

VA-7200 Electric Valve Actuator

Introduction

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).



VA-7200 with VG7000 (left)
and VG8000

Features and Benefits

<input type="checkbox"/> 1000N Force Output compact unit	Covers a wide range of applications with one actuator
<input type="checkbox"/> Magnetic clutch	Provides constant output force for positive close-off of valves, and protects motor in stall conditions
<input type="checkbox"/> Unique yoke design	Easy field mounting to valves reduces installation and stroke adjustment time
<input type="checkbox"/> Optional hand wheel	Allows manual positioning independent of the power supply
<input type="checkbox"/> Positioner with adjustable starting point and span, reverse and direct action modes	Eases setup and installation and allows sequence control
<input type="checkbox"/> Built-In resistor for current input control	Provides greater application flexibility
<input type="checkbox"/> Active 0...10 V position feedback on proportional and floating	Provides active signal for independent position monitoring
<input type="checkbox"/> Auxiliary switches and feedback potentiometer available	Provides potential free contacts for independent monitoring of the actuator's position
<input type="checkbox"/> "Signal fail" safe position	Valve safety position after control signal failure, the safety position, up / down, is selectable in-situ

Ordering data

VA-72 - 0

Voltage supply

- 1 24 VAC, 50 / 60 Hz
3 230 VAC, 50 / 60 Hz

Valve type

- 10 Threaded valves: VG7000
82 Flanged valves: VBD, VBF and VG8000

Options

Floating models

Factory fitted accessories		Manual override	230 VAC	24 VAC
00	None	No	X	X
01	0...10 V feedback potentiometer	No	-	X
03	2 kΩ feedback potentiometer	No	-	X
20	(2) Auxiliary switches	No	-	X
40	None	Yes	X	X
41	0...10 V feedback potentiometer	Yes	-	X
43	2 kΩ feedback potentiometer	Yes	-	X
50	(2) Auxiliary switches	Yes	-	X
70	(1) Auxiliary switches + (1) switch for manual override signal	Yes	-	X

Proportional models (0...10 V / 0...20mA)

Factory fitted accessories		Manual override	230 VAC	24 VAC
02	None	No	-	X
06	0...10 V feedback potentiometer	No	-	X
22	(2) Auxiliary switches	No	-	X
42	None	Yes	-	X
46	0...10 V feedback potentiometer	Yes	-	X
52	(2) Auxiliary switches	Yes	-	X
72	(1) Auxiliary switch and (1) switch for auto / manual indication	Yes	-	X

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

Ordering procedure

The actuator can be ordered as a separate unit or a factory fitted valve-actuator combination. Should the latter be requested, please just add "+M" to the end of the actuator ordering code.

For example:

Item 1 **VG7203AT** (valve body)

Item 2 **VA-7242-1001** (actuator)

Alternatively, to order a factory fitted combination.

Item 1 **VG7203AT** (valve body)

Item 2 **VA-7242-1001+M** (actuator)

Actuator / valve combinations

The VA-7200 can be combined with the following valve ranges:

● **VG7000 series**

Brass trim valves:

- VG72** □1□ T 2-way PDTC (NO) DN 25...50
- VG74** □1□ T 2-way PDT0 (NC) DN 25...50
- VG78** □2□ T 3-way mixing DN 25...50

Stainless steel valves:

- VG72** □3□ T 2-way PDTC (NO) DN 15...50
- VG74** □3□ T 2-way PDT0 (NC) DN 15...50
- VG78** □4□ T 3-way mixing DN 15...50

● **VG8000 series**

- VG82** □□ S1N 2-way PDTC (NO) DN 15...40
- VG84** □□ S1N 2-way PDT0 (NC) DN 15...40
- VG88** □□ S1N 3-way mixing DN 15...40
- VG89** □□ S1N 3-way diverting DN 15...40

● **VBD series**

- VBD-4** □□ 4-520□ 2-way PDT0 (NC) DN 15...40
- VBD-4** □□ 8-520□ 3-way mixing DN 15...25

● **VBF series**

- VBF**-□□□ 4-5200 2-way PDT0 (NC) DN 15...50
- VBF**-□□□ 8-5200 3-way mixing DN 15...50

For complete ordering information, please refer to the relevant product bulletin

Operation

Floating control models

Connections	Actuator Stem	"Signal fail" safe position
1-2	extends	N / A
1-3	retracts	N / A

Proportional control models (0...10 V or 0...20 mA)

Jumper function	Input control signal	Actuator Stem	"Signal fail" safe position
Direct action	increases	Extends	selectable
	decreases	Retracts	selectable
Reverse action	increases	Retracts	selectable
	decreases	Extends	selectable

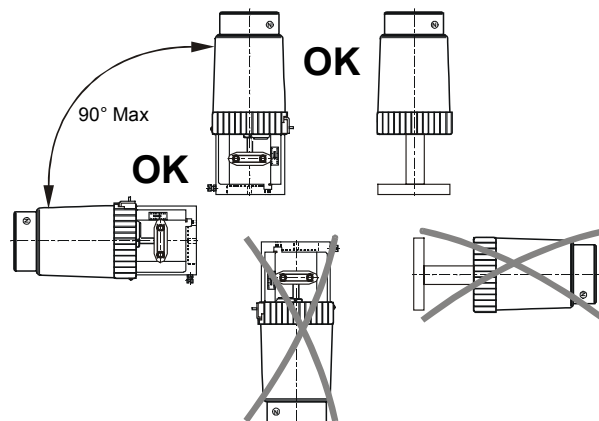
"Signal Fail" safe position (only for Voltage input)

A signal failure on proportional models will cause the actuator to automatically move the stem to a (via jumper) pre-selected position (100% extended or 100% retracted).

Mounting instructions

When mounting the actuator on a valve, please follow the instructions below:

- It is recommended that the valves be mounted upright in an easily accessible location. When mounted horizontally, the yoke should be fitted such that the stanchions are aligned vertically, one above the other.



- The actuator must be protected against dripping water, which could enter the housing and damage the mechanism or motor.
- Do not cover with insulating material.
- Sufficient clearance must be allowed for actuator removal (refer to the dimension drawings).
- The valve must be installed so that the plug seats against the flow, as indicated by the arrows on the valve.

Wiring instructions

- All wiring must be in accordance with local regulations and national electrical codes and should be carried out by authorised personnel only.
- Make sure that the line power supply is in accordance with the power supply specified on the device.
- See also the instructions in paragraph "Application".

! WARNING

Shock Hazard

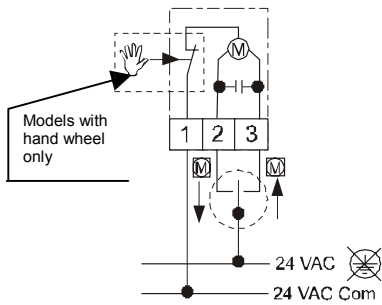
Disconnect the power supply before wiring connections are made to prevent personal injury.

Equipment Damage Hazard

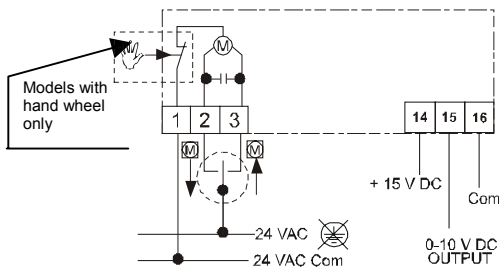
Make and check all wiring connections before applying power to the system. Short circuited or improperly connected wires may result in permanent damage to the unit.

Wiring Diagrams:

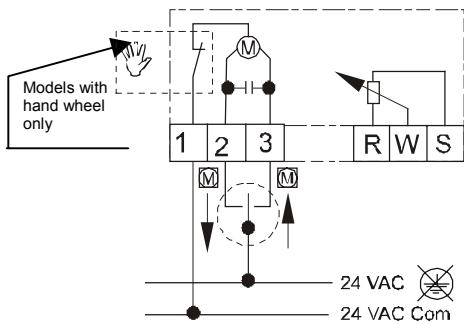
Floating models 24 VAC



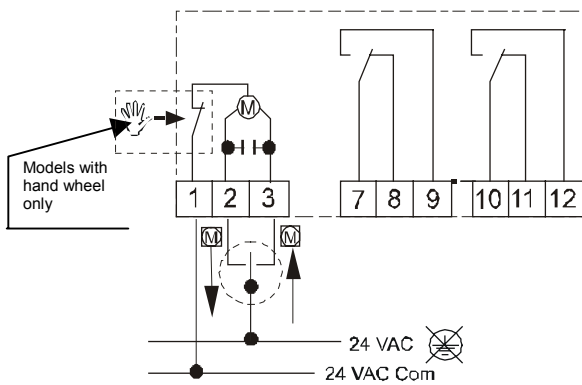
VA-7200-xx01 and VA-7240-xx01



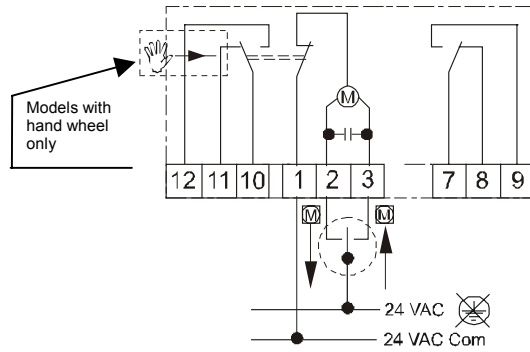
VA-7201-xx01 and VA-7241-xx01



VA-7203-xx01 and VA-7243-xx01

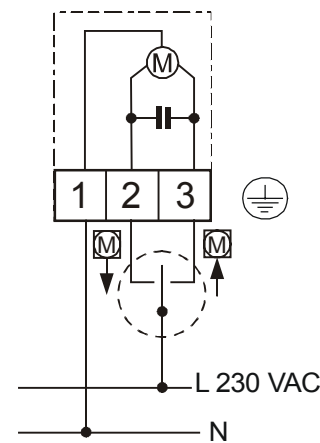


VA-7220-xx01 and VA-7250-xx01



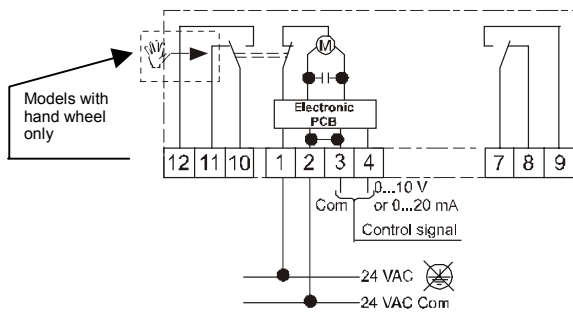
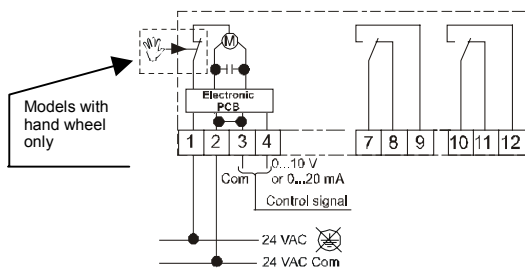
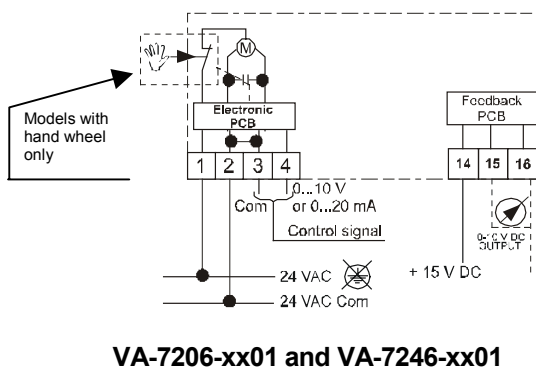
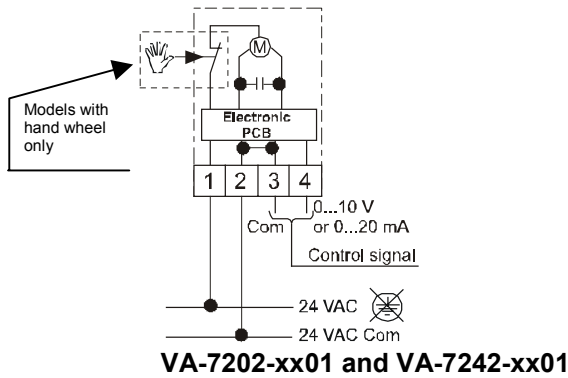
VA-7270-xx01

Floating model 230 VAC



VA-7200-xx03 and VA-7240-xx03

Proportional models 24 VAC



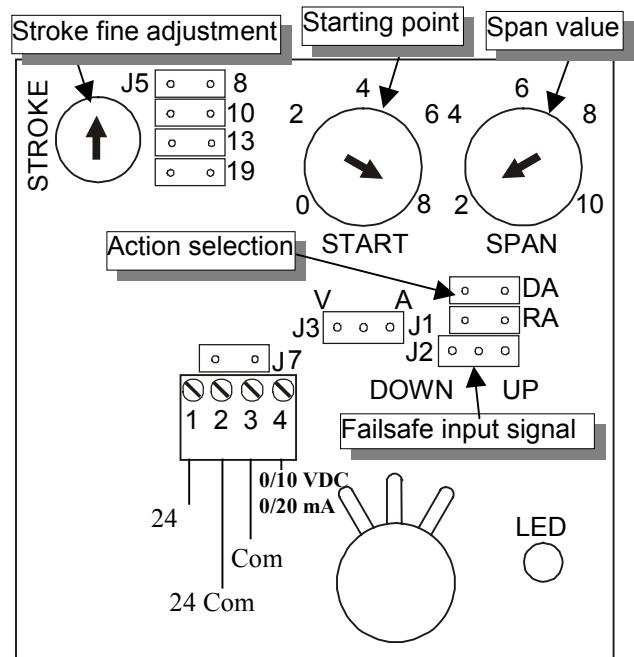
Adjustments for proportional models

The adjustment procedure varies depending on whether voltage or current control is used, taking this into account, to adjust please carry out the following instructions:

1. Set the stroke jumper to match the valve stroke, this setting is approximate. Jumper location is as depicted below:

Stroke selection jumpers (J5):

- Jumper 8: 8mm
- Jumper 10: 10mm
- Jumper 13: 13mm
- Jumper 19: 19mm



VA-72x2 and VA-72x6 PCB Components

The V / A jumper (J3) allows selection of the input signal type as follows:

- Volts
- mA

When the voltage input range (J3) is set the DOWN / UP jumper (J2) allows selection of the actuator "failsafe" stem position as follows:

- DOWN
- UP

Note: Disconnecting J7 from PCB, the power supply is interrupted. Therefore the plug must be in place for actuator operation.

2. Set the direct / reverse action jumper (J1) so that the valve stem travels in the desired direction (as per changes in control signal)
 - DA (J1 top jumper) stem extends on signal increase.
 - RA (J1 bottom jumper) stem retracts on signal increase.
3. Select voltage (V) or current (mA) input signal to match the controller output (if the input signal selection jumper is removed the actuator defaults to voltage input).

Note: When mA input is selected, multiply the "start" and "span" scales by two.
4. Set the signal fail default position to "fully up", or "fully down", if the actuator control signal is lost i.e. an open connection, the actuator will default to this pre-designated position.

Note: When mA input is selected, the actuator will default to the "low" input signal position.
5. Adjust the potentiometers to the nominal values. Set the stroke fine adjustment to midpoint. Set the starting point (offset) to the "low" input signal using the scale printed on the PCB as a reference. Set the span value to the "high" input signal minus the offset; see table below. Use the scales for reference.
6. Apply the voltage specified by application (RA / DA) requirements to drive the actuator to the "fully up" position using the following table. (If mA input is selected, multiply all values by two).
7. Slowly turn the starting point potentiometer clockwise until the valve stem reaches stroke limit, when the valve stem is in the "fully up" position (the LED will be illuminated and there should be no gear movement).
8. Slowly turn the starting point potentiometer anti-clockwise, stop when the LED flashes or goes out.

Note: The actuator electronics contain a time-out feature. If calibration takes longer than 3...10 minutes, the LED will extinguish, falsely indicating a satisfactory condition. Should this occur, cycle the power to the actuator and readjust the starting point.
9. Apply the input voltage requirements specified by the application (RA / DA) to drive the valve stem to the "fully down" position as per chart in step 6.
10. To ensure that the valve stem is in the "fully down" position, slowly turn the stroke potentiometer clockwise until the valve stem reaches stroke limit (the LED will be on and there should be no gear movement).
11. Slowly turn the stroke potentiometer anti-clockwise, until the LED extinguishes.
12. If the "fully down" position cannot be achieved, return the stroke potentiometer to the nominal position and then slowly turn the span potentiometer anti-clockwise until "fully down" is achieved. Repeat step 11.
13. Adjust the voltage to drive the actuator to "fully up" position. Verify starting point adjustment.
14. Check for proper operation using the min. and max. operating voltages. Allow the actuator to complete several operating cycles.

Note: The LED will remain illuminated for 3...10 minutes after the actuator has completed its operation cycle.
15. Refit the cover and secure the screws. The unit is now ready for operation.

Calibration values

Actual		Reference	
Minimum	Maximum	Minimum	Maximum
0	10	1	9
0	5	1	4
5	10	6	9

Note: Using the calibration values (± 0.5 V) will ensure proper close-off throughout the life of the valve (takes seat wear into account).

If the application requires values other than those given, use the **minimum actual value + 1 V** and the **maximum actual value - 1 V** to determine the reference values.

- DA: "fully up" (min. voltage)
- RA: "fully up" (max. voltage)

When the actuator is in operation the LED will illuminate.

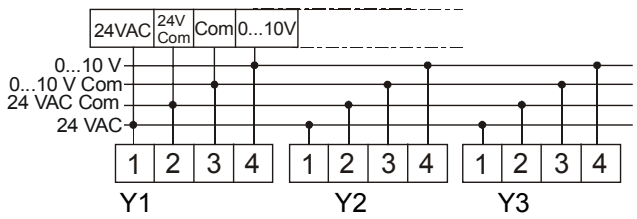
Factory Settings

The VA-7200 is delivered with the following factory settings:

19 mm stroke
 0...10 V input input signal
 Direct action
 Fail safe position "fully up"
 Starting point 1 V
 Span 8 V

Applications

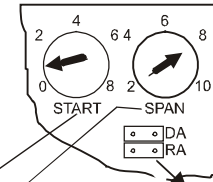
Actuators with built-in positioner for controllers with 0...10V output is sequential operation.



To further actuators

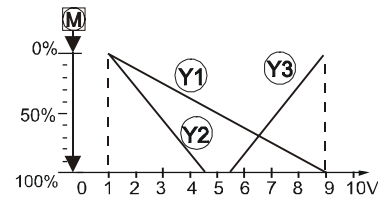
The controller output 0...10 V can operate several actuators with built-in electronic positioner. The electrical wiring for parallel and sequenced operation is identical.

The sequencing and action of the actuator are individually adjustable on each positioner. Each positioner has its own adjustment for starting point between 0...10 V and span between 2...10 V. Using the minimum adjustable span of 2 V therefore enables a maximum of 5 sequenced devices; further sequencing can be accomplished by using additional controller outputs. Each positioner can be switched for direct or reverse action.



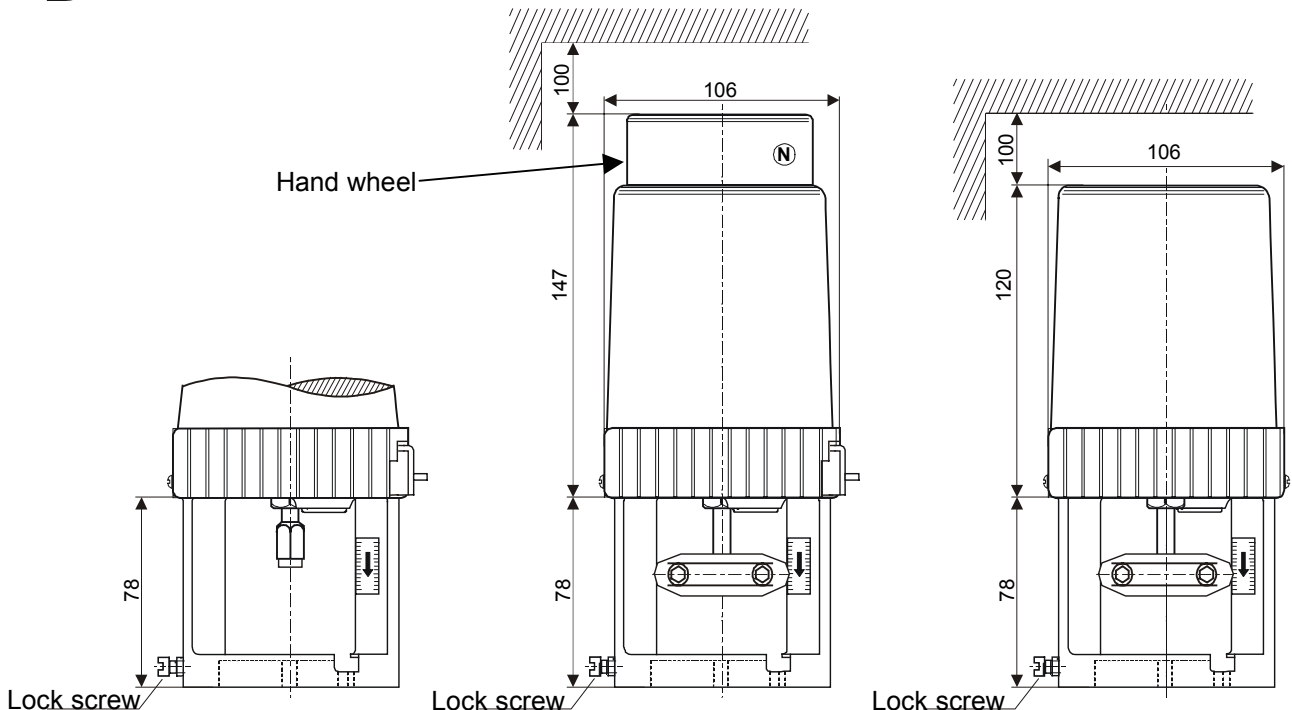
	Starting Point	Span	Starting + Span	Positioner Action
Y1	1V	8V	9V	DA *
Y2	1V	3,5V	4,5V	DA
Y3	5,5V	3,5V	9V	RA

* Factory calibration



Example of adjustments

Dimensions (in mm)



VA-7200 for VG7000 Valve Series (section)

VA-7200 for, VBD, VBF and VG8000 Valve Series With and without Manual Override

Specifications

Models:	Floating		Proportional
Action / control:	Optional 0...10 VDC feedback Optional 2 k Ω feedback		0...10 VDC or 0...20mA Optional 0...10 V feedback Optional 2 Aux. switches Optional 1 Aux. switch and 1 Auto / manual switch
Manual override:	Optional hand wheel		
Type of motor:	Synchronous / reversible		
Supply voltage (50/60 Hz):	230 V + 10% - 15% 50...60 Hz	24 V \pm 15% 50...60 Hz	24 V \pm 15% 50...60 Hz
Motor ratings:	5 W		
Actual power	5.6 VA at 50 Hz 6.7 VA at 60 Hz		
Apparent power	5.6 VA at 50 Hz 6.7 VA at 60 Hz		
Electronic positioner ratings:	-		2 VA 100 k Ω input impedance (0...10 VDC) 500 Ω input impedance (0...20 mA)
0...10 V Feedback ratings:	-	0.75 VA, 0...10 VDC Minimum load 800 Ω	0.75 VA, 0...10 VDC Minimum load 800 Ω
Limit of auxiliary switch:	2 (1) A, 24 VAC		
Actuator force:	1000 N + 30% - 20%		
Stroke:	20 mm maximum; 8, 10, 13, 19 mm selectable		
Nominal speed at 50 Hz (60 Hz):	4 (3.2) s / mm		
Enclosure protection:	Non manual override models IP 42 (IEC 60529) Manual override models IP 40 (IEC 60529)		
Materials:	Self extinguishing VO-UL 94 ABS + PC		
Enclosure:	Self extinguishing nylon PA		
Hand wheel:	Self extinguishing nylon PA		
Yoke:	Die cast aluminium		
Ambient Operating condition:	-5 to +55, $^{\circ}$ C, non condensing		
Ambient Storage condition:	-20 to +65 $^{\circ}$ C, non condensing		
Electrical connections:	2.5 mm ²	2.5 mm ²	1.5 mm ²
Optional PCBs:	-	1.5 mm ²	1.5 mm ²
Net weight:	1.0 kg		
(Models with hand wheel):	(1.2 kg)		
CE Compliance:	EMC (89/336 EEC) according to the standard EN 50081-1 and EN 50082-1 LVD (73/23 EEC) according to the standard EN 60335		

The performance specifications are nominal and conform to acceptable industrial standards. For application at conditions beyond these specifications, consult the local Johnson Controls office.

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