.
- Input galvanically separated from high voltage part.
- Adjustable minimum speed or cut-off selection.
- Input selection 0-10 V or 4-20 mA.
- Small dimensions.
- DIN rail mounted

U215LR Pressure Actuated Single Phase Fan Speed Controllers Selection Table

Range (selectable)	Supply voltage (230 VAC) 50/60 Hz	Additional features Note: Style 50 is allowed on the Dutch market !	Type-Model Number	
0-10 Vdc or 4-20 mA	3 Amp rating	Adjustable minimum speed or cut-off selectable	**U215LR -9110**	
PWM signal input		Impedance 1,5 kOhm, Voltage range 5V to 20V, Frequency range 10Hz to 1 kHz	**U215LR-PWM11**	

For accessories, see Section Accessories. For replacement parts see Section Replacements

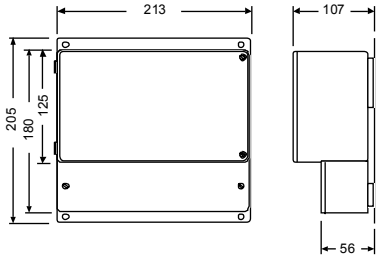
* Quantity orders only

Q

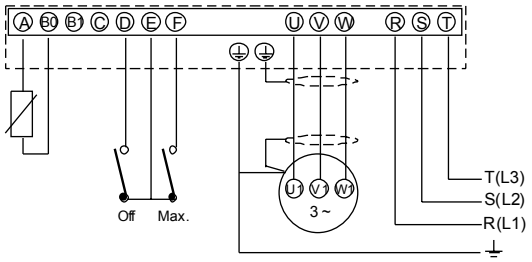
A255 Temperature Actuated Fan Speed Controllers for 3-phase Motors

Fan Speed Controllers

A255 Fan Speed Controller



Dimensions



Wiring

Description

These controllers are designed for applications where the fan speed must be controlled by a temperature sensor input signal .

The controller varies the supply voltage to the motor from 30 % to at least 96 % over the proportional band using the phase cutting principle. *It is recommended to confirm with the electric motor manufacturer if a controller using the phase cutting principle for speed variation can be used.* Motors that will be controlled by the A255 should not draw more than 5 A per phase.

Features

- Various temperature sensor enclosures to match many applications.
- Allows connection in both “Star” and “Delta” configurations.
- Contact input to force output to max. or off.
- Built-in direct/reverse action selector switch.
- IP54 enclosure.
- Built-in set point adjustment.
- Minimum speed or cut-off selection.
- Adjustable minimum speed or cut-off.
- Adjustable maximum speed limit.
- Proportional band adjustment.
- Adjustable hysteresis in cut-off mode.
- Cos□ motor adjustment.

A255 Pressure Actuated Single Phase Fan Speed Controllers Selection Table

Range (°C)	Prop. band (K)	Supply voltage (V ac) 50/60 Hz 3 phase	Switch Rating	Additional features	Type-Model Number	
0 to 65	1 to 10	400	5A	Note: input sensor, type A99x-91xx, has to be ordered separately	**A255MM-9100**	
		230			**A255ML-9100**	

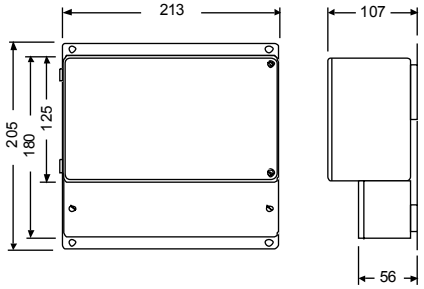
For accessories, see Section Accessories. For replacement parts see Section Replacements

Q

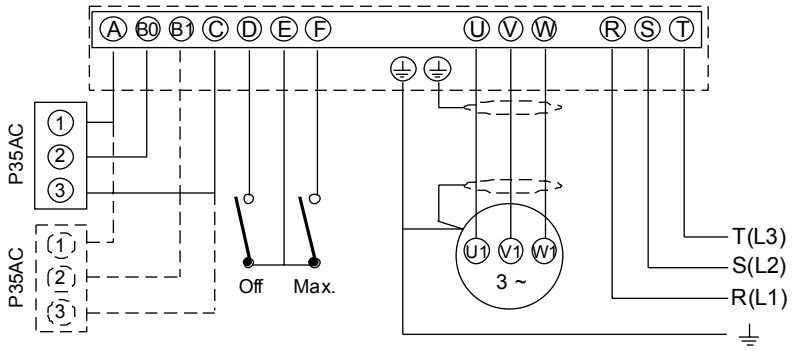
P255 Single/Dual Input Pressure Actuated Fan Speed Controllers for 3-phase Motors

Fan Speed Controllers

P255



Dimensions



Wiring P255

Description

These controllers are designed for speed variation of 3-phase motors, especially for fan speed control on air cooled condensers.

Head pressure control of a refrigeration system, through speed variation of the fan, results in optimum performance throughout the year.

Using a pressure transducer as the input device, gives the most direct and fastest response to pressure variations in the refrigerant system. The controller varies the supply voltage to the motor from 30% to at least 96% over the proportional band using the phase cutting principle. *It is recommended to confirm with the electric motor manufacturer if a controller using the phase cutting principle for speed variation can be used.* Motors that will be controlled by the P255 should not draw more than 5 A per phase.

The controller used for dual pressure input varies the fan speed by directly sensing the pressure changes of two separate refrigerant circuits. Each pressure transducer can be adjusted at a setpoint between 8 to 42 bar. The controller selects the input with the greatest cooling demand. The transducers can be used in non-corrosive refrigerant systems.

Features

- Condenser pressure control by fan speed variation.
- Pressure input.
- Dual input possibility.
- Transducers with proven reliability.
- Easy accessible setpoint screw.
- Minimum speed or cut-off selection.
- Adjustable minimum speed or cut-off.
- Adjustable maximum speed limit.
- Proportional band adjustment.
- Contact input to force output to max. or off.
- Allows connection in both “Star” and “Delta” configurations.
- Motor speed action can be reversed by interchanging only two wires.
- Adjustable hysteresis in cut-off mode.
- IP54 enclosure for electronic module.
- Cos□ motor adjustment.

P255 Pressure Actuated Single Phase Fan Speed Controllers Selection Table

Range (bar)	Prop. band (bar)	Pressure Connection	Supply voltage (VAC) 50/60 Hz 3 phase	Rating	Full Volage setpoint	Additional features	Type-Model Number	
14 to 24	1 to 6	style 47	230	5 Amp	16	Direct mount sensor	**P255ML -9200**	
14 to 24	1 to 6	style 45A	400				**P255MM -9100**	
8 to 14	0.5 to 4				10		**P255MM -9101**	
14 to 24	1 to 6	style 47			16	Direct mount sensor	**P255MM -9200**	
8 to 14	0.5 to 4				10	Direct mount sensor	**P255MM -9201**	
14 to 24	1 to 6	style 13			16		**P255MM -9600**	
8 to 14	0.5 to 4				10		**P255MM -9601**	
14 to 24	1 to 6	style 50			16	Same as P255MM-9100 but Style 50	**P255MM -9500**	
8 to 14	0.5 to 4				10	Same as P255MM-9101 but Style 50	**P255MM -9501**	
3.5 to 10	0.5 to 4				6		**P255MM -9502**	
22 to 42	1 to 8				30	For use on R410A applications	**P255MM -9503**	

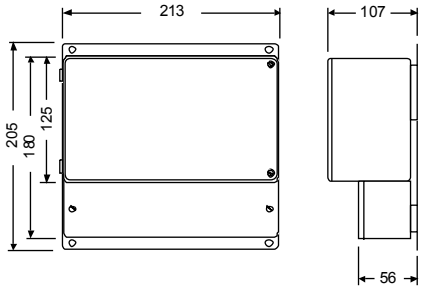
Q

For accessories, see Section Accessories. For replacement parts see Section Replacements

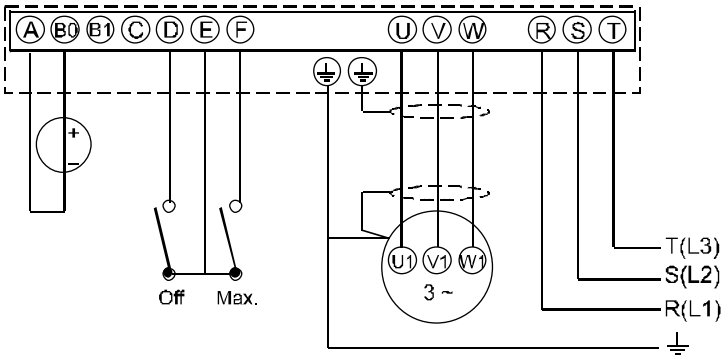
U255 (0 - 10 V Input) Fan Speed Controllers for 3-phase Motors

Fan Speed Controllers

P255



Dimensions



Wiring U255

Description

These controllers are designed for applications where the fan speed must be controlled by a voltage input signal (e.g. 0-10V, 1-5V etc.) from a transmitter or control system.

The signal from one pressure transmitter connected to electronic pressostats, indicators and fan speed control eliminates pressure connections and capillaries through which possible loss of refrigerant is reduced. Head pressure control of a refrigeration system, through speed variation of the fan on an air-cooled condenser, results in optimum performance throughout the year.

The controller varies the supply voltage to the motor from 30% to at least 96% over the proportional band using the phase cutting principle. *It is recommended to confirm with the electric motor manufacturer if a controller using the phase cutting principle for speed variation can be used.* Motors that will be controlled by the U255 should not draw more than 5 A per phase.

Features

- Adjustable voltage input.
- Allows connection in both “Star” and “Delta” configurations.
- Contact input to force output to max. or off.
- Built-in power supply.
- Built-in direct/reverse action selector switch.
- IP54 enclosure.
- Built-in set point adjustment.
- Minimum speed or cut-off selection.
- Adjustable minimum speed or cut-off
- Adjustable maximum speed limit.
- Proportional band adjustment.
- Adjustable hysteresis in cut-off mode.
- Cos□ motor adjustment.

Range	Prop. band	Supply voltage (VAC) 50/60 Hz 3 phase	Rating	Additional features Note: Style 50 is allowed on the Dutch market !	Type-Model Number	
0 - 10 V	0.7-10 V	400 V	5 Amp	Can also be used for 0-5 V, 1-5 V input or other inputs within the range 0-10 V.	**U255MM -9100**	
0 - 10 V	0.7-10 V	230 V		Can also be used for 0-5 V, 1-5 V input or other inputs within the range 0-10 V.	**U255ML -9100**	

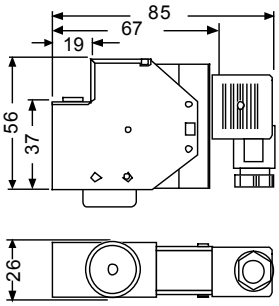
For accessories, see Section Accessories. For replacement parts see Section Replacements

Q

P35 Pressure Transducers

Fan Speed Controllers

P35AC



Dimensions

Wiring (see Section Fan Speed Controllers)

Replacement Press. transducers for P215 versions (300K ohm)

Range	Setting (bar)	Style	Cap. Length (m)	Additional features Note: Style 50 is allowed on the Dutch market !	Type-Model Number	
14/24	16	45A	0.9		**P35AC -9100**	
8/14	10				**P35AC -9101**	
3.5/10	7				**P35AC -9102**	
14/24	16	47			**P35AC -9202**	
8/14	10				**P35AC -9203**	
14/24	16	50		Same as P35AC-9100 but Style 50	**P35AC -9500**	
8/14	10			Same as P35AC-9101 but Style 50	**P35AC -9501**	
14/24	16	51		Same as P35AC-9100 but Style 51	**P35AC -9507**	
22/42	30	50		For R410A applications	**P35AC -9512**	
14/24	16	13		(also used for replacement P15/P215 series fan speed controllers)	**P35AC -9600**	
8/14	10				**P35AC -9601**	

Replacement Press. transducers P255 versions (100K ohm)

14/24	16	47	0.9		**P35AC -9200**	
8/14	10				**P35AC -9201**	
	10	45A			**P35AC -9105**	
14/24	16				**P35AC -9106**	
8/14	10	13			**P35AC -9603**	
14/24	16				**P35AC -9604**	
8/14	10	50		Same as P35AC-9105 but Style 50	**P35AC -9505**	
14/24	16			Same as P35AC-9106 but Style 50	**P35AC -9506**	
22/42	30			For R410A applications	**P35AC -9511**	

Replacement Press. transducers P255 versions (500K ohm)

14/24	18	50	0.9	Special 500 KOhm for Carrier CS-LEE90/95-controllers	**P35AC-9104**	
	16			Special 500 KOhm for P215LR-400V. version	**P35AC-9510**	
22/40	30			Special 500 KOhm version for R410A applications	**P35AC-9513**	

For accessories, see Section Accessories.

Q

Accessories for Pressure Transducers

Fan Speed Controllers

Description	Type-Model Number	
Mounting bracket + screws for P35AC transducer	**BKT034N602R**	

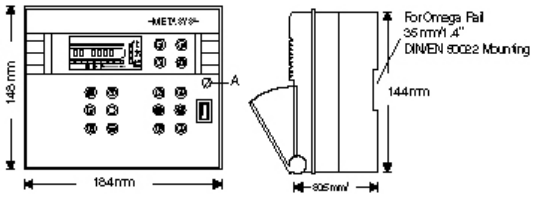
Replacement Parts

Replacement electronic module P215LR-230 V types	**P38AA-9111**	
Replacement electronic module P215LR-230 V incl. heatpump input types	**P38AA-9112**	
Replacement electronic module P215BR-230 V types	**P38AA-9211**	
Replacement electronic module P215TR-230 V types	**P38AA-9311**	
Replacement electronic module P255MM	**P38AD-9100**	
Replacement electronic module P255ML	**P38AD-9101**	

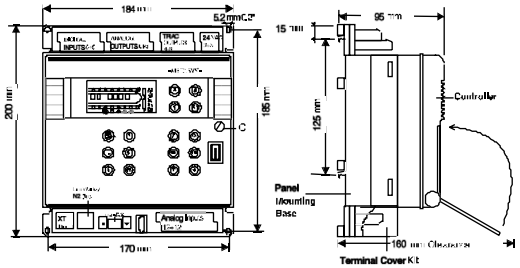
DX-9100 Extended Digital Controller

Electronic Controllers DDC

DX-9100 Extended Digital Controller



Dimensions DX-9100-8154



Dimensions DX-9100-8454

For wiring we suggest that you order the Technical Data Sheet

Description

The DX-9100 Digital Controller is the ideal digital control solution for multiple chiller or boiler plant control applications, for the HVAC process of air handling units or for distributed lighting and related electrical equipment control applications.

The LONWORKS® Compatible Digital Controller, DX-9200 series, can be used for air handling unit or distributed lighting and related electrical equipment control applications.

As a standalone controller, the DX has both the hardware and software flexibility to adapt to the variety of control processes found in its targeted applications. Along with its outstanding control flexibility, the controller can extend its input and output point capability by communicating with input/output (I/O) extension modules on an extension bus, and provides monitoring and control of all connected points at its built-in LED display.

A separate display unit, DT-9100, with a text and graphic LCD screen and keypad provides a customized presentation of data according to the application and customer requirements.

When integrated into a full Metasys network, point and control information is available throughout the network, and at all Metasys operator workstations.

Features

- Full set of control algorithms in software modules
- Graphic configuration tool
- Standalone control
- Real-time clock and time programs
- Trend data storage
- Extension bus for additional I/O points
- Extension modules for a variety of analog and digital I/O combinations
- Built-in local status display and control panel
- Optional text and graphic display unit (DT-9100)
- Optional manual override switches on extension modules
- N2 Bus communications (DX-9100)
- LonWorks communication (DX-9200)
- Dynamic Data Access™ capabilities with Metasys network

DX-9100 Extended Digital Controller Selection Table

Analog Inputs	Binary Inputs	Analog Outputs	Binary Outputs	Supply Voltage	Communication Bus		Type-Model Number	
					N2	LonWorks		
8	8	2	6	24 VAC ±10%, 50/60Hz	N2-Bus		**DX-9100-8154**	
8	8	8	6				**DX-9100-8454**	
8	8	8	6			Room and light control	**DX-9200-8454-A**	
8	8	8	6			Airhandling control	**DX-9200-8454-D**	
Jumper Selectable • RTD(1KΩ NI) • 0-10 VDC Transmitter • 0-20 mA Transmitter (4 max.)	Dry Contacts	Jumper Selectable • 0-10 VDC • 0-20 mA (4)	24 VAC Triacs at 0.5 amps					

Note: Refer to DX-9200 Technical Bulletin for details of the LonWorks® network interface specifications. LonWorks is a Registered Trade Mark of Echelon Corp.

R

DX-9100 Extended Digital Controller (continued)

Electronic Controllers DDC

DT-9100 Display Unit

Description		Type-Model Number	
Display unit with panel mounting kit	24 VAC ±10%, 4VA 50/60Hz or 9 to 12 VDC, 2 VA	**DT-9100-8104**	
Display unit wall mounting kit		**DT-9100-8902**	
12 VDC power supply for 230 VAC source		**DT-9100-8901**	

Accessories **(order separately)**

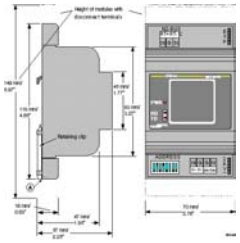
Description	Type-Model Number	
Terminal covers wall mounting base	**DX-9100-8991**	
Wall Mounting Base	**DX-9100-8990**	
Panel Mounting Base	**DX-9100-8997**	
Cabinet Door Mounting Frame	**DX-9100-8996**	
Access protection key	**DC-9100-8905**	
Lithium Battery	**DC-9100-6800**	
Graphics configuration software WinGX-9100	**GX-9100-0502-W**	

R

XTM-905/XT-9100 Extension Module, XPx/XP910x Expansion Modules

Electronic Controllers DDC

XTM-905/XT-9100 Extension Module, XPx/XP910x Expansion Modules



Dimensions

Description

Extension Modules (XT-9100/XP910x or XTM-905/XPx) are submodules that provide various combinations of analog and binary input/output points. They may be mounted next to the controller on the same DIN rail, or remotely, up to 1200 meters from the controller. Up to eight submodule combinations can connect to the XT Bus of the controller, providing up to 64 Additional I/O points. The XT Bus has the same physical characteristics as the Metasys N2 Bus.

For wiring we suggest that you order the Technical Data Sheet

XT and XP Expansion Modules Table

Analog Inputs	Binary Inputs	Analog Outputs	Binary Outputs 0/1		Supply Voltage	Override	Type-Model Number	
0-10V, 0/4-20 mA, Ni 1000, Pt1000, A99		0-10V, 0-20 mA	Relay 250VAC,3A	Triac 24VAC, 0.5A				
Extension Module for XP module connection to DX module					24 VAC, +15% -10%, 50-60 Hz	None	XT-9100-8304	
6	-	2	-	-			XP-9102-8304	
-	-	-		8			XP-9103-8304	
-	4	-	-	4			XP-9104-8304	
-	8	-	-	-			XP-9105-8304	
-	-	-	4	-			XP-9106-8304	

XTM-905/XPx Modules Selection Table

Analog Inputs	Binary Inputs	Analog Outputs	Binary Outputs 0/1		Supply Voltage	Override	Type-Model Number	
0-10V, 0/4-20 mA, Ni 1000, Pt1000, A99		0-10V, 0-20 mA	Relay 250VAC,3A	Triac 24VAC, 0.5A				
Extension Module for XPx expansion modules connection to DX module					24 VAC, +15% -10%, 50-60 Hz		XTM-905-5	
4	-	-	-	-		option	XPA-421-5	
-	-	4	-	-			XPA-442-5	
6	-	2	-	-			XPA-821-5	
-	8	-	-	-			XPB-821-5	
-	4	-	2 (moment)	-			XPM-401-5	
-	4	-	3 (latching)	-			XPL-401-5	
-	4	-	3 (electric)	-			XPE-401-5	
-	4	-	4 (electric)	-			XPE-404-5	
-	4	-	-	4			XPT-401-5	
-	-	-	-	8		none	XPT-861-5	

***Accessories* (order separately)**

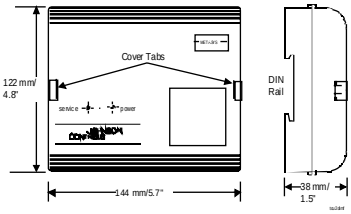
Description	Type-Model Number	
Transformer 230 V AC / 24 V AC, 9VA	TR-9100-8101	

R

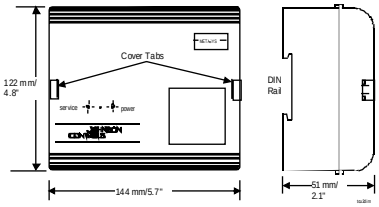
TCU Fan Coil Unit Controller

Electronic Controllers DDC

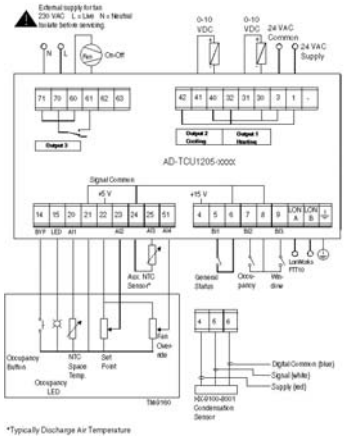
TCU Fan Coil Unit Controller



Dimensions 24 VAC



Dimensions 230 VAC



Wiring AD-TCU1205-xxxx (for other models please consult Technical Bulletin)

Description

The TCU Fan Coil Unit Controller is a LONWORKS® network compatible device that provides direct digital control of fan coil units with heating and/or cooling coils, and a single-speed, three-speed or variable-speed fan. The controller is designed for field installation or for mounting by original equipment manufacturers (OEMs). The space comfort set points, occupancy mode and fan speed may be adjusted from the TM-9100 Series Room Command Module, or from a LONWORKS compatible Room Command Module when the controller is connected to a LONWORKS network. The controller complies with the LONMARK® interoperability guidelines for sharing data with other network sensors and devices. Operating variables and parameters can be monitored and adjusted from a LONWORKS compatible supervisory system, including the Metasys® NCM network controller that integrates the fan coil unit controller into a facility-wide network.

Features

- Range of models designed for field and factory installations
  Relay outputs for fan control
  Choice of outputs for heating and cooling control
  230 VAC or 24 VAC power supply models
- Software commissioning tool
- Library of configurations for all models
- Multiple modes of operation for various occupancy conditions
- Setpoint and mode override from room command module
- LONWORKS peer-to-peer communications network
- LONMARK Space Comfort Controller Profile
- LONWORKS network connection to Metasys network controller
- Metasys Dynamic Data Access™ networking capabilities
- Standalone operation with default parameters
- Non-volatile memory (Flash and E^2PROM)

TCU Fan Coil Unit Controller Selection Table

Application	Power Supply	Output Configuration			Ordering Code	
		Output 1 (2xTriac)	Output 2 (Analog or 2xTriac)	Output 3 (Relay)		
Two-pipe Fan Coil Unit	24 VAC, ± 15% at 50/60 Hz (+ 60 VA max. for controlled devices) Independent 230 VAC supply for fan motor	Triac 1: not used Triac 2: Lighting On/Off	Analog 0 - 10 VDC Heating/Cooling	On/Off Fan	**AD-TCU1215-0AxA** ***AD-TCU1215-0ExA**	
		Triac 1: not used Triac 2: Lighting On/Off	Analog 0 - 10 VDC Heating/Cooling	3-Speed Fan	**AD-TCU2215-0AxA** ***AD-TCU2215-0ExA**	
		Triac 1: Heat/Cool On/Off Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	On/Off Fan	**AD-TCU1225-0AxB** ***AD-TCU1225-0ExB**	
		Triac 1: Heat/Cool On/Off Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	3-Speed Fan	**AD-TCU2225-0AxB** ***AD-TCU2225-0ExB**	
		Triac 1: Heat/Cool DAO Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	On/Off Fan	**AD-TCU1225-0AxC** ***AD-TCU1225-0ExC**	
		Triac 1: Heat/Cool DAO Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	3-Speed Fan	**AD-TCU2225-0AxC** ***AD-TCU2225-0ExC**	
		Triac 1: } Heat/Cool PAO Triac 2: }	Triac 1: not used Triac 2: Lighting On/Off	On/Off Fan	**AD-TCU1225-0AxD** ***AD-TCU1225-0ExD**	
		Triac 1: } Heat/Cool PAO Triac 2: }	Triac 1: not used Triac 2: Lighting On/Off	3-Speed Fan	**AD-TCU2225-0AxD** ***AD-TCU2225-0ExD**	

Notes:
1. * Models operate with binary hardware input (BI1) to set Heat/Cool mode, (AD-TCU1215-0EAA, for example). Other models use Source Temperature input.
2. Hardware setpoint range: x = A for 12 to 28°C x = B for +/-3°C
3. Outputs 1 and 2 are powered from 24 VAC supply with a maximum total output capacity of 60VA.

TCU Fan Coil Unit Controller (continued)

Electronic Controllers DDC

TCU Fan Coil Unit Controller Selection Table (continued)

Application	Power Supply	Output Configuration			Ordering Code	
		Output 1 (Analog or 2xTriac)	Output 2 (Analog or 2xTriac)	Output 3 (Relay)		
Four-pipe Fan Coil Unit (or separate heating and cooling sources)	24 VAC, ± 15% at 50/60 Hz (+ 60 VA max. for controlled devices) Independent 230 VAC supply for fan motor	Analog 0 - 10 VDC Heating	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU1205-0BxA *AD-TCU1205-0CxA**	
		Analog 0 - 10 VDC Heating	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU2205-0BxA**	
		Triac 1: Heating On/Off Triac 2: Lighting On/Off	Triac 1: Cooling On/Off Triac 2: not used	On/Off Fan	**AD-TCU1225-0BxB *AD-TCU1225-0CxB**	
		Triac 1: Heating On/Off Triac 2: Lighting On/Off	Triac 1: Cooling On/Off Triac 2: not used	3-Speed Fan	**AD-TCU2225-0BxB**	
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Triac 1: Cooling DAO Triac 2: not used	On/Off Fan	**AD-TCU1225-0BxC *AD-TCU1225-0CxC**	
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Triac 1: Cooling DAO Triac 2: not used	3-Speed Fan	**AD-TCU2225-0BxC**	
		Triac 1: } Heating PAO Triac 2: }	Triac 1: } Cooling PAO Triac 2: }	On/Off Fan	**AD-TCU1225-0BxD *AD-TCU1225-0CxD**	
		Triac 1: } Heating PAO Triac 2: }	Triac 1: } Cooling PAO Triac 2: }	3-Speed Fan	**AD-TCU2225-0BxD**	
		Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Triac 1: } Cooling Stage 1 Triac 2: } Cooling Stage 2	On/Off Fan	**AD-TCU1225-0BxE**	
		Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Triac 1: } Cooling Stage 1 Triac 2: } Cooling Stage 2	3-Speed Fan	**AD-TCU2225-0BxE**	
		Triac 1: Heating On/Off Triac 2: Lighting On/Off	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU1215-0BxF *AD-TCU1215-0CxF**	
		Triac 1: Heating On/Off Triac 2: Lighting On/Off	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU2215-0BxF**	
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU1215-0BxG *AD-TCU1215-0CxG**	
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU2215-0BxG**	
		Triac 1: } Heating PAO Triac 2: }	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU1215-0BxH *AD-TCU1215-0CxH**	
		Triac 1: } Heating PAO Triac 2: }	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU2215-0BxH**	
		Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU1215-0BxJ *AD-TCU1215-0CxJ**	
		Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU2215-0BxJ**	
		Triac 1: } Heating On/Off Triac 2: } Cooling On/Off	Analog 0 - 10 VDC Variable-Speed Fan	Lighting On/Off	**AD-TCU1215-0DxB**	
		Triac 1: } Heating DAO Triac 2: } Cooling DAO	Analog 0 - 10 VDC Variable-Speed Fan	Lighting On/Off	**AD-TCU1215-0DxC**	

Notes:
1. * Models operate with Condensation Sensor (BI1) to close cooling valve, (AD-TCU1205-0CBA, for example).
2. Hardware setpoint range: x = A for 12 to 28°C x = B for +/-3°C
3. Outputs 1 and 2 are powered from 24VAC supply with a maximum total output capacity of 60VA.
4. Analog outputs are direct acting for normally closed valves. Reverse acting outputs available on special request.

R

TCU Fan Coil Unit Controller (continued)

Electronic Controllers DDC

TCU Fan Coil Unit Controller Selection Table (continued)

Application	Power Supply	Output Configuration			Ordering Code
		Output 1 (2xTriac – 230VAC)	Output 2 (2xTriac – 230VAC)	Output 3 (Relay)	
Two-pipe Fan Coil Unit	230 VAC, ± 10% at 50/60 Hz (690 VA max. for fan motor – triacs separatly powered).	Triac 1: Heat/Cool On/Off Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	On/Off Fan	**AD-TCU3245-0AxB** ***AD-TCU3245-0ExB**
		Triac 1: Heat/Cool On/Off Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	3-Speed Fan	**AD-TCU4245-0AxB** ***AD-TCU4245-0ExB**
		Triac 1: Heat/Cool DAO Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	On/Off Fan	**AD-TCU3245-0AxC** ***AD-TCU3245-0ExC**
		Triac 1: Heat/Cool DAO Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	3-Speed Fan	**AD-TCU4245-0AxC** ***AD-TCU4245-0ExC**
		Triac 1: } Heat/Cool PAO Triac 2: }	Triac 1: not used Triac 2: Lighting On/Off	On/Off Fan	**AD-TCU3245-0AxD** ***AD-TCU3245-0ExD**
		Triac 1: } Heat/Cool PAO Triac 2: }	Triac 1: not used Triac 2: Lighting On/Off	3-Speed Fan	**AD-TCU4245-0AxD** ***AD-TCU4245-0ExD**

Notes:
1. * Models operate with binary hardware input (BI1) to set Heat/Cool mode, (AD-TCU3245-0EAB, for example). Other models use Source Temperature input.
2. Hardware setpoint range: x = A for 12 to 28°C x = B for +/-3°C
3. Outputs 1 and 2 are externally powered at 230VAC with a maximum output capacity of 1 ampere for each triac.

Application	**Power Supply**	**Output Configuration**			**Ordering Code**
		Output 1 (2xTriac – 230VAC)	**Output 2 (2xTriac – 230VAC)**	**Output 3 (Relay)**	
Four-pipe Fan Coil Unit (or separate heating and cooling sources)	230 VAC, ± 10% at 50/60 Hz (690 VA max. for fan motor – triacs separatly powered).	Triac 1: Heating On/Off Triac 2: Lighting On/Off	Triac 1: Cooling On/Off Triac 2: not used	On/Off Fan	**AD-TCU3245-0BxB** ***AD-TCU3245-0CxB**
		Triac 1: Heating On/Off Triac 2: Lighting On/Off	Triac 1: Cooling On/Off Triac 2: not used	3-Speed Fan	**AD-TCU4245-0BxB**
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Triac 1: Cooling DAO Triac 2: not used	On/Off Fan	**AD-TCU3245-0BxC** ***AD-TCU3245-0CxC**
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Triac 1: Cooling DAO Triac 2: not used	3-Speed Fan	**AD-TCU4245-0BxC**
		Triac 1: } Heating PAO Triac 2: }	Triac 1: } Cooling PAO Triac 2: }	On/Off Fan	**AD-TCU3245-0BxD** ***AD-TCU3245-0CxD**
		Triac 1: } Heating PAO Triac 2: }	Triac 1: } Cooling PAO Triac 2: }	3-Speed Fan	**AD-TCU4245-0BxD**
		Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Triac 1: } Cooling Stage 1 Triac 2: } Cooling Stage 2	On/Off Fan	**AD-TCU3245-0BxE**
		Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Triac 1: } Cooling Stage 1 Triac 2: } Cooling Stage 2	3-Speed Fan	**AD-TCU4245-0BxE**

Notes:
1. * Models operate with Condensation Sensor to close cooling valve, (AD-TCU3245-0CBC, for example).
2. Hardware setpoint range: x = A for 12 to 28°C x = B for +/-3°C
3. Outputs 1 and 2 are externally powered at 230VAC with a maximum output capacity of 1 ampere for each triac.

R

TCU Fan Coil Unit Controller (continued)

Electronic Controllers DDC

TCU Fan Coil Unit Controller Selection Table (continued)

Application	Power Supply	Output Configuration			Ordering Code	
		Output 1 (2xTriac)	Output 2 (Analog or 2xTriac)	Output 3 (Relay)		
Two-pipe Fan Coil Unit	230 VAC, ± 10% at 50/60 Hz (includes 6 VA max. for controlled devices at 24 VAC ± 15% and 690 VA max. for fan motor).	Triac 1: not used Triac 2: Lighting On/Off	Analog 0 - 10 VDC Heating/Cooling	On/Off Fan	**AD-TCU5215-0AxA** ***AD-TCU5215-0ExA**	
		Triac 1: not used Triac 2: Lighting On/Off	Analog 0 - 10 VDC Heating/Cooling	3-Speed Fan	**AD-TCU6215-0AxA** ***AD-TCU6215-0ExA**	
		Triac 1: Heat/Cool On/Off Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	On/Off Fan	**AD-TCU5225-0AxB** ***AD-TCU5225-0ExB**	
		Triac 1: Heat/Cool On/Off Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	3-Speed Fan	**AD-TCU6225-0AxB** ***AD-TCU6225-0ExB**	
		Triac 1: Heat/Cool DAO Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	On/Off Fan	**AD-TCU5225-0AxC** ***AD-TCU5225-0ExC**	
		Triac 1: Heat/Cool DAO Triac 2: not used	Triac 1: not used Triac 2: Lighting On/Off	3-Speed Fan	**AD-TCU6225-0AxC** ***AD-TCU6225-0ExC**	
		Triac 1: } Heat/Cool PAO Triac 2: }	Triac 1: not used Triac 2: Lighting On/Off	On/Off Fan	**AD-TCU5225-0AxD** ***AD-TCU5225-0ExD**	
		Triac 1: } Heat/Cool PAO Triac 2: }	Triac 1: not used Triac 2: Lighting On/Off	3-Speed Fan	**AD-TCU6225-0AxD** ***AD-TCU6225-0ExD**	

Notes:
1. * Models operate with binary hardware input (BI1) to set Heat/Cool mode, (AD-TCU5215-0EAA, for example). Other models use Source Temperature input.
2. Hardware setpoint range: x = A for 12 to 28°C x = B for +/-3°C
3. Outputs 1 and 2 are internally powered at 24VAC with a maximum total output capacity of 6VA.

Application	Power Supply	Output Configuration			Ordering Code	
		Output 1 (Analog or 2xTriac)	Output 2 (Analog or 2xTriac)	Output 3 (Relay)		
Four-pipe Fan Coil Unit (or separate heating and cooling sources)	230 VAC, ± 10% at 50/60 Hz (includes 6 VA max. for controlled devices at 24 VAC ± 15% and 690 VA max. for fan motor).	Analog 0 - 10 VDC Heating	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU5205-0BxA** ***AD-TCU5205-0CxA**	
		Analog 0 - 10 VDC Heating	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU6205-0BxA**	
		Triac 1: Heating On/Off Triac 2: Lighting On/Off	Triac 1: Cooling On/Off Triac 2: not used	On/Off Fan	**AD-TCU5225-0BxB** ***AD-TCU5225-0CxB**	
		Triac 1: Heating On/Off Triac 2: Lighting On/Off	Triac 1: Cooling On/Off Triac 2: not used	3-Speed Fan	**AD-TCU6225-0BxB**	
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Triac 1: Cooling DAO Triac 2: not used	On/Off Fan	**AD-TCU5225-0BxC** ***AD-TCU5225-0CxC**	
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Triac 1: Cooling DAO Triac 2: not used	3-Speed Fan	**AD-TCU6225-0BxC**	
		Triac 1: } Heating PAO Triac 2: }	Triac 1: } Cooling PAO Triac 2: }	On/Off Fan	**AD-TCU5225-0BxD** ***AD-TCU5225-0CxD**	
		Triac 1: } Heating PAO Triac 2: }	Triac 1: } Cooling PAO Triac 2: }	3-Speed Fan	**AD-TCU6225-0BxD**	
		Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Triac 1: } Cooling Stage 1 Triac 2: } Cooling Stage 2	On/Off Fan	**AD-TCU5225-0BxE**	

R

TCU Fan Coil Unit Controller (continued)

Electronic Controllers DDC

TCU Fan Coil Unit Controller Selection Table (continued)

Application	Power Supply	Output Configuration			Ordering Code	
		Output 1 (Analog or 2xTriac)	Output 2 (Analog or 2xTriac)	Output 3 (Relay)		
Four-pipe Fan Coil Unit (or separate heating and cooling sources)	230 VAC, ± 10% at 50/60 Hz (includes 6 VA max. for controlled devices at 24 V ± 15%) + 690 VA max. for fan motor.	Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Triac 1: } Cooling Stage 1 Triac 2: } Cooling Stage 2	3-Speed Fan	**AD-TCU6225-0BxE**	
		Triac 1: Heating On/Off Triac 2: Lighting On/Off	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU5215-0BxF** ***AD-TCU5215-0CxF**	
		Triac 1: Heating On/Off Triac 2: Lighting On/Off	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU6215-0BxF**	
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU5215-0BxG** ***AD-TCU5215-0CxG**	
		Triac 1: Heating DAO Triac 2: Lighting On/Off	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU6215-0BxG**	
		Triac 1: } Heating PAO Triac 2: }	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU5215-0BxH** ***AD-TCU5215-0CxH**	
		Triac 1: } Heating PAO Triac 2: }	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU6215-0BxH**	
		Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Analog 0 - 10 VDC Cooling	On/Off Fan	**AD-TCU5215-0BxJ** ***AD-TCU5215-0CxJ**	
		Triac 1: } Heating Stage 1 Triac 2: } Heating Stage 2	Analog 0 - 10 VDC Cooling	3-Speed Fan	**AD-TCU6215-0BxJ**	
		Triac 1: } Heating On/Off Triac 2: } Cooling On/Off	Analog 0 - 10 VDC Variable-Speed Fan	Lighting On/Off	**AD-TCU5215-0DxB**	
		Triac 1: } Heating DAO Triac 2: } Cooling DAO	Analog 0 - 10 VDC Variable-Speed Fan	Lighting On/Off	**AD-TCU5215-0DxC**	

Notes:
1. * Models operate with Condensation Sensor (BI1) to close cooling valve, (AD-TCU5205-0CBA, for example).
2. Hardware setpoint range: x = A for 12 to 28°C x = B for +/-3°C
3. Outputs 1 and 2 are internally powered at 24VAC with a maximum total output capacity of 6VA.
4. Analog outputs are direct acting for normally closed valves. Reverse acting outputs available on special request.

Room Command Module (Direct Connect) Ordering Codes

Description				Type-Model Number	
Occupancy Button	NTC Sensor	w/o S.P. dial		**TM-9150-0000**	
Occupancy Button	NTC Sensor	12-28°C		**TM-9160-0000**	
Occupancy Button	NTC Sensor	+/- 3 K		**TM-9160-0005**	
Occupancy Button	NTC Sensor	12-28°C	3-Speed Fan Override	**TM-9160-0002**	
Occupancy Button	NTC Sensor	+/- 3 K	3-Speed Fan Override	**TM-9160-0007**	
Occupancy Button	w/o Sensor	12-28°C		**TM-9170-0000**	
Occupancy Button	w/o Sensor	+/- 3 K		**TM-9170-0005**	
Occupancy Button	w/o Sensor	12-28°C	3-Speed Fan Override	**TM-9170-0002**	
Occupancy Button	w/o Sensor	+/- 3 K	3-Speed Fan Override	**TM-9170-0007**	

Note: All models above with off-white cover and grey base.
Add "-W" to code for white cover and white base, e.g., TM-9150-0000-W.
Add "-K" to code for set point dial with serrated edge (not for TM-9150), e.g. TM-9160-0005-K, TM-9160-0005-WK.
The TCU Fan Coil Unit Controller does not support the TM-9180 Room Command Module.

Software and Accessories Ordering Codes

Description	Type-Model Number	
Unit Mount NTC Temperature Sensor (1.5-m cable)	**TE-9100-8501**	
TCU Commissioning Software for Windows 95/98 NT (SP6) (CD ROM).	**COMM-PRO-0**	

R

VMA Variable Air Volume Controller

Electronic Controllers DDC

VMA Variable Air Volume Controller

Description
The Variable Air Volume Modular Assembly (VMA) is a family of configurable digital controllers. Differing models in the VMA1400 series combine a controller, pressure sensor and/or actuator housed in one pre-assembled unit.
The VMA1400 series is available in four models:
• Cooling Only (VMA1410)
• Cooling with Reheat and/or Fan (VMA1420)
• External Actuator (VMA1430)
The VMA1410, 1420, 1430 are designed for pressure-independent, single duct systems. The VMA1420 and VMA1430 can also be used with parallel or series fan powered boxes, supply/exhaust applications, and dual duct systems.

Features
- easy-to-handle unit with a compact footprint
- pre-wired controller with pressure sensor and actuator for reduced installation time
- fast response actuator that drives the damper from full open to full closed (90°)
- continuous loop tuning through proportional adaptive algorithms using patented P-Adaptive and Pattern Recognition Adaptive Control (PRAC) technologies
- advanced diagnostics that identify and correct system deviations related to flow, damper travel, and energy
- N2 network communications for integrating VMA as a part of a facility management System.
- simple question/answer software format for quick, easy configuration of project-specific applications.

VMA Variable Air Volume Controller Selection Table

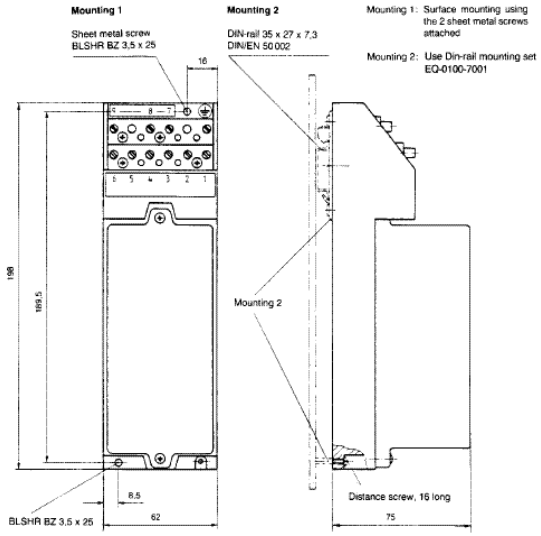
	Inputs/Outputs	Point	Rating	Model			Description	Ordering Code	
				1410	1420	1430			
Analog Inputs	Zone temperature	AI-1	1K Ni,Si, Pt, or 2.25 K NTC	X	X	X	Integrated VAV Controller/Actuator/Pressure sensor (cooling only)	**AP-VMA1410-0**	
	Zone setpoint	AI-2	1.6 Kohm pot.meter	X	X	X			
	Sideloop (humidity, dew point)	AI-3	0..10 VDC		X	X			
	Supply air temp. or supplemental heat temp.	AI-4	1K Ni,Si, Pt, or 2.25 K NTC		X	X	Integrated VAV Controller/Actuator/Pressure sensor (w/ Reheat and Fan-Powered)	**AP-VMA1420-0**	
	Velocity pressure	internal	0…374 pa	X	X	X	Integrated VAV Controller/Pressure sensor (w/ Reheat and Fan-Powered)	**AP-VMA1430-0**	
Binary Inputs	Tempory occupied/Standby	BI-1	Dry contact	X	X	X			
	Occupied	BI-2		X	X	X			
	Off or window or shutdown	BI-3		X	X	X			
Analog Outputs	Proportional heat	AO-1, AO-2	0…10 VDC at 10 mA		X	X			
Binary Outputs	Lights, Fan, Box Heat-Valve or 1-3 stage Electric, Supplement Heat-Valve or Single Stage Electric Box Heat, External Damper Actuator,	BO-1, BO-2, BO-3, BO-4, BO-5	24 VAC at 0.5 A each		X	X			
	Stepper Motor with Position Actuator	Internal	2-phase Stepper	X	X				

R

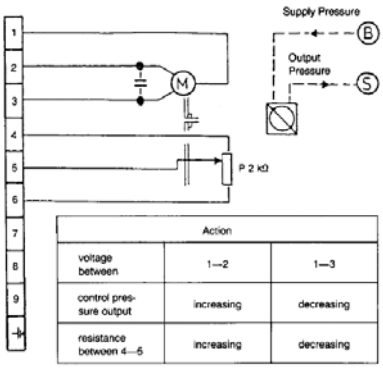
EP-2000 Series Electro-Pneumatic Transducers

Accessories

EP-2000



Dimensions



Wiring/Tubing

Description

The EP-2000 electro-pneumatic transducer with motor is used for converting an electrical contact signal into a 0.2 to 1.0 bar pneumatic standard signal.

The instrument is suitable for connection of electrical incremental controllers with pneumtatic devices or for electrical remote adjustment

Features

- High linearity
- Low histeresis
- High accuracy
- Low air supply influence
- Low air consumption
- High air capacity

EP-2000 Motorised E / P-transducer Selection Table

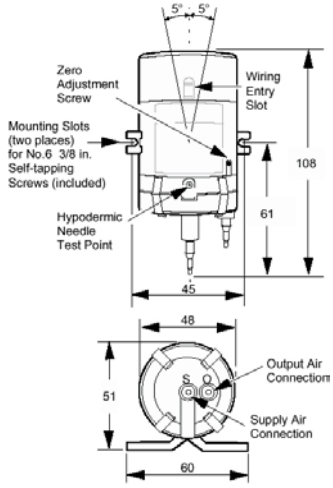
Description	Supply Pressure B	Output Pressure SA	Running Time	Type-Model Number	
Motorised E/P-transducer for 230 V, 50-60 Hz	1,2 bar, max. 1,6 bar	0,2…1,0 bar	Ca. 120 s At 50 Hz	**EP-2000-7001**	
Motorised E/P-transducer for 24 V, 50 Hz			ca. 96 s at 60 Hz	**EP-2000-7004**	

S

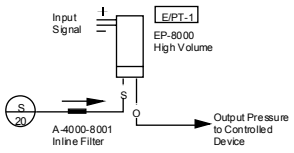
EP-8000 Series Electro-Pneumatic Transducers

Accessories

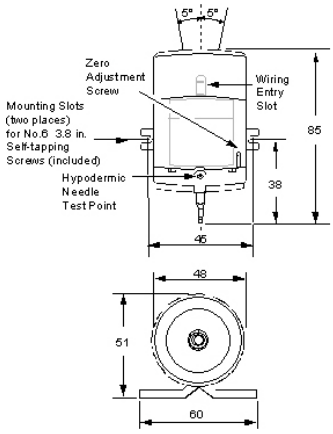
EP-8000



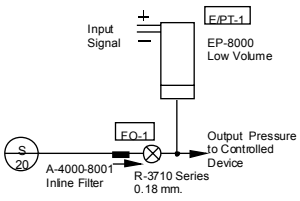
Dimensions of High Volume out put model



Wiring/Tubing for High Volume Model



Dimensions of Low Volume out put model



Wiring/Tubing for Low Volume Model

Description

EP-8000 Series Electro-Pneumatic Transducers convert a voltage or current signal from an electronic controller into a pneumatic output pressure signal. An increase or decrease in the input signal proportionally increases or decreases (respectively) the output pressure signal from the EP-8000.

It is designed to output a proportional pneumatic control signal in response to an electronic control signal. All units feature barbed air connections for 5/32 or ¼ inch O.D. polytubing. Sequencing of pneumatic valve or damper actuators can be accomplished using a Johnson Controls V-9502 (Valve) or D-9502 (Damper) Actuator Positioner.

Four models are available, which are grouped into two basic versions: low volume output units (nonrelay) and high volume output units (relay)

- Supply Pressure 126 to 175 kPa (18 to 25 psig), nominal 140 kPa (20 psig)
- Hysteresis 1.4 kPa typical,
- Enclosure IP42

Features

- Compact, simple design
- Choice of 0 to 10 VDC or 4 to 20 mA input range
- Hypodermic needle test point
- Factory set, fully adjustable zero and span
- High accuracy with low hysteresis

EP-8000 Series Electro-Pneumatic Transducers Selection Table

Output	Input Range	Factory Output Range kPa (psig)	Maximum Input	Input Impedance	Type-Model Number	
Low Volume (Non-relay)	0.5…9 VDC	7…126 (1 – 18)	30 mA DC	1000 Ω minimum	**EP-8000-1**	
High Volume (Relay)	0.25…9.5 VDC	3-5…133 (0.5 – 19)	30 mA DC		**EP-8000-2**	
Low Volume (Non-relay)	4…20 mA DC	21…105 (3-15)	30 mA DC	350 Ω maximum	**EP-8000-3**	
High Volume (Relay)	4…20 mA DC	21…105 (3-15)	30 mA DC		**EP-8000-4**	

Accessories (order separately)

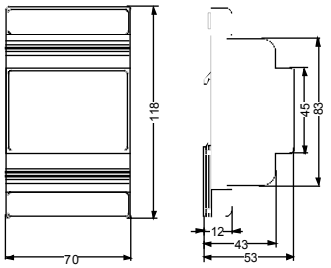
Description	Type-Model number	
Inline Air Filter (required for all models)	**A-4000-8001**	
Mounting bracket	**EP-8000-101**	
Restriction/T-fitting for models without relay	**R-3710-8307**	
Restriction right-angle for models without relay	**R-3710-8207**	

S

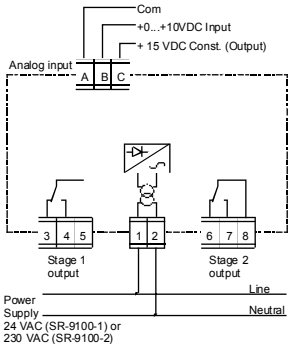
SR-9100 Staging Relay 0…10 V input, 2 relay outputs

Accessories

SR-9100



Dimensions



Wiring

Description

The SR-9100 is a two-stage staging relay with 0...10 VDC input signal and 2 potential free contact outputs. The SR-9100 can be used in conjunction with a Johnson Controls transducer or a Johnson Controls controller, to convert the 0...10 VDC output signal into two ON/OFF SPDT stages. The two outputs can be connected to two ON/OFF control devices, such as compressors, electrical heating coils, etc. At each stage there is the possibility to adjust the switching point (SP) and the differential.

Features

- DIN-omega rail mounting
- 24 VAC or 230 VAC supply models available
- High rating 250 VAC, 10 (5) A SPDT contact outputs
- LED indicating status of outputs
- Fixed time delay between stages
- Same styling as SC-9100 easy DDC controller
- Adjustable SetPoint, Differential and mode.
- Several modules can be connected in parallel on one 0...10 V signal

SR-9100 Staging Relay Selection Table

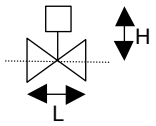
Set point Range	Diff. Range	Supply Voltage	Tolerance	Contacts	Time Delay	Type-Model Number	
5…95% (0.5…9.5 VDC)	5…60% (0.5…6.0 VDC)	24 VAC	-15%/+10%	250 VAC, 10 (5) A, SPDT	Stage 1: 1 second	**SR-9100-1**	
		230 VAC			Stage 2: 2 seconds	**SR-9100-2**	

S

GS-3001 Solenoid Gas Valve (Normally Open)

Solenoid Safety Shut Off Valves

GS-3001



Description

The GS3001 series, normally open valve, is used for soundness proving of gas armatures and for discharging excess or leakage gas.

Features

- Normally open valve
- CPI available

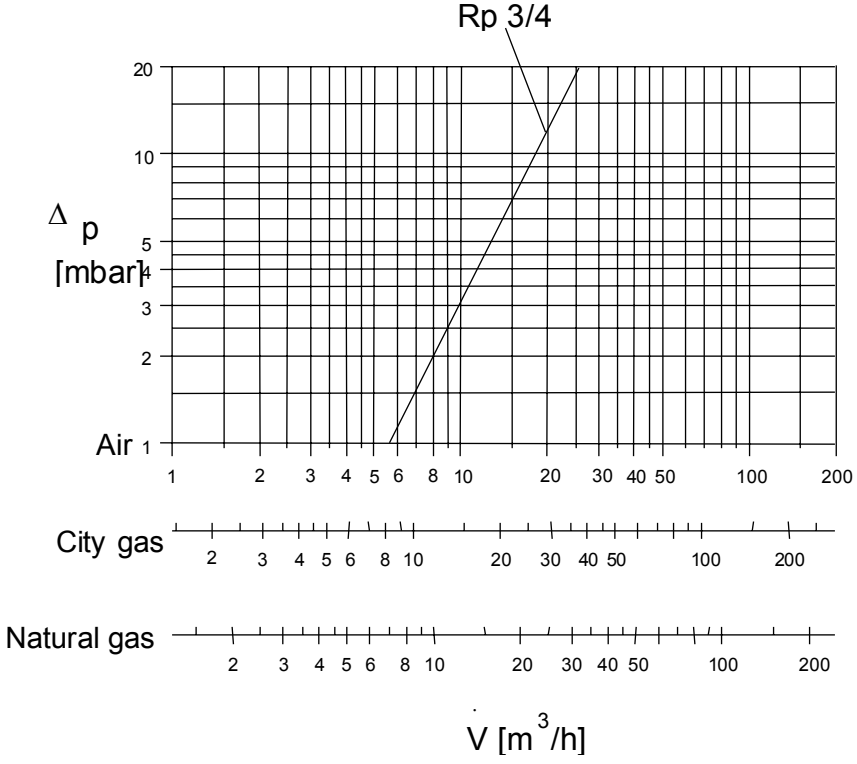
Technical Specifications

Class: 0
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: vertical-horizontal
Operating Voltages: 230V, 120V, 24V 50/60Hz and 24VDC
Power Consumption: 21VA, 18W
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 13,5
Duty Cycles: max. 20min^{-1}
Approvals: EC (EN 161, DIN 3394), European Pressure Directive 97/23/EC, CE-0085AR0270

Connection	L (mm)	H (mm)
Rp 3/4	100	118 (CPI: 154)

GS-3001 Solenoid Gas Valve Selection Table

Connection	Pmax (mbar)	Options	Power Supply *	Type-Model Number	
Rp 3/4	360	Standard	230V 50/60 Hz	**GS-3001-3120**	
Rp 3/4	360	Standard	24V 50/60 Hz	**GS-3001-3140**	
Rp 3/4	360	CPI	230V 50/60 Hz	**GS-3001-3121**	
Rp 3/4	360	CPI	24V 50/60 Hz	**GS-3001-3141**	



T

PV-1000 Ingition Solenoid Gas Valve Rp 1/8 to Rp 1/2

Solenoid Safety Shut Off Valves

Description

The PV-1000 series are single seated two-way valves with solenoid action for the control and ignition of gas appliances and are suitable for forced and induced draught gas burners and burner trains.

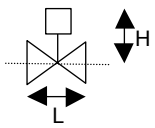
Features

- Compact body design
- Sizes Rp 1/8, 1/4, 3/8, 1/2

Technical Specifications

Class: A
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: horizontal-vertical
Operating Voltages: 230V, 120V, 24V 50/60Hz
Power Consumption: 9VA (Rp 1/8, 1/4), 13VA (Rp 3/8, 1/2)
Enclosure: IP54 (DIN 40 050)
Wiring: 3-pin connector plug DIN43650 AM3
Duty Cycles: max. $20min^{-1}$
Approvals: EC (EN 161)
CE-0085AR0365

PV-1000



Connection	L (mm)	H (mm)
Rp 1/8 - 1/2	66	75

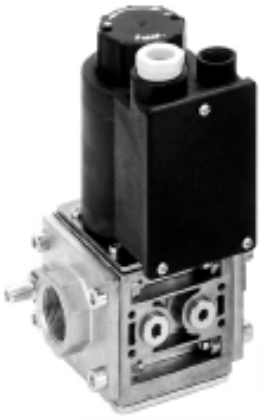
PV-1000 Solenoid Gas Valve Selection Table

Connection	Pmax (mbar)	Vn (m_N^3/h) Natural Gas Δp = 2,5mbar	Power Supply	Type-Model Number	
Rp 1/8	350	1.5	24V AC 50/60 Hz	PV-1000-3101	
			230 V AC 50/60 Hz	PV-1000-3301	
Rp 1/4	350	1.7	24V AC 50/60 Hz	PV-1000-3102	
			230 V AC 50/60 Hz	PV-1000-3302	
Rp 3/8	350	3.1	24V AC 50/60 Hz	PV-1000-3103	
			230 V AC 50/60 Hz	PV-1000-3303	
Rp 1/2	350	3.1	24V AC 50/60 Hz	PV-1000-3104	
			230 V AC 50/60 Hz	PV-1000-3304	

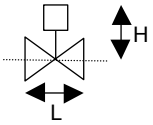
T

GS-20/25 and GS-40/45 Single stage Solenoid Gas Valves

Solenoid Safety Shut Off Valves



GS-20/25 and GS-40/45 Solenoid Gas Valves



Description

The single block GS-20/25 and 40/45 gas valves are designed for use in main gas lines for commercial and industrial power and atmospheric gas burners. They are suitable for forced and induced draft gas burners and burner trains. These valves are available as single and double seat seat versions with flow adjuster and optional hydraulic damper.

Features

- Compact body design. Two body sized GS-2 and GS-4
- Sizes GS-2: Rp 3/8, 1/2, 3/4, 1
  Sizes GS-4: Rp 3/4, 1, 1-1/4, 1-1/2
- Flow adjuster standard, hydraulic damper available
- Single and double seat versions
- Side pressure taps G 1/8 (G 1/4 available for GS-4)

Technical Specifications

Class: A
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: horizontal-vertical
Operating Voltages: 230V, 120V, 24V 50/60Hz
Power Consumption: 23VA
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 13,5
Duty Cycles: max. 10min^{-1}
Approvals: EC (EN 161), CSA (ANSI Z21.21, ANSI Z21.78), European Pressure Directive 97/23/EC, UL on request, CE-0063AN3731

Model	L (mm) valve body + flanges	H (mm) (Hydraulic damper +17mm)
GS-2	60 +32 (Rp 3/8, 1/2), +38 (Rp 3/4), +44 (Rp 1)	133 (160)
GS-4	80 +38 (Rp 3/4), +44 (Rp 1), +46 (Rp 1-1/4, 1-1/2)	143 (170)

GS-20/25 and GS-40/45 Solenoid Gas Valves Selection Table

Description	Pmax (mbar)	Single/ Double Seating	Power Supply	Type-Model Number	
Valve without filterplate or connection flange. See page 231 for applicable connection flange. Flow Curves see page 221.					
On/Off, fast opening with flow adjuster	200	Single	230V 50/60 Hz	**GS-2510-2000**	
			24V 50/60 Hz	**GS-2512-2000**	
On/Off, step slow opening with flow adjuster (hydraulic damper)	200	Single	230V 50/60 Hz	**GS-2520-2000**	
			24V 50/60 Hz	**GS-2522-2000**	
On/Off, fast opening with flow adjuster	360	Double	230V 50/60 Hz	**GS-2010-2000**	
			24V 50/60 Hz	**GS-2012-2000**	
On/Off, step slow opening with flow adjuster (hydraulic damper)	360	Double	230V 50/60 Hz	**GS-2020-2000**	
			24V 50/60 Hz	**GS-2022-2000**	
On/Off, fast opening with flow adjuster	100	Single	230V 50/60 Hz	**GS-4510-2000 ***	
			24V 50/60 Hz	**GS-4512-2000 ***	
On/Off, step slow opening with flow adjuster (hydraulic damper)	100	Single	230V 50/60 Hz	**GS-4520-2000 ***	
			24V 50/60 Hz	**GS-4522-2000 ***	
On/Off, fast opening with flow adjuster	360	Double	230V 50/60 Hz	**GS-4010-2000 ***	
			24V 50/60 Hz	**GS-4012-2000 ***	
On/Off, step slow opening with flow adjuster (hydraulic damper)	360	Double	230V 50/60 Hz	**GS-4020-2000 ***	
			24V 50/60 Hz	**GS-4022-2000 ***	

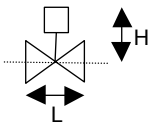
* with side pressure taps G 1/4 the last digits will be 3000 (e.g. GS-4010-3000).

T

GS-21.. and GS-41.. Two-stage Solenoid Gas Valves

Gas Controls

GS-21/41 Two Stage Gas Valves



Description

The model is an on/off valve with a manual flow adjuster for the 1st stage. The electronically integrated damper acts to slow opening of the 1st to the 2nd stage of the valve. There is no flow adjuster for the 2nd stage. The 2-Stage Model is recommended to be used for appliances with high flow, where the flow in the 1st stage is higher than 40% of the maximum flow. The use of a bypass valve with an on/off valve is recommended if the flow in the 1st stage is less than 40%.

Features

- Compact body design. Two body sized GS-2 and GS-4
- Sizes GS-2: Rp 3/8, 1/2, 3/4, 1
  Sizes GS-4: Rp 3/4, 1, 1-1/4, 1-1/2
- Side pressure taps G 1/8 (G 1/4 for GS-4 available)

Technical Specifications

Class: A
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: upright, vertical
Operating Voltages: 230V, 120V 50/60Hz
Power Consumption: 17VA
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 13,5
Duty Cycles: max. $1 min^{-1}$
Approvals: EC (EN 161), CSA (ANSI Z21.21, ANSI Z21.78), European Pressure Directive 97/23/EC, CE-0063AN3731

Model	L (mm) valve body + flanges	H (mm)
GS-2	60 +32 (Rp 3/8, 1/2), +38 (Rp 3/4), +44 (Rp 1)	133
GS-4	80 +38 (Rp 3/4), +44 (Rp 1), +46 (Rp 1-1/4, 1-1/2)	143

GS-21 and GS-41 Solenoid Gas Valves Selection Table

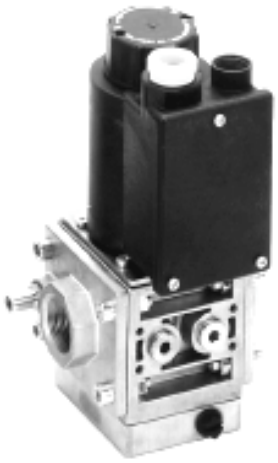
Description	Pmax (mbar)	Single/ Double Seating	Power Supply	Type-Model Number	
Valve without filterplate or connection flange, see page 231 for applicable connection flange. Flow curves see page 221.					
On/Off, two stage valve	360	Double	230V 50/60 Hz	**GS-2120-2000**	
On/Off, two stage valve	360	Double	230V 50/60 Hz	**GS-4120-2000 ***	

* with side pressure taps G 1/4 the last digits will be 3000 (e.g. GS-4010-3000).

T

GS-20 and GS-40 Multi option, Single stage Solenoid Gas Valves

Gas Controls



GS-20.. and GS-40.. Solenoid Gas Valves

Description

Pressure Regulator: on/off valve with a diaphragm balancing with the force of the regulator spring.

Only GS-4 models: The Servo Precision model is an on/off valve with an adjustable servo precision regulator. The servo precision regulator operates as a dual-stage regulator for start gas and control pressure. When the valve is energised, the pressure regulator first moves to the start gas stage (P_{ST}), remains there for several seconds, and then slowly moves to the pre-adjusted setpoint pressure (P_G).

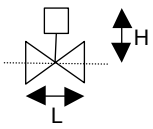
Only GS-4 models: The Gas/Air Ratio control provides modulating combustion for appliance efficiency. When the valve is energised, it begins to open. The opening degree is determined by the pre-adjusted ratio and combustion air pressure (P_A), which is connected to the controller by an external impulse line as the primary setpoint parameter. The controller modulates the valve opening degree without overshooting the preset outlet pressure. For additional precision control, the combustion chamber pressure (P_F) can be connected to the controller as an additional reference to compensate for the effect of combustion pressure variations.

Features

- Compact body design. Two body sized GS-2 and GS-4
- Sizes GS-2: Rp 3/8, 1/2, 3/4, 1
  Sizes GS-4: Rp 3/4, 1, 1-1/4, 1-1/2
- Side pressure taps G 1/8 (G 1/4 for GS-4 available)

Technical Specifications

Class: A
Regulating Settings:
Spring Regulator: 6 to 20 mbar
Servo Regulator: Start Gas Stage PST 2.5 to 10 mbar, Outlet Pressure PG 5 to 50 mbar
Gas/Air Ratio: Outlet Pressure PG 0.5 to 50 mbar, Air Inlet Pressure PA 0.5 to 30 mbar
Combustion Chamb. Pressure PF -2 to 20 mbar, Zero Set Z -2 to 2 mbar
Maximum Regulating Differential Pressure
Spring Regulator: 20 mbar
Servo Regulator & Gas/Air Ratio: 50 mbar
Regulator Classifications:
Spring Regulator Class B/EN88
Servo Regulator & Gas/Air Ratio Class A/EN88
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: horizontal-vertical
Operating Voltages: 230V, 120V, 24V 50/60Hz
Power Consumption: 23VA
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 13,5
Duty Cycles: max. $1 min^{-1}$
Approvals: EC (EN88, EN 161), CSA (ANSI Z21.21, ANSI Z21.78),
European Pressure Directive 97/23/EC, UL on request
CE-0063AN3731



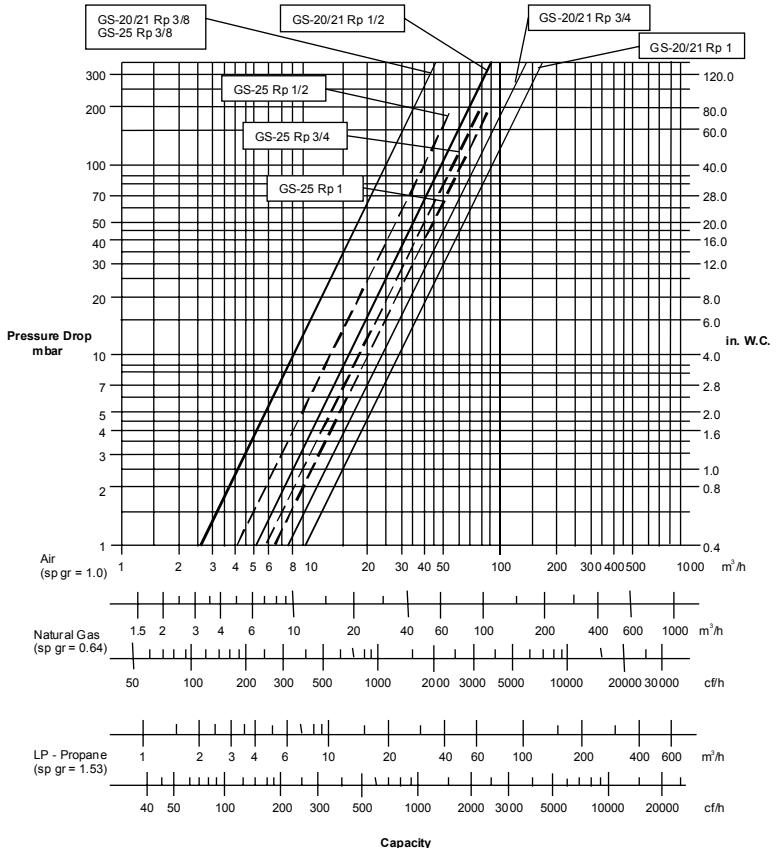
Model	L (mm) valve body + flanges	H (mm)
GS-2	60 +32 (Rp 3/8, 1/2), +38 (Rp 3/4), +44 (Rp 1)	133
GS-4	80 +38 (Rp 3/4), +44 (Rp 1), +46 (Rp 1-1/4, 1-1/2)	143

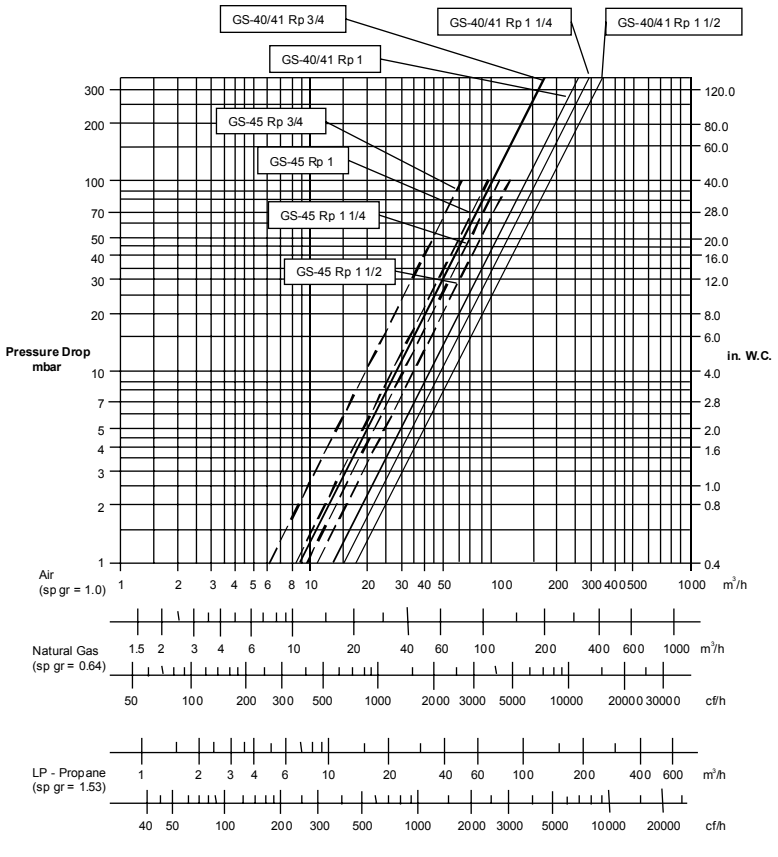
GS-20.. and GS-40.. Solenoid Gas Valves **Selection Table**

Description	Pmax (mbar)	Single/ Double Seating	Power Supply	Type-Model Number	
Valve without filterplate or connection flange. See page 231 for applicable connection flange. Flow curves see next page.					
On / Off valve with pressure regulator	100	Double	230V 50/60 Hz	**GS-2030-2000**	
			24V 50/60 Hz	**GS-2032-2000**	
On / Off valve with pressure regulator	100	Double	230V 50/60 Hz	**GS-4030-2000 ***	
			24V 50/60 Hz	**GS-4032-2000 ***	
On / Off valve with Servo Precision Regulator, step slow opening	100	Double	230V 50/60 Hz	**GS-4050-2000 ***	
			24V 50/60 Hz	**GS-4052-2000 ***	
On / Off valve with Gas/Air Ratio Controller	100	Double	230V 50/60 Hz	**GS-4060-2000 ***	
			24V 50/60 Hz	**GS-4062-2000 ***	

* with side pressure taps G 1/4 the last digits will be 3000 (e.g. GS-4010-3000).

T


GS-20/21 Rp 3/8
GS-25 Rp 3/8
GS-20/21 Rp 1/2
GS-20/21 Rp 3/4
GS-20/21 Rp 1
GS-25 Rp 1/2
GS-25 Rp 3/4
GS-25 Rp 1
Pressure Drop
mbar
in. W.C.
Air
(sp gr = 1.0)
m³/h
Natural Gas
(sp gr = 0.64)
m³/h
cf/h
LP - Propane
(sp gr = 1.53)
m³/h
cf/h
Capacity


GS-40/41 Rp 3/4
GS-40/41 Rp 1 1/4
GS-40/41 Rp 1 1/2
GS-40/41 Rp 1
GS-45 Rp 3/4
GS-45 Rp 1
GS-45 Rp 1 1/4
GS-45 Rp 1 1/2
Pressure Drop
mbar
in. W.C.
Air
(sp gr = 1.0)
m³/h
Natural Gas
(sp gr = 0.64)
m³/h
cf/h
LP - Propane
(sp gr = 1.53)
m³/h
cf/h
Capacity

T

GS-5000 Single stage Solenoid Gas Valves

Solenoid Safety Shut Off Valves

GS-5000 Solenoid Gas Valves

Description

The GS-5000 series are single seated two-way valves with solenoid action for vertical to horizontal mounting and are suitable for the control of main gaslines on commercial and industrial power and atmospheric gas burners.

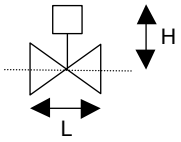
Screwed versions: Rp 1-1/2, 2, Flanged versions: DN 40, 50

Features

- Class A valves for control of main gas lines on commercial and industrial gas burners
- CPI and flow adjuster available

Technical Specifications

Class: A
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: horizontal-vertical
Operating Voltages (Power Consumption):
Rp 1-1/2, DN40: 230V, 120V, 24V 50/60Hz (46VA), 12 VDC, 24 VDC (36W)
Rp 2, DN50: 230V, 120V 50/60Hz (55VA)
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 13,5
Duty Cycles: max. $10min^{-1}$
Approvals: EC (EN 161), European Pressure Directive 97/23/EC, CE-0085AQ780



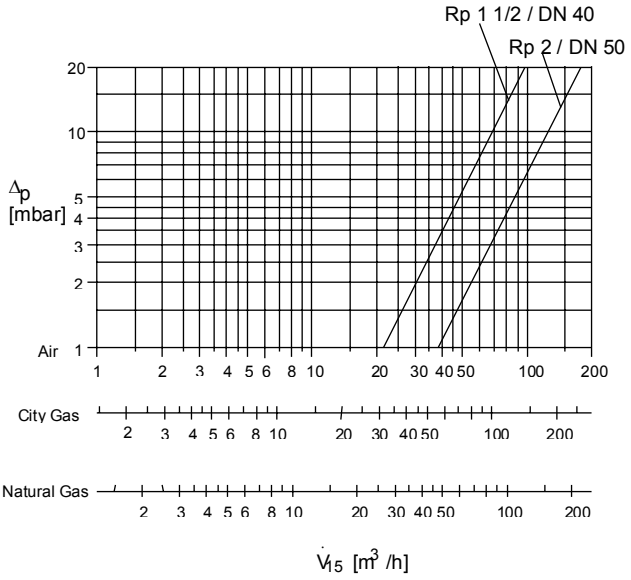
Connection	L (mm)	H (mm) (CPI: +36mm)
Rp 1-1/2	150	176
DN40	200	176
Rp 2	180	204
DN50	230	204

GS-5000 Gas Valves Selection Table

Connection	Pmax (mbar)	Options	Power Supply	Type-Model Number	
Rp 1-1/2	200	Standard *	230V 50/60 Hz	**GS-5001-4140**	
			24V 50/60 Hz	**GS-5001-4160**	
DN40	200	Standard *	230V 50/60 Hz	**GS-5002-4140**	
			24V 50/60 Hz	**GS-5002-4160**	
Rp 2	150	Standard **	230V 50/60 Hz	**GS-5001-5140**	
DN50	150	Standard **	230V 50/60 Hz	**GS-5002-5140**	

* other voltages on request. Flow adjuster and CPI available on request

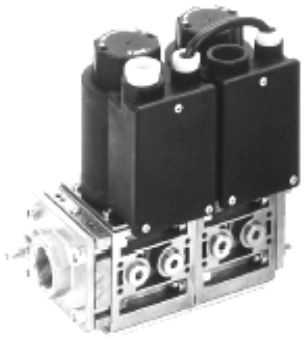
** Flow adjuster and CPI available on request



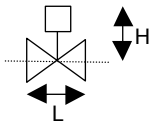
T

GM-20/25 and GM-40/45 Single stage Duo block Solenoid Gas Valves

Solenoid Safety Shut Off Valves



GM-20/25 and GM-40/45 Solenoid Gas Valves



Description

These valves, of modular construction, provide, in the space of a relatively compact valve, all the components normally needed in a burner gas train, together with a wide range of features, options and technological innovations for medium to high-flow gas circuits. The valves are designed for control of atmospheric and forced draught gas burners in both heating and process applications.

Features

- Compact body design. Two body sized GM-2 and GM-4
- Sizes GM-2: Rp 3/8, 1/2, 3/4, 1
  Sizes GM-4: Rp 3/4, 1, 1-1/4, 1-1/2
- Flow adjuster standard, hydraulic damper available
- Single and double seat versions
- Side pressure taps G 1/8 (G 1/4 available for GM-4)

Technical Specifications

Class: A
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: horizontal-vertical
Operating Voltages: 230V, 120V, 24V 50/60Hz
Power Consumption: 23VA
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 13,5
Duty Cycles: max. $10min^{-1}$
Approvals: EC (EN126, EN 161), CSA (ANSI Z21.21, ANSI Z21.78), European Pressure Directive 97/23/EC, UL on request, CE-0063AN3731

Model	L (mm) valve body + flanges	H (mm)
GM-2	132 +32 (Rp 3/8, 1/2), +38 (Rp 3/4), +44 (Rp 1)	133
GM-4	173 +38 (Rp 3/4), +44 (Rp 1), +46 (Rp 1-1/4, 1-1/2)	143

GM-20/25 and GM-40/45 Solenoid Gas Valves Selection Table

Description Valve 1	Description Valve 2	Pmax (mbar)	Power Supply	Type-Model Number	
Valve without connection flange. See page 231 for applicable connection flange. Flow Curves see page 227.					
On / Off valve, single seat	On / Off valve single seat, flow adjuster	200	230V 50/60 Hz	**GM-2510-2000**	
			24V 50/60 Hz	**GM-2512-2000**	
On / Off valve, single seat	On / Off, step slow opening valve, single seat, flow adjuster	200	230V 50/60 Hz	**GM-2520-2000**	
			24V 50/60 Hz	**GM-2522-2000**	
On / Off valve, double seat	On / Off valve double seat, flow adjuster	360	230V 50/60 Hz	**GM-2010-2000**	
			24V 50/60 Hz	**GM-2012-2000**	
On / Off valve, double seat	On / Off, step slow opening valve, double seat, flow adjuster	360	230V 50/60 Hz	**GM-2020-2000**	
			24V 50/60 Hz	**GM-2022-2000**	
On / Off valve, single seat	On / Off valve single seat, flow adjuster	100	230V 50/60 Hz	**GM-4510-2000 ***	
			24V 50/60 Hz	**GM-4512-2000 ***	
On / Off valve, single seat	On / Off, step slow opening valve, single seat, flow adjuster	100	230V 50/60 Hz	**GM-4520-2000 ***	
			24V 50/60 Hz	**GM-4522-2000 ***	
On / Off valve, double seat	On / Off valve double seat, flow adjuster	360	230V 50/60 Hz	**GM-4010-2000 ***	
			24V 50/60 Hz	**GM-4012-2000 ***	
On / Off valve, double seat	On / Off, step slow opening valve, double seat, flow adjuster	360	230V 50/60 Hz	**GM-4020-2000 ***	
			24V 50/60 Hz	**GM-4022-2000 ***	

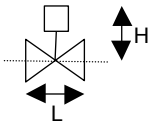
* with side pressure taps G 1/4 the last digits will be 3000 (e.g. GS-4010-3000).

T

GM-21/26 and GM-41/46 Two stage Duo block Solenoid Gas Valves

Solenoid Safety Shut Off Valves

GM-21/26 and GM-41/46 Solenoid Gas Valves



Description

The model is an on/off valve with a manual flow adjuster for the 1st stage. The electronically integrated damper acts to slow opening of the 1st to the 2nd stage of the valve. There is no flow adjuster for the 2nd stage. The 2-Stage Model is recommended to be used for appliances with high flow, where the flow in the 1st stage is higher than 40% of the maximum flow. The use of a bypass valve with an on/off valve is recommended if the flow in the 1st stage is less than 40%.

Features

- Compact body design. Two body sized GM-2 and GSM4
- Sizes GM-2: Rp 3/8, 1/2, 3/4, 1
  Sizes GM-4: Rp 3/4, 1, 1-1/4, 1-1/2
- Side pressure taps G 1/8 (G 1/4 for GM-4 available)

Technical Specifications

Class: A
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: horizontal-vertical
Operating Voltages: 230V, 120V 50/60Hz
Power Consumption: 40VA
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 13,5
Duty Cycles: max. 1min^{-1}
Approvals: EC (EN126, EN 161), CSA (ANSI Z21.21, ANSI Z21.78),
European Pressure Directive 97/23/EC,
CE-0063AN3731

Data of Pressure Regulator see page 233

Model	L (mm) valve body + flanges	H (mm)
GM-2	132 +32 (Rp 3/8, 1/2), +38 (Rp 3/4), +44 (Rp 1)	133
GM-4	173 +38 (Rp 3/4), +44 (Rp 1), +46 (Rp 1-1/4, 1-1/2)	143

GM-21/26 and GM-41/46 Solenoid Gas Valves Selection Table

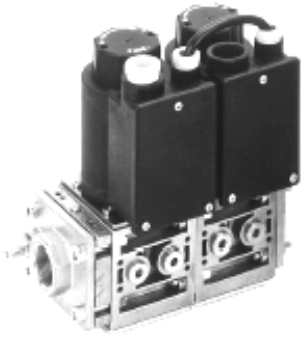
Description Valve 1	Description Valve 2	Pmax (mbar)	Power Supply	Type-Model Number	
Valve without connection flange. See page 231 for applicable connection flange. Flow Curves see page 227.					
On / Off valve, single seat	On / Off valve two stage with flow	200	230V 50/60 Hz	**GM-2620-2000**	
On / Off valve, double seat	On / Off valve two stage with flow	360	230V 50/60 Hz	**GM-2120-2000**	
On / Off valve, single seat	On / Off valve two stage with flow	100	230V 50/60 Hz	**GM-4620-2000 ***	
On / Off valve, double seat	On / Off valve two stage with flow	360	230V 50/60 Hz	**GM-4120-2000 ***	

* with side pressure taps G 1/4 the last digits will be 3000 (e.g. GS-4010-3000).

T

GM-20/25/21 and GM-40/45/41 Single stage and Two stage Duo block Solenoid Gas Valves

Gas Controls



GM-20/25/21 and GM-40/45/41 Solenoid Gas Valves

Description

Two-Stage models: on/off valve with a manual flow adjuster for the 1st stage. The electronically integrated damper acts to slow opening of the 1st to the 2nd stage of the valve. There is no flow adjuster for the 2nd stage. The 2-Stage Model is recommended to be used for appliances with high flow, where the flow in the 1st stage is higher than 40% of the maximum flow. The use of a bypass valve with an on/off valve is recommended if the flow in the 1st stage is less than 40%.

Pressure Regulator: on/off valve with a diaphragm balancing with the force of the regulator spring.

Only GM-4 models: The Servo Precision model is an on/off valve with an adjustable servo precision regulator. The servo precision regulator operates as a dual-stage regulator for start gas and control pressure. When the valve is energised, the pressure regulator first moves to the start gas stage (P_{ST}), remains there for several seconds, and then slowly moves to the pre-adjusted setpoint pressure (P_G).

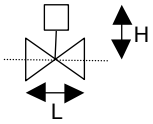
Only GM-4 models: The Gas/Air Ratio control provides modulating combustion for appliance efficiency. When the valve is energised, it begins to open. The opening degree is determined by the pre-adjusted ratio and combustion air pressure (P_A), which is connected to the controller by an external impulse line as the primary setpoint parameter. The controller modulates the valve opening degree without overshooting the preset outlet pressure. For additional precision control, the combustion chamber pressure (P_F) can be connected to the controller as an additional reference to compensate for the effect of combustion pressure variations.

Features

- Compact body design. Two body sized GM-2 and GM-4
- Sizes GM-2: Rp 3/8, 1/2, 3/4, 1
  Sizes GM-4: Rp 3/4, 1, 1-1/4, 1-1/2
- Side pressure taps G 1/8 (G 1/4 for GM-4 available)

Technical Specifications

Class: A
Regulating SettinGM:
Spring Regulator: 6 to 20 mbar
Servo Regulator: Start Gas Stage PST 2.5 to 10 mbar, Outlet Pressure PG 5 to 50 mbar
Gas/Air Ratio: Outlet Pressure PG 0.5 to 50 mbar, Air Inlet Pressure PA 0.5 to 30 mbar
Combustion Chamb. Pressure PF -2 to 20 mbar, Zero Set Z -2 to 2 mbar
Maximum Regulating Differential Pressure
Spring Regulator: 20 mbar
Servo Regulator & Gas/Air Ratio: 50 mbar
Regulator Classifications:
Spring Regulator Class B/EN88
Servo Regulator & Gas/Air Ratio Class A/EN88
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: horizontal-vertical
Operating Voltages: 230V, 120V, 24V 50/60Hz
Power Consumption: 23VA
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 13,5
Duty Cycles: max. $1 min^{-1}$
Approvals: EC (EN88, EN 161, EN 126), CSA (ANSI Z21.21, ANSI Z21.78),
European Pressure Directive 97/23/EC, UL on request (not for Two-Stage Valves)
CE-0063AN3731



Model	L (mm) valve body + flanges	H (mm)
GM-2	132 +32 (Rp 3/8, 1/2), +38 (Rp 3/4), +44 (Rp 1)	133
GM-4	173 +38 (Rp 3/4), +44 (Rp 1), +46 (Rp 1-1/4, 1-1/2)	143

Continued on next page.

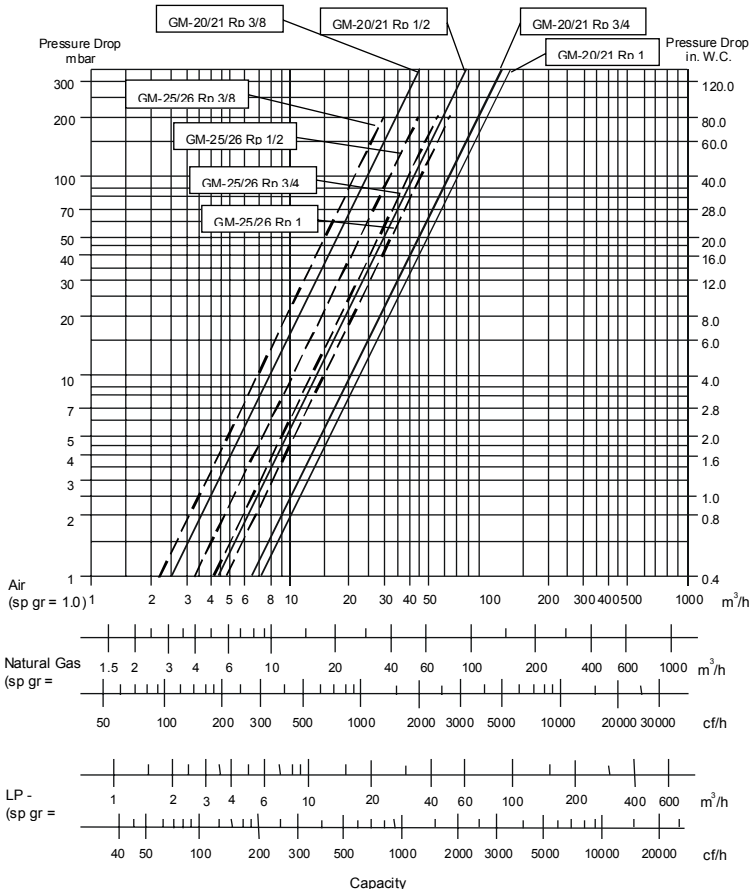
T

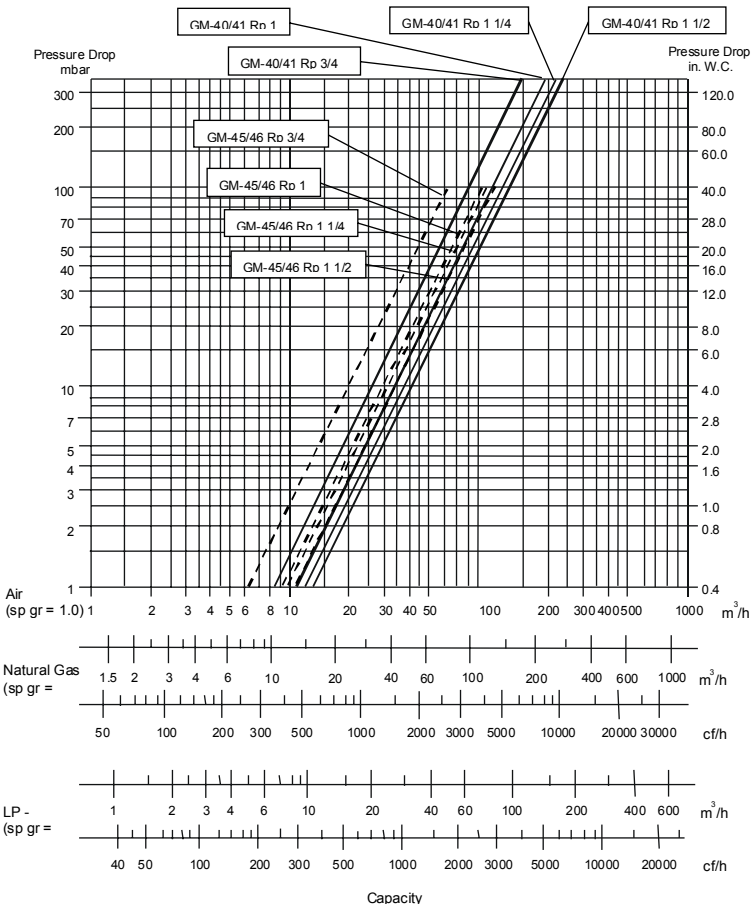
GM-20/25/21 and GM-40/45/41 Solenoid Gas Valves Selection Table

Description Valve 1	Description Valve 2	Pmax (mbar)	Power Supply	Type-Model Number	
Valve without connection flange. See page 231 for applicable connection flange. Flow Curves see next page					
On / Off valve with pressure regulator	On / Off valve, single seat, flow adjuster	100	230V 50/60 Hz	**GM-2530-2000**	
			24V 50/60 Hz	**GM-2532-2000**	
On / Off valve with pressure regulator	On / Off, step slow opening valve, single seat, flow adjuster	100	230V 50/60 Hz	**GM-2540-2000**	
			24V 50/60 Hz	**GM-2542-2000**	
On / Off valve with pressure regulator	On / Off valve, double seat, flow adjuster	100	230V 50/60 Hz	**GM-2030-2000**	
			24V 50/60 Hz	**GM-2032-2000**	
On / Off valve with pressure regulator	On / Off, step slow opening valve, double seat, flow adjuster	100	230V 50/60 Hz	**GM-2040-2000**	
			24V 50/60 Hz	**GM-2042-2000**	
On / Off valve with pressure regulator	On / Off valve two stage with flow adjuster first stage	100	230V 50/60 Hz	**GM-2140-2000**	
On / Off valve with pressure regulator	On / Off valve, single seat, flow adjuster	100	230V 50/60 Hz	**GM-4530-2000 ***	
			24V 50/60 Hz	**GM-4532-2000 ***	
On / Off valve with pressure regulator	On / Off, step slow opening valve, single seat, flow adjuster	100	230V 50/60 Hz	**GM-4540-2000 ***	
			24V 50/60 Hz	**GM-4542-2000 ***	
On / Off valve with pressure regulator	On / Off valve, double seat, flow adjuster	100	230V 50/60 Hz	**GM-4030-2000 ***	
			24V 50/60 Hz	**GM-4032-2000 ***	
On / Off valve with pressure regulator	On / Off, step slow opening valve, double seat, flow adjuster	100	230V 50/60 Hz	**GM-4040-2000 ***	
			24V 50/60 Hz	**GM-4042-2000 ***	
On / Off valve, single seat	On / Off valve Servo Precision Regulator	100	230V 50/60 Hz	**GM-4550-2000 ***	
			24V 50/60 Hz	**GM-4552-2000 ***	
On / Off valve, single seat	On / Off, valve Gas/Air Ratio	100	230V 50/60 Hz	**GM-4560-2000 ***	
			24V 50/60 Hz	**GM-4562-2000 ***	
On / Off valve, double seat	On / Off valve Servo Precision Regulator	100	230V 50/60 Hz	**GM-4050-2000 ***	
			24V 50/60 Hz	**GM-4052-2000 ***	
On / Off valve, double seat	On / Off, valve Gas/Air Ratio	100	230V 50/60 Hz	**GM-4060-2000 ***	
			24V 50/60 Hz	**GM-4062-2000 ***	
On / Off valve with pressure regulator	On / Off valve two stage with flow adjuster first stage	100	230V 50/60 Hz	**GM-4140-2000 ***	

* with side pressure taps G 1/4 the last digits will be 3000 (e.g. GS-4010-3000).

T

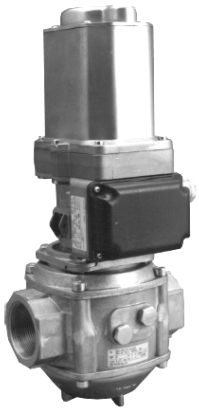

GM-20/21 Rp 3/8
GM-20/21 Rp 1/2
GM-20/21 Rp 3/4
GM-20/21 Rp 1
Pressure Drop mbar
Pressure Drop in. W.C.
GM-25/26 Rp 3/8
GM-25/26 Rp 1/2
GM-25/26 Rp 3/4
GM-25/26 Rp 1
Air (sp gr = 1.0)
Natural Gas (sp gr =
LP - (sp gr =
m³/h
cf/h
Capacity


GM-40/41 Rp 1
GM-40/41 Rp 1 1/4
GM-40/41 Rp 1 1/2
GM-40/41 Rp 3/4
Pressure Drop mbar
Pressure Drop in. W.C.
GM-45/46 Rp 3/4
GM-45/46 Rp 1
GM-45/46 Rp 1 1/4
GM-45/46 Rp 1 1/2
Air (sp gr = 1.0)
Natural Gas (sp gr =
LP - (sp gr =
m³/h
cf/h
Capacity

T

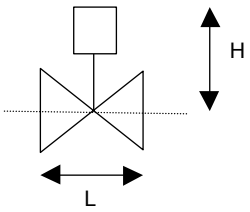
GH-5000 Electro-hydraulic Gas Safety Shut-Off Valves (screwed and flanged)

Electro-Hydraulic Safety Shut-Off Valves



GH-5000 (screwed)

GH-5000 (flanged)



Dimensions

Description

The GH-5000 series is a well tried and tested range of safety shut-off valves caters for the large flows required for large boilers and appliances.

Functions available (all models):

- On - Off
- High - Low - Off
- High - Low - Off - CPI
- Ignition - High - Low - Off
- On - Off - CPI

Actuators are replaceable and within range limitations.

Available screwed versions: Rp 3/4, 1, 1-1/2, 2, 2-1/2, 3

Available flanged versions: DN65, 80, 100, 125, 150

Features

- Compact body design
- Modular construction
- Class A valves for control of main gas lines on commercial and industrial power and atmospheric gas burners

Technical Specifications

Class: A
Media: suitable for all types of gas according to DVWG sheet G 260/I
Mounting position: horizontal-vertical
Operating Voltages: 230V, 120V 50/60Hz
Power Consumption: 200W on opening action, 15W in opened state
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 13,5
Duty Cycles: $3min^{-1}$ (Rp 3/4 - 1-1/2, DN40)
$2min^{-1}$ (Rp 2 - 3, DN50 - 80)
$1min^{-1}$ (DN100 - 150)
Approvals: EC (EN 161), European Pressure Directive 97/23/EC,
CE-0085AP0774 for GH-51 and GH-54
CE-0063E3730/01 for GH-52 and GH-56

Connection	L (mm)	H (mm)
Rp 3/4	119	296
Rp 1	119	296
Rp 1-1/2	119	296
Rp 2	153	323
Rp 2-1/2	135	359
Rp 3	135	359
DN40	200	296
DN50	230	323
DN65	290	359
DN80	310	349
DN100	350	377
DN125	400	388
DN150	480	412

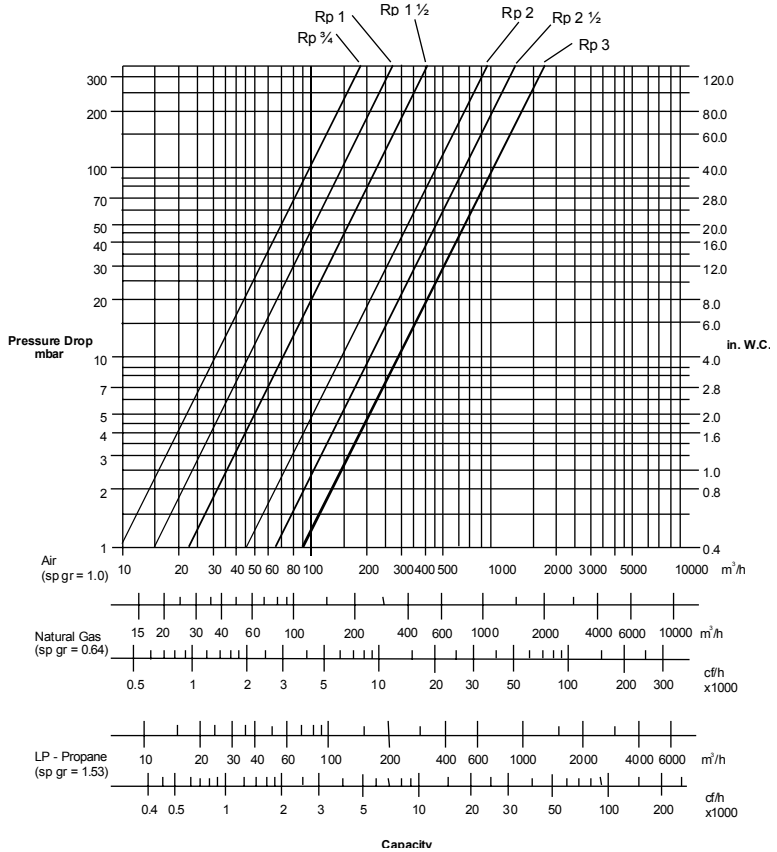
Continued on next page.

T

GH-5000 screwed models Selection Table

Connection	Vn (m_N^3/h) Natural Gas Δp = 2,5mbar	Actuator Configuration	Pmax (mbar)	Opening time (s)	Stroke (mm)	Type Model Number *	
Rp 3/4	18	On-Off	1.000	≤ 6,5	14	**GH-5110-2110**	
		On-Low-Off				**GH-5110-2311**	
		On-Low-Off + CPI				**GH-5119-2411**	
		Ignition On-Low-Off				**GH-5110-2511**	
		On-Off + CPI				**GH-5119-2610**	
Rp 1	29	On-Off	1.000	≤ 6,5	14	**GH-5110-3110**	
		On-Low-Off				**GH-5110-3311**	
		On-Low-Off + CPI				**GH-5119-3411**	
		Ignition On-Low-Off				**GH-5110-3511**	
		On-Off + CPI				**GH-5119-3610**	
Rp 1-1/2	42	On-Off	1.000	≤ 6,5	14	**GH-5110-5110**	
		On-Low-Off				**GH-5110-5311**	
		On-Low-Off + CPI				**GH-5119-5411**	
		Ignition On-Low-Off				**GH-5110-5511**	
		On-Off + CPI				**GH-5119-5610**	
Rp 2	91	On-Off	1.000	≤ 8	22	**GH-5210-6110**	
		On-Low-Off				**GH-5210-6311**	
		On-Low-Off + CPI				**GH-5219-6411**	
		Ignition On-Low-Off				**GH-5210-6511**	
		On-Off + CPI				**GH-5219-6610**	
Rp 2-1/2	130	On-Off	1.000	≤ 8	22	**GH-5610-7111**	
		On-Low-Off				**GH-5610-7311**	
		On-Low-Off + CPI				**GH-5619-7411**	
		Ignition On-Low-Off				**GH-5610-7511**	
		On-Off + CPI				**GH-5619-7611**	
Rp 3	170	On-Off	800	≤ 8	22	**GH-5610-8111**	
		On-Low-Off				**GH-5610-8311**	
		On-Low-Off + CPI				**GH-5619-8411**	
		Ignition On-Low-Off				**GH-5610-8511**	
		On-Off + CPI				**GH-5619-8611**	

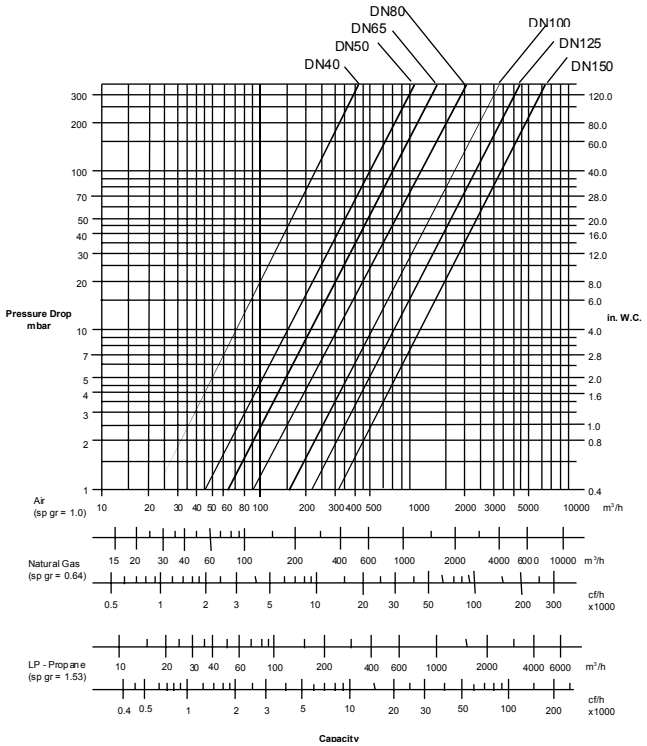
- 120VAC versions available on request



GH-5000 flanged models Selection Table

Connection	Vn (m_N^3/h) Natural Gas Δp = 2,5mbar	Actuator Configuration	Pmax (mbar)	Opening time (s)	Stroke (mm)	Type Model Number (Excluding Voltage)*	
DN 40	43	On-Off	1000	≤ 6,5	14	**GH-5120-1110**	
		On-Low-Off				**GH-5120-1311**	
		On-Low-Off + CPI				**GH-5129-1411**	
		Ignition On-Low-Off				**GH-5120-1511**	
		On-Off + CPI				**GH-5129-1610**	
DN 50	88	On-Off	1000	≤ 8	22	**GH-5220-2110**	
		On-Low-Off				**GH-5220-2311**	
		On-Low-Off + CPI				**GH-5229-2411**	
		Ignition On-Low-Off				**GH-5220-2511**	
		On-Off + CPI				**GH-5229-2610**	
DN 65	127	On-Off	1000	≤ 8	22	**GH-5620-3111**	
		On-Low-Off				**GH-5620-3311**	
		On-Low-Off + CPI				**GH-5629-3411**	
		Ignition On-Low-Off				**GH-5620-3511**	
		On-Off + CPI				**GH-5629-3611**	
DN 80	168	On-Off	800	≤ 8	22	**GH-5620-4111**	
		On-Low-Off				**GH-5620-4311**	
		On-Low-Off + CPI				**GH-5629-4411**	
		Ignition On-Low-Off				**GH-5620-4511**	
		On-Off + CPI				**GH-5629-4611**	
DN 100	320	On-Off	800	≤ 13	36	**GH-5720-5110**	
		On-Low-Off				**GH-5720-5311**	
		On-Low-Off + CPI				**GH-5729-5411**	
		Ignition On-Low-Off				**GH-5720-5511**	
		On-Off + CPI				**GH-5729-5610**	
DN 125	420	On-Off	650	≤ 13	36	**GH-5720-6110**	
		On-Low-Off				**GH-5720-6311**	
		On-Low-Off + CPI				**GH-5729-6411**	
		Ignition On-Low-Off				**GH-5720-6511**	
		On-Off + CPI				**GH-5729-6610**	
DN 150	610	On-Off	350	≤ 13	36	**GH-5720-7110**	
		On-Low-Off				**GH-5720-7311**	
		On-Low-Off + CPI				**GH-5729-7411**	
		Ignition On-Low-Off				**GH-5720-7511**	
		On-Off + CPI				**GH-5729-7610**	

* 120 VAC versions available



T

Accessories for Gas Controls GM-…/GS-…

Gas Controls

Pressure Switches for Gas Controls see page 233

Description	Power Supply	Type-Model number	
Flange-Set Rp 3/8 for GS-2.../GM-2...		**GO-0021-0000 ***	
Flange-Set Rp 1/2 for GS-2.../GM-2...		**GO-0022-0000 ***	
Flange-Set Rp 3/4 for GS-2.../GM-2...		**GO-0023-0000 ***	
Flange-Set Rp 1 for GS-2.../GM-2...		**GO-0024-0000 ***	
Flange-Set Rp 3/4 for GS-4.../GM-4...		**GO-0043-0000 ***	
Flange-Set Rp 1 for GS-4.../GM-4...		**GO-0044-0000 ***	
Flange-Set Rp 1-1/4 for GS-4.../GM-4...		**GO-0046-0000 ***	
Flange-Set Rp 1-1/2 for GS-4.../GM-4...		**GO-0045-0000 ***	
Flange-Sets are available in NPT execution.			
Bypass-Solenoid Valve, 200 mbar (internal bypass)	230 VAC	**GO-2530-0000**	
Ignition Gas Valve, 200 mbar (external bypass)	230 VAC	**GO-2630-0000**	
Filter plate with DIN-Filter insert for GS-2.../GM-2... (Standard with GM-2...)		**GO-0120-0000 ***	
Filter plate with DIN-Filter insert for GS-4.../GM-4... (Standard with GM-4...)		**GO-0140-0000 ***	
Filter GS-25/27.. (Sieve 50 µm and fleece)		**GO-9003-0000 ***	
Filter GS-45/47.. (Sieve 50 µm and fleece)		**GO-9004-0000 ***	
Filter GM/GS-2... (Sieve 50 µm and fleece)		**GO-9001-0000 ***	
Filter GM/GS-4... (Sieve 50 µm and fleece)		**GO-9002-0000 ***	
Wiring connector 4 pole for direct mount on control cover, ISO 4 400 (DIN 43650)		**GO-9101-0000**	
Wiring connector 4 pole for pressure switch, GO-1101-0000, ISO 4400 (DIN 43650)		**GO-9102-0000**	
Wiring connector 4 pole for Closed Position Indicator.		**GO-9103-0000**	
NPT Cable inlet (PG 13,5 on $^1/_2$" NPT)		**GO-9401-0000**	
Signalswitch CPI-Set for GS-2.../GM-2... **		**GO-4200-0000 ***	
Signalswitch CPI-Set for GS-4.../GM-4... **		**GO-4400-0000 ***	
Control cover for directmount wiring connector for GS/GM ISO 4400 (DIN 43 650)		**GO-9402-0000**	

* these options are available mounted to the valve. In that case the last digit of the international order code will be set to "1". (e.g. GO-1000-0001)

** CPI can only be used at on/off valves with double seat (not for regulators, two-stage and electronic modulating valve models)

T

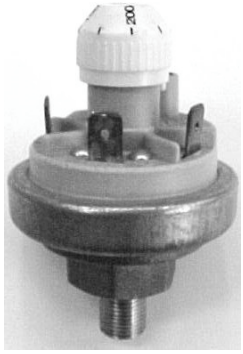
Replacement Parts for Gas Controls GM/GS-2/4

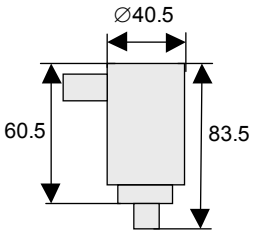
Gas Controls

Description	Power Supply	Type-Model number	
Replacement actuators (coils and wiring boxes)			
GS-20 / 25 / 40 / 45	230 V	**GO-9510-0000**	
	120 V	**GO-9511-0000**	
	24 V	**GO-9512-0000**	
GS-20 / 25 / 40 / 45 with directmount wiring connector	230 V	**GO-9510-1000**	
	120 V	**GO-9511-1000**	
	24 V	**GO-9512-1000**	
GM-20 / 25 / 40 / 45	230 V	**GO-9520-0000**	
	120 V	**GO-9521-0000**	
	24 V	**GO-9522-0000**	
GM-20 / 25 / 40 / 45 with directmount wiring connector	230 V	**GO-9520-1000**	
	120 V	**GO-9521-1000**	
	24 V	**GO-9522-1000**	
GS-21 / 41	230 V	**GO-9540-0000**	
	120 V	**GO-9541-0000**	
GS-21 / 41 with directmount wiring connector	230 V	**GO-9540-1000**	
	120 V	**GO-9541-1000**	
GM-21 / 26 / 41 / 46	230 V	**GO-9550-0000**	
	120 V	**GO-9551-0000**	
GM-21 / 26 / 41 / 46 with directmount wiring connector	230 V	**GO-9550-1000**	
	120 V	**GO-9551-1000**	
GS/GM-2 / 4 UL, for GM-valves please order 2 actuators	230 V	**GO-9530-0000**	
	120 V	**GO-9531- 0000**	
	24 V	**GO-9532-0000**	

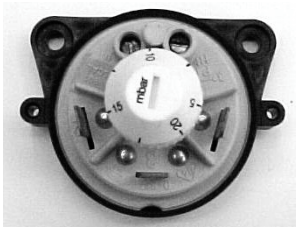
GO-10.. Gas Pressure Switches

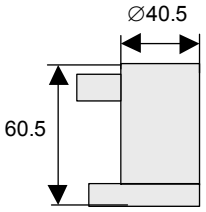
Gas Pressure Controls





Models GO-101. and 102. for installation on pressure taps





Models GO-100. for installation on filter plate (GM/GS-2/4)

Description

This switch senses a change in the gas inlet or outlet pressure.

Features

- Easy to read set point scale.
- Wide range (5 to 500 mbar)
- Versatile mounting options

Technical Specifications

Electrical Data: 6 (1.5) A / 250 VAC
Media: suitable for all types of gas according to DVWG sheet G 260/I, air
Mounting position: horizontal-vertical
Enclosure: IP54 (DIN 40 050)
Wiring: cable grommet PG 9, male connector AMP 6.3x0.8 EN60730-1
Trip Setting Tolerance: ±10%
Tolerance of differential: ±5%
Approvals: EC (DVGW, DIN 3398-1, VDE 0630)
CE-0085AR0012

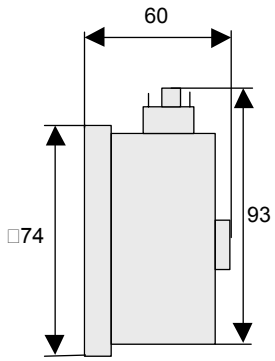
GO-10.. Pressure Controls Selection Table

Range (mbar)	Max. pressure (mbar)	Connection	Type-Model Number	
5 - 20	500	Filter plate GM/GS-2/4 models. Please order filter plate separately for GS-2/4 models.	**GO-1000-0000**	
10 - 50	500		**GO-1001-0000**	
5 - 20	500	G 1/8	**GO-1010-0000**	
10 - 50	500	G 1/8	**GO-1011-0000**	
50 - 250	1000	G 1/8	**GO-1013-0000**	
100 - 500	1000	G 1/8	**GO-1014-0000**	
5 - 20	500	G 1/4	**GO-1020-0000**	
10 - 50	500	G 1/4	**GO-1021-0000**	
50 - 250	1000	G 1/4	**GO-1023-0000**	
100 - 500	1000	G 1/4	**GO-1024-0000**	

T

GO-11.. Gas Pressure Switches

Gas Pressure Controls



Description

This switch senses a change in the gas inlet or outlet pressure.

Features

- Easy to read set point scale.
- Wide range (6 to 50 mbar)

Technical Specifications

Electrical Data: 5 (2) A / 250 VAC
Media: suitable for all types of gas according to DVWG sheet G 260/I, air
Mounting position: horizontal-vertical
Enclosure: IP54 (DIN 40 050)
Wiring: 4-pin connector plug ISO 4400 (DIN 43650)
Tolerance of differential: ≤ 1.4 mbar
Approvals: EC (prEN 1854), CE-0063AR1501

Models GO-11.. for GM/GS-2/4 Valve Models

GO-11.. Sensitive Gas Pressure Controls Selection Table

Range (mbar)	Max. pressure (mbar)	Connection	Type-Model Number	
6 - 50	360	Filter plate GM/GS-2/4 models. Please order filter plate separately for GS-2/4 models.	**GO-1101-0000**	

T