Johnson Controls

European products catalogue 2017

Controls, HVAC and refrigeration products

A safe, confortable and sustainable world

HVAC control products

Building Automation Systems

Refrigeration components

Security products

Johnson Controls

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Our 117,000 employees create intelligent buildings, efficient energy solutions, integrated infrastructure and next generation transportation systems that work seamlessly together to deliver on the promise of smart cities and communities. Our commitment to sustainability dates back to our roots in 1885, with the invention of the first electric room thermostat. We are committed to helping our customers win and creating greater value for all ofour stakeholders through strategic focus on our buildings and energy growth platforms.

HVAC control products

Valves

Line Extension

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HVAC control products

Actuators

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HVAC control products

Sensors

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HVAC control products

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BAS system software

BAS network automation

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BAS controllers

Field controllers

OEM controllers

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Refrigeration components

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Modulating water valves PAGE

Humidity controls PAGE

Fan speed controllers PAGE

Field controllers PAGE

Transducers and sensors PAGE

Leak detection PAGE

Security products

P2000

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Valves and actuators combinations

Control valve selection

	VFB	VG1000	VG3000	VG7000	VGS800	VG9000	VG8000	VG8300	V6W0000
2-way	•	•	•	•	•	•	•	•	
3-way mixing valve		•	•	•	•	•	•		
3-way diverting valve		•					•		
3-way + by-pass valve			•						
6-way valves									•
Electric actuator	•	•	•	•	•	•	•	•	•
Pneumatic actuator				•			•	•	

	VFB	VG1000	VG3000	VG7000	VGS800	VG9000	VG8000	VG8300	V6W0000
K_{VS} 0,25				■					■
K_{VS} 0,4			■	■			■		■
K_{VS} 0,63			■	■	■	■			■
K_{VS} 0,7									■
K_{VS} 1		■	■	■	■	■			■
K_{VS} 1,25									■
K_{VS} 1,6		■	■	■	■	■			■
K_{VS} 2,1									■
K_{VS} 2,5		■	■	■	■	■			
K_{VS} 2,7									■
K_{VS} 4		■	■	■	■	■	■		
K_{VS} 6,3		■	■	■	■	■	■		
K_{VS} 10		■		■	■	■	■		
K_{VS} 16		■		■	■	■		■	
K_{VS} 25		■		■	■	■			
K_{VS} 40		■		■	■	■			
K_{VS} 52	■								
K_{VS} 63		■				■			
K_{VS} 72	■								
K_{VS} 100		■				■			
K_{VS} 124	■								
K_{VS} 126	■								
K_{VS} 150		■							
K_{VS} 160						■			
K_{VS} 180		■							
K_{VS} 243	■								
K_{VS} 250							■	■	■
K_{VS} 350							■	■	
K_{VS} 397	■								
K_{VS} 721	■								
K_{VS} 1083	■								
K_{VS} 1591	■								
K_{VS} 2852	■								
K_{VS} 4670	■								
K_{VS} 6946	■								
K_{VS} 9063	■								
K_{VS} 12044	■								
K_{VS} 14804	■								
K_{VS} 19212	■								

Johnson Controls

Terminal unit valves

VG3000
DN10...25, PN16

The VG3000 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.

Following actuators are available:

VA-708x thermal ON/OFF actuator;

VA-709x thermal 0...10 V actuator;

VA-748x electric terminal unit valve actuator.

The valves are available in 2-way, 3-way mixing and 3-way mixing with built-in by-pass configurations.

Features

▶ 2-way PDTC (NO) with 6 bar close off pressure
▶ Extend range of K_{VS} (0.4....6.3)
▶ Forged brass body, stainless steel stem and spring
▶ Actuator can be field installed after piping
▶ Commissioning cap available as accessory (VG3000-CAP)

Threaded male connection

Threaded female connection

Dimensions in mm

Threaded male connection BSPP

Codes	Dimensions (mm)			
	A	B	C	D
VG3210BS	52	55	45	---
VG3210CS				
VG3210DS				
VG3210ES				
VG3210FS	56	58		
VG3210JS				
VG3210KS	66			
VG3210LS	80	61.5	45.5	
VG3211BS	52	70	60	---
VG3211CS				
VG3211DS				
VG3211ES				
VG3211FS	56	73		
VG3211JS				
VG3211KS	66			
VG3211LS	80	74		

Codes	Dimensions (mm)			
	A	B	C	D
VG3310BS	52	66	45	---
VG3310CS				
VG3310DS				
VG3310ES				
VG3310FS	56	67	46	
VG3310JS		73		
VG3310KS	66	80		
VG3310LS	80	85		
VG3410BS	52	95.5	45	40
VG3410CS				
VG3410DS				
VG3410ES				
VG3410FS	56	96.5	46	
VG3410JS		98.2		
VG3410KS	66	99.2		
VG3410LS	80	125		72

Threaded female connection BSPP

Codes	Dimensions (mm)		
	A	B	C
VG3200FS	60	58	45
VG3200KS	65	60	45
VG3200LS	80	64	45.5
VG3201FS	60	73	60
VG3201KS	65	75	60
VG3201LS	80	77	58
VG3300FS	60	76	46
VG3300KS	65	80	46
VG3300LS	80	85.5	46

Threaded female connection NPT

Codes	Dimensions (mm)		
	A	B	C
VG3240FS	60	58	45
VG3240KS	65	60	45
VG3240LS	80	64	45.5
VG3241FS	60	73	60
VG3241KS	65	75	60
VG3241LS	80	77	58
VG3340FS	60	76	46
VG3340KS	65	80	46
VG3340LS	80	85.5	46

Terminal unit valves

VG3000

Ordering information

Threaded male connection BSPP

Codes	Body type	Body size	K$_{VS}$ (Cv) Control port	K$_{VS}$ By-pass port
VG3210BS	2-way PDTC (NO)	DN10	0.4 (0.43)	---
VG3210CS			0.63 (0.70)	
VG3210DS			1.0 (1.12)	
VG3210ES			1.6 (1.9)	
VG3210FS			2.5 (2.9)	
VG3210JS		DN15	2.5 (2.9)	
VG3210KS			4.0 (4.7)	
VG3210LS		DN20	6.3 (7.4)	
VG3211BS	2-way PDTC (NO)	DN10	0.4 (0.43)	
VG3211CS			0.63 (0.70)	
VG3211DS			1.0 (1.12)	
VG3211ES			1.6 (1.9)	
VG3211FS			2.5 (2.9)	
VG3211JS		DN15	2.5 (2.9)	
VG3211KS			4.0 (4.7)	
VG3211LS		DN20	6.3 (7.4)	
VG3310BS	3-way mixing	DN10	0.4 (0.43)	0.25
VG3310CS			0.63 (0.70)	0.4
VG3310DS			1.0 (1.12)	0.63
VG3310ES			1.6 (1.9)	1.0
VG3310FS			2.5 (2.9)	---
VG3310JS		DN15	2.5 (2.9)	1.6
VG3310KS			4.0 (4.7)	2.5
VG3310LS		DN20	6.3 (7.4)	4.0
VG3410BS	3-way with built-in by-pass mixing	DN10	0.4 (0.43)	0.25
VG3410CS			0.63 (0.70)	0.4
VG3410DS			1.0 (1.12)	0.63
VG3410ES			1.6 (1.9)	1.0
VG3410FS			2.5 (2.9)	---
VG3410JS		DN15	2.5 (2.9)	1.6
VG3410KS			4.0 (4.7)	2.5
VG3410LS		DN20	6.3 (7.4)	4.0

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Terminal unit valves

VG3000

Ordering information

*Threaded female connection
BSPP*

Codes	Body type	Body size	K$_{VS}$ (Cv) Control port	K$_{VS}$ By-pass port
VG3200FS	2-way PDTC (NO)	DN15	2.5 (2.9)	---
VG3200KS		DN20	4.0 (4.7)	---
VG3200LS		DN25	6.3 (7.4)	---
VG3201FS	2-way PDTC (NO)	DN15	2.5 (2.9)	---
VG3201KS		DN20	4.0 (4.7)	---
VG3201LS		DN25	6.3 (7.4)	---
VG3300FS	3-way mixing	DN15	2.5 (2.9)	1.6
VG3300KS		DN20	4.0 (4.7)	2.5
VG3300LS		DN25	6.3 (7.4)	4.0

*Threaded female Connection
NPT*

Codes	Body type	Body size	K$_{VS}$ (Cv) Control port	K$_{VS}$ By-pass port
VG3240FS	2-way PDTC (NO)	DN15	2.5 (2.9)	---
VG3240KS		DN20	4.0 (4.7)	---
VG3240LS		DN25	6.3 (7.4)	---
VG3241FS	2-way PDTC (NO)	DN15	2.5 (2.9)	---
VG3241KS		DN20	4.0 (4.7)	---
VG3241LS		DN25	6.3 (7.4)	---
VG3340FS	3-way Mixing	DN15	2.5 (2.9)	1.6
VG3340KS		DN20	4.0 (4.7)	2.5
VG3340LS		DN25	6.3 (7.4)	4.0

Accessory (order separately)

Code	Description
VG3000-CAP	Plastic commissioning cap

Terminal unit valves

V6W0000

DN15...20, PN16

The V6W0000 line consists in six-way ball valves used for HVAC 4 pipes applications to automatically carry out the winter-summer change-over or, potentially, the control of radiant ceilings, fan coils and chilled beams.

Features

▶ No cross-flow between floating and cooling circuits.
▶ Different K_{VS} combination for an accurate and valuable control.
▶ Compact and economical solution.
▶ Changeable disk to select K_{VS} on site, avoiding any possible ordering mistakes.

Dimensions in mm

V6W1AAE

V6W1BCF

Ordering information

Codes	Body size	K_{VS} max	K_{VS} with disk	Connection
V6W1AAE	DN15	1.25	1 - 0.63 - 0.4 - 0.25	3/4" Male Flat ends
V6W1BCF	DN20	2.7	2.1 - 1.6 - 1.0 - 0.7	

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Plant valves

VGS800

DN15...50, PN16

These valves are primarily designed to regulate the flow of water in response to the demand of a controller in zone and terminal unit applications. Following electric actuators are available:

VA-77xx and VA78xx electric valve actuators.

Features
▶ Cast bronze body
▶ K_{VS} 0.63...40
▶ 2-way PDTO (normally closed)
  using 3-way mixing valve with modkit,
  3-way mixing configuration
▶ Fluid temperature 2...130 °C
▶ BSPP male threaded body connections

Ordering information

3-way mixing configuration

Codes	Body size	K_{VS}	Nominal stroke (mm)	Close-off pressure kPa	
				VA-77x820x 500 N	VA-78xx-xxx-12 1000 N
VGS8A5W1N	DN15	0.63	13	958	1600
VGS8A4W1N		1.0			
VGS8A3W1N		1.6			
VGS8A2W1N		2.5			
VGS8A1W1N		4.0			
VGS8B1W1N	DN20	6.3		605	1600
VGS8C1W1N	DN25	10		280	1046
VGS8D1W1N	DN32	16		176	744
VGS8E1W1N	DN40	25		54	369
VGS8F1W1N	DN50	40		---	208

Note
Ordering of factory mounted valves and electric actuators. The valves and actuators can be ordered separetely or factory mounted. When factory mounted, please add "+M" to the order code for the actuator.

Dimensions in mm

Body Size	G	L	H	H1
DN15	1 ⅛	80	55	65
DN20	1 ¼	90	55	65
DN25	1 ½	110	55	66
DN32	2	120	55	67
DN40	2 ¼	130	60	72
DN50	2 ¾	150	65	77

Pipe muffles

Codes	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

Note
3 pipe muffels are needed for the mixing valves

Modkit for transformation of 3-way into 2-way valves

Codes	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

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

Plant valves

VG7000
DN15…50, PN16

VG7000 series bronze control 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 (HVAC) systems.

These valves are available in Push-Down-To-Close (PDTC), Push-Down-To-Open (PDTO), and three-way mixing configurations. Both electric and pneumatic actuators are available for factory or field mounting.

Features

▶ DN15 through DN50 bronze valves, in two-way PDTC, PDTO and three-way mixing configurations

▶ Wide range of electric actuators available for all valves

▶ Every valve tested for tight shutoff

▶ Uses Standard Johnson Controls U-cup Packing

▶ Flexible features-and-options ordering template

▶ Standard bonnet and stem design

▶ Leakage
  - Brass trim: 0.01% of maximum flow per EN60534-4, Class IV
  - Stainless steel trim: 0.05% of maximum flow

▶ Inherent flow characteristics
  Equal percentage: 2-way valves
  Linear: 3-way valves in compliance with EN 600534

▶ Rangeability
  25:1 at 0.25…1 K_{VS} and 100:1 at 1.6…40 K_{VS}
  In accordance with EN 60534-2-4

▶ Maximum recommended operating pressure drop
  240 kPa for DN15 and DN32 - 200 kPa for DN40 to DN50

▶ Fluid temperature operating limits
  Valves with brass trim:
  - With V-3801 and VA-731x Actuators: 2 °C to 120 °C water /
                                          100 kPa Saturated Steam
  - With all other actuators: 2 °C to 140 °C water /
                                          260 kPa Saturated Steam
  - Valves with stainless steel trim: 2 to 170 °C /
                                          690 kPa Saturated Steam

Dimensions in mm

Body Size	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

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Plant valves

VG7000

Ordering codes for valve bodies

VG7 ☐ ☐ ☐ ☐ ☐

	Stem type	
T	Standard threaded stem	
S	Slotted stem and small bonnet (for VA-7310 electric and V-3801 pneumatic actuators only, only available for DN15 and DN20 valves with brass trim)	

	Size	Flow coefficient K$_{VS}$
A	DN15	0.25
B	DN15	0.4
C	DN15	0.63
D	DN15	1.0
E	DN15	1.6
F	DN15	2.5
G	DN15	4.0
L	DN20	6.3
N	DN25	10
P	DN32	16
R	DN40	25
S	DN50	40

	Body configuration	Trim type	Inherent flow characteristics
1	2-way	Brass trim	Equal percentage
2	3-way mixing	Brass trim	Linear in both ports
3	2-way	Stainless steel trim	Equal percentage
4	3-way mixing	Stainless steel trim	Linear in both ports
5	3-way mixing	Brass trim	Equal percentage in control port, linear in bypass port (only available for VG7x1... valves with BSPP male connection)

	End connection
0	BSP Parallel Female Threaded
1	BSP Parallel Male Threaded (only DN15 and DN20, with Brass Trim)

	Body configuration
2	2-way PDTC (Normally Open)
4	2-way PDTO (Normally Closed)
8	3-way Mixing

Plant valves

Maximum close-off pressures (in kPa), for valves with brass trim and electric actuators

Size	VA-731x	VA-715x	VA-77xx	VA-720x	VA78xx
DN15	1600	1600		---	
DN15	700	1600		---	
DN15	400	1490		---	
DN20	250	950		---	
DN25	---	595		1235	
DN32	---	360		750	
DN40	---	235		480	
DN50	---	145		310	

Maximum close-off pressures (in kPa), for valves with stainless steel trim and electric actuators

Size	VA-731x	VA-715x	VA-77xx	VA-720x	VA78xx
DN15	---	1600		1600	
DN15	---	1600		1600	
DN15	---	930		1600	
DN20	---	595		1220	
DN25	---	370		770	
DN32	---	230		470	
DN40	---	145		300	
DN50	---	90		190	

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Plant valves

VG7000

Maximum close-off pressures (in kPa), for valves with brass trim and pneumatic actuators

Actuator	Valves	2-way PDTC or 3-way valves with 138 kPa air supply		2-way PDTO or 3-way valves with 0 kPa air supply	
		Spring range kPa *			
	Size	21 to 42	63 to 91	21 to 42	63 to 91
V-3801	DN15	1600	1600	580	1600
	DN15	1180	530	165	715
	DN15	670	300	90	405
	DN20	430	190	55	255
V-3000	DN15	1600	1600	1430	1600
	DN15	1600	1100	405	1450
	DN15	1310	620	230	820
	DN20	835	390	145	525
	DN25	520	240	85	315
	DN32	320	145	50	195
	DN40	200	95	35	125
	DN50	130	60	20	85
V-400	DN25	1600	985	400	1275
	DN32	1220	600	240	780
	DN40	785	385	160	495
	DN50	500	250	95	315

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Plant valves

Maximum close-off pressures (in kPa), for valves with stainless steel trim and pneumatic actuators

Actuator	Valves	2-way PDTC or 3-way valves with 138 kPa air supply		2-way PDTO or 3-way valves with 0 kPa air supply	
		Spring range kPa *			
	Size	21 to 42	63 to 91	21 to 42	63 to 91
V‑3000	DN15	1600	1600	1090	1600
	DN15	1600	825	300	1085
	DN15	980	470	170	615
	DN20	630	295	110	395
	DN25	385	180	60	240
	DN32	240	110	35	145
V‑400	DN15	1600	1600	1600	1600
	DN15	1600	1600	1345	1600
	DN15	1600	1600	760	1600
	DN20	1600	1175	485	1520
	DN25	1510	740	295	960
	DN32	925	450	185	585
	DN40	595	290	115	370
	DN50	380	185	75	240

Note
* The recommended spring ranges for use with a V‑9502 Positioner are: 21 to 42 kPa for PDTC valves, 63 to 91 kPa for PDTO valves and 63 to 91 kPa for three way valves.

Plant valves

VG9000

DN15...100, PN6 and PN10

These flanged valves are primarily designed to regulate the flow of water and low pressure steam in response to the demand of a controller, in Heating, Ventilating and Air Conditioning (HVAC) systems.

Following electric actuators are available:

VA-7700 for DN15...50 valves

VA7810 for DN15...65 valves

VA1000 for DN65...100 valves.

Features

▶ Nodular cast iron body
▶ K_{VS} 0.63...160
▶ 2-way PDTO (normally closed) and 3-way mixing configurations
▶ Fluid temperature 2...140 °C
▶ DIN flanged

Dimensions in mm

Body Size	PN6							PN10						
	B	D1	D2	D3	d	H1	Holes	B	D1	D2	D3	d	H1	Holes
DN15	130	80	55	38	11	65	4	130	95	65	46	14	65	4
DN20	140	90	65	48	11	70	4	150	105	75	56	14	75	4
DN25	150	100	75	58	11	75	4	160	115	85	65	14	80	4
DN32	180	120	90	69	14	90	4	180	140	100	76	19	90	4
DN40	180	130	100	78	14	90	4	200	150	110	84	19	100	4
DN50	200	140	110	88	14	100	4	230	165	125	99	19	115	4
DN65	240	160	130	108	14	120	4	290	185	145	118	19	145	4
DN80	260	190	150	124	19	130	4	310	200	160	132	19	155	8
DN100	300	210	170	144	19	150	4	350	220	180	156	19	175	8

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Plant Valves

VG9000

Ordering information

PN6 series (VG9xxxS1K)

Codes*	Body size	K$_{VS}$	Close-off pressure kPa				
			RA-3000-732x 3000 N	VA-1x20-GGA-1** 2000 N	VA-1125-GGA-1** 2500 N	VA-77xx-820x 500 N	VA78xx-xxx-12 1000 N
2-way PDTO (Normally Closed) configuration							
VG94A5S1K	DN15	0.63	---	---	---	600	600
VG94A4S1K		1.0					
VG94A3S1K	DN15	1.6					
VG94A2S1K		2.5					
VG94A1S1K		4.0					
VG94B1S1K	DN20	6.3					
VG94C1S1K	DN25	10				590	600
VG94E2S1K	DN32	16				360	
VG94E1S1K	DN40	25				190	480
VG94F1S1K	DN50	40				100	290
VG94G1S1K	DN65	63		470	620		150
VG94H1S1K	DN80	100	510	300	400	---	---
VG94J1S1K	DN100	160	320	180	240		---
3-way mixing configuration							
VG98A5S1K	DN15	0.63	---	---	---	600	600
VG98A4S1K		1.0					
VG98A3S1K	DN15	1.6					
VG98A2S1K		2.5					
VG98A1S1K		4.0					
VG98B1S1K	DN20	6.3					
VG98C1S1K	DN25	10				490	600
VG98E2S1K	DN32	16				280	
VG98E1S1K	DN40	25				130	440
VG98F1S1K	DN50	40				60	260
VG98G1S1K	DN65	63		470	620		130
VG98H1S1K	DN80	100	510	300	400	---	---
VG98J1S1K	DN100	160	320	180	240		---

Notes
* For factory mounted valve actuators just add "+M" to the actuator ordering code.
** For fluid temperature >140 °C the extension kit VA1000-EP must be mounted.

Plant valves

VG9000

Ordering information

PN10 series (VG9xxxS1L)

Codes*	Body size	K$_{VS}$	Close-off pressure kPa				
			RA-3000-732x 3000 N	VA-1x20-GGA-1** 2000 N	VA-1125-GGA-1** 2500 N	VA-77xx-820x 500 N	VA78xx-xxx-12 1000 N
2-way PDTO (Normally Closed) configuration							
VG94A5S1L	DN15	0.63	---	---	---	1000	1000
VG94A4S1L		1.0					
VG94A3S1L		1.6					
VG94A2S1L		2.5					
VG94A1S1L		4.0					
VG94B1S1L	DN20	6.3				980	
VG94C1S1L	DN25	10				640	
VG94E2S1L	DN32	16				400	900
VG94E1S1L	DN40	25				210	510
VG94F1S1L	DN50	40				110	310
VG94G1S1L	DN65	63		470	620		160
VG94H1S1L	DN80	100	510	300	400	---	---
VG94J1S1L	DN100	160	320	180	240		
3-way Mixing configuration							
VG98A5S1L	DN15	0.63	---	---	---	1000	1000
VG98A4S1L		1.0					
VG98A3S1L		1.6					
VG98A2S1L		2.5					
VG98A1S1L		4.0					
VG98B1S1L	DN20	6.3				880	
VG98C1S1L	DN25	10				430	
VG98E2S1L	DN32	16				240	790
VG98E1S1L	DN40	25				110	420
VG98F1S1L	DN50	40				40	240
VG98G1S1L	DN65	63		470	620		120
VG98H1S1L	DN80	100	510	300	400	---	---
VG98J1S1L	DN100	160	320	180	240		

Notes
* For factory mounted valve actuators just add "+M" to the actuator ordering code.
** For fluid temperature >140 °C the extension Lit VA1000-EP must be mounted.

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Plant valves

VG8000N

DN15...150, PN16

These electrically and pneumatically operated flanged valves are primarily designed to regulate the flow of water and steam in response to the demand of a controller in Heating, Ventilating and Air Conditioning (HVAC) systems.

A variety of electric and pneumatic actuators are available.

Features

▶ Nodular cast iron body
▶ K_{VS} 0.1...350
▶ 2-way PDTC (normally open),
   3-way mixing and 3-way diverting configurations
▶ Fluid temperature 0...180 °C
   with Glycerine cup –10...180 °C
▶ DIN flanged

Dimensions in mm

Body size	B	D1	D2	D3	d	H1	H5	Bolts	Holes
DN15	130	95	65	45	13.5	100	76	M12 x 45	4
DN20	150	105	75	58	13.5	106	76	M12 x 50	4
DN25	160	115	85	68	13.5	106	76	M12 x 50	4
DN32	180	140	100	78	17.5	123	81	M16 x 55	4
DN40	200	150	110	88	17.5	140	78	M16 x 55	4
DN50	230	165	125	102	17.5	145	101	M16 x 60	4
DN65	290	185	145	122	17.5	156	102	M16 x 60	4
DN80	310	200	160	138	17.5	180	108	M16 x 65	8
DN100	350	220	180	158	17.5	225	136	M16 x 70	8
DN125	400	250	210	188	17.5	255	155	M16 x 75	8
DN150	480	285	240	212	22	290	175	M20 x 75	8

European product catalogue 2017
Manufacturer reserves the right to change specifications without prior notice

Plant valves

VG8000N

Ordering information

2-way PDTC (Normally Open) configuration

Codes *	Body size	K$_{VS}$	Close-off pressure kPa						
			FA-2000-741x 2400 N	FA-2000-751x 2200 N	FA-3300 6000 N	RA-3100-8226 2700 N	VA1x20 ** 2000 N	VA1125 ** 2500 N	VA78xx 1000 N
VG82A4S1N	DN15	1.0							
VG82A3S1N	DN15	1.6							
VG82A2S1N	DN15	2.5							1600
VG82A1S1N	DN15	4.0		---		---	1600	1600	
VG82B1S1N	DN20	6.3							
VG82C1S1N	DN25	10	---		---				1570
VG82D1S1N	DN32	16							770
VG82E1S1N	DN40	25							440
VG82F1S1N	DN50	40		1030		650	800	1080	
VG82G1S1N	DN65	63		790		500	630	830	
VG82H1S1N	DN80	100		370		220	380	390	---
VG82J1S1N	DN100	160	190		740	120	160	230	
VG82K1S1N	DN125	250	110	---	460		90	140	
VG82L1S1N	DN150	350	50		280	---	40	75	

Notes
* For factory mounted valve actuators just add "+M" to the actuator ordering code
  For ordering a valve with Glycerine cup packing, add suffix "20" to the ordering code: i.e. VG8xxxS1H20.
  Teflon free model are available on request.
** For fluid temperature >140 °C the extension kit VA1000–EP must be mounted.

Plant Valves

VG8000N

Ordering information

3-way mixing configuration

Codes*	Body size	K$_{VS}$	FA-2000-741x 2400 N	FA-2000-751x 2200 N	FA-3300 6000 N	RA-3100-8226 2700 N	VA1x20 ** 2000 N	VA1125 ** 2500 N	VA78xx 1000 N
VG88A4S1N	DN15	1.0	---	---	---	---	1600	1600	1600
VG88A3S1N	DN15	1.6							
VG88A2S1N	DN15	2.5							
VG88A1S1N	DN15	4.0							
VG88B1S1N	DN20	6.3							
VG88C1S1N	DN25	10							1570
VG88D1S1N	DN32	16							770
VG88E1S1N	DN40	25							440
VG88F1S1N	DN50	40		1030		650	800	1080	---
VG88G1S1N	DN65	63		790		500	630	830	
VG88H1S1N	DN80	100		370		220	380	390	
VG88J1S1N	DN100	160	190		740	120	160	230	
VG88K1S1N	DN125	250	110	---	460	---	90	140	
VG88L1S1N	DN150	350	50		280		40	75	

Notes
* For factory mounted valve actuators just add "+M" to the actuator ordering code
  For ordering a valve with Glycerine cup packing, add suffix "20" to the ordering code: i.e. VG8xxxS1H20.
  Teflon free model are available on request.
** For fluid temperature >140 °C the extension kit VA1000–EP must be mounted.

Plant valves

VG8000N

Ordering information

3-way diverting configuration

Codes*	Body size	K$_{VS}$	Close-off pressure kPa						
			FA-2000-741x 2400 N	FA-2000-751x 2200 N	FA-3300 6000 N	RA-3100-8226 2700 N	VA1x20 ** 2000 N	VA1125 ** 2500 N	VA78xx 1000 N
VG89A4S1N	DN15	1.0	---	---	---	---	1600	1600	1600
VG89A3S1N	DN15	1.6	---	---	---	---	1600	1600	1600
VG89A2S1N	DN15	2.5	---	---	---	---	1600	1600	1600
VG89A1S1N	DN15	4.0	---	---	---	---	1600	1600	1600
VG89B1S1N	DN20	6.3	---	---	---	---	1600	1600	1600
VG89C1S1N	DN25	10	---	---	---	---	1600	1600	1570
VG89D1S1N	DN32	16	---	---	---	---	1600	1600	770
VG89E1S1N	DN40	25	---	---	---	---	1600	1600	440
VG89F1S1N	DN50	40	---	1030	---	650	800	1080	---
VG89G1S1N	DN65	63	---	790	---	500	630	830	---
VG89H1S1N	DN80	100	---	370	---	220	380	390	---
VG89J1S1N	DN100	160	190	---	740	120	160	230	---
VG89K1S1N	DN125	250	110	---	460	---	90	140	---
VG89L1S1N	DN150	350	50	---	280	---	40	75	---

Notes
* For factory mounted valve actuators just add "+M" to the actuator ordering code
  For ordering a valve with Glycerine cup packing, add suffix "20" to the ordering code: i.e. VG8xxxS1H20.
  Teflon free model are available on request.
** For fluid temperature >140 °C the extension kit VA1000–EP must be mounted.

Johnson Controls

Plant valves

VG8000H

DN15...150, PN25

These flanged valves are primarily designed to regulate the flow of water and steam in response to the demand of a controller, in Heating, Ventilating and Air Conditioning (HVAC) systems.
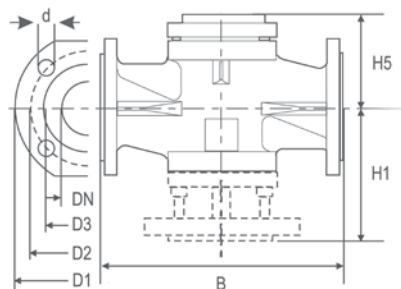
A variety of electric and pneumatic actuators are available.

Features

▶ Nodular cast iron body

▶ K_{VS} 0.4...350

▶ 2-way PDTC (normally open),
   3-way mixing and 3-way diverting configurations

▶ Fluid temperature 2...200 °C,
   with glycerin cup: −20...200 °C
   with cooling fins: up to 280 °C

▶ DIN Flanged

Dimensions in mm

Body size	B	D1	D2	D3	d	H1	H5	Bolts	Holes
DN15	130	95	65	45	13.5	100	76	M12 x 45	4
DN20	150	105	75	58	13.5	106	76	M12 x 50	4
DN25	160	115	85	68	13.5	106	76	M12 x 50	4
DN32	180	140	100	78	17.5	123	81	M16 x 55	4
DN40	200	150	110	88	17.5	140	78	M16 x 55	4
DN50	230	165	125	102	17.5	145	101	M16 x 60	4
DN65	290	185	145	122	17.5	156	102	M16 x 60	8
DN80	310	200	160	138	17.5	180	108	M16 x 65	8
DN100	350	235	190	162	22	225	136	M20 x 70	8
DN125	400	270	220	188	26	255	155	M24 x 75	8
DN150	480	300	250	218	26	290	175	M24 x 80	8

Plant valves

VG8000H

2-way PDTC (Normally Open) configuration

| Codes* | Body size | K$_{VS}$ | Close-off pressure kPa | | | | | | | |
			FA-2000-741x 2200 N	FA-2000-751x 2400 N	FA-3300-741x 6000 N	RA-3000-732x 3000 N	RA-3100-8226 1700 N	VA1x20** 2000 N	VA1125** 500 N	VA78xx 1000 N
VG82A4S1H	DN15	1.0	---	---	---	---	---	2500	2500	2500
VG82A3S1H		1.6								
VG82A2S1H		2.5								
VG82A1S1H		4.0								
VG82B1S1H	DN20	6.3								2030
VG82C1S1H	DN25	10			---					1360
VG82D1S1H	DN32	16								660
VG82E1S1H	DN40	25						1550	2000	370
VG82F1S1H	DN50	40		920		1300	600	750	1020	---
VG82G1S1H	DN65	63		710		1010	450	580	750	
VG82H1S1H	DN80	100		330		480	200	260	370	
VG82J1S1H	DN100	160	180		720	290	100	140	210	
VG82K1S1H	DN125	250	100	---	450	170	---	80	120	
VG82L1S1H	DN150	350	50		270	100		40	70	

Notes

* For factory mounted valve actuators just add "+M" to the type model number
  For ordering a valve with Cooling fin, add suffix "10" to the ordering code: i.e. VG8xxxS1H10
  For ordering a valve with Glycerine cup packing, add suffix "20" to the ordering code: i.e. VG8xxxS1H20.
  Reduced kvs coefficients are available on request.

** For fluid temperature >140 °C the extension kit VA1000-EP must be mounted. Max-Fluid temperature must not exceed 200 °C.

Plant valves

VG8000H

Ordering information

3-way mixing configuration

Codes*	Body size	K_VS	Close-off pressure kPa							
			FA-2000-741x 2200 N	FA-2000-751x 2400 N	FA-3300-741x 6000 N	RA-3000-732x 3000 N	RA-3100-8226 1700 N	VA1x20** 2000 N	VA1125** 500 N	VA78xx 1000 N
VG88A4S1H	DN15	1.0	---	---	---	---	---	2500	2500	2500
VG88A3S1H		1.6								
VG88A2S1H		2.5								
VG88A1S1H		4.0								2030
VG88B1S1H	DN20	6.3								1360
VG88C1S1H	DN25	10								660
VG88D1S1H	DN32	16								
VG88E1S1H	DN40	25						1550	2000	370
VG88F1S1H	DN50	40		920		1300	600	750	1020	---
VG88G1S1H	DN65	63		710		1010	450	580	750	
VG88H1S1H	DN80	100		330		480	200	260	370	
VG88J1S1H	DN100	160	180		720	290	100	140	210	
VG88K1S1H	DN125	250	100	---	450	170	---	80	120	
VG88L1S1H	DN150	350	50		270	100		40	70	

Notes

*   For factory mounted valve actuators just add "+M" to the type model number
    For ordering a valve with Cooling fin, add suffix "10" to the ordering code: i.e. VG8xxxS1H10
    For ordering a valve with Glycerine cup packing, add suffix "20" to the ordering code: i.e. VG8xxxS1H20.
    Reduced kvs coefficients are available on request.
** For fluid temperature >140 °C the extension kit VA1000-EP must be mounted. Max-Fluid temperature must not exceed 200 °C.

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Plant valves

VG8000H

Ordering information

3-way diverting configuration

Codes *	Body size	K_{VS}	FA-2000-741x 2200 N	FA-2000-751x 2400 N	FA-3300-741x 6000 N	RA-3000-732x 3000 N	RA-3100-8226 1700 N	VA1x20 ** 2000 N	VA1125 ** 500 N	VA78xx 1000 N
						Close-off pressure kPa				
VG89A4S1H	DN15	1.0								
VG89A3S1H		1.6								2500
VG89A2S1H		2.5								
VG89A1S1H		4.0		---		---	---	2500	2500	
VG89B1S1H	DN20	6.3	---		---					2030
VG89C1S1H	DN25	10								1360
VG89D1S1H	DN32	16								660
VG89E1S1H	DN40	25						1550	2000	370
VG89F1S1H	DN50	40		920		1300	600	750	1020	
VG89G1S1H	DN65	63		710		1010	450	580	750	
VG89H1S1H	DN80	100		330		480	200	260	370	---
VG89J1S1H	DN100	160	180		720	290	100	140	210	
VG89K1S1H	DN125	250	100	---	450	170	---	80	120	
VG89L1S1H	DN150	350	50		270	100		40	70	

Notes

*   For factory mounted valve actuators just add "+M" to the type model number
     For ordering a valve with Cooling fin, add suffix "10" to the ordering code: i.e. VG8xxxS1H10
     For ordering a valve with Glycerine cup packing, add suffix "20" to the ordering code: i.e. VG8xxxS1H20.
     Reduced kvs coefficients are available on request.
** For fluid temperature >140 °C the extension kit VA1000-EP must be mounted. Max-Fluid temperature must not exceed 200 °C.

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Plant valves

VG8300N

DN40...150, PN16 pressure balanced

These pressure balanced flanged valves are primarily designed to regulate the flow of water and steam in response to the demand of a controller in Heating, Ventilating and Air Conditioning (HVAC) systems.

These valves have a specially designed plug, which through specific balancing of pressures allows higher close-off pressures with standard actuator combinations.

A variety of electric and pneumatic actuators are available.

Features

▸ Nodular cast iron bodies
▸ K_{VS} 25...350
▸ 2-way PDTC (normally open) configuration
▸ PN16
  Fluid temperature 2...180 °C
  with glycerin cup -10...180 °C
▸ Pressure balanced valve plug
▸ DIN flanged

Dimensions in mm

Body size	B	D1	D2	D3	d	H1	H5	Bolts	Holes
DN40	200	150	110	88	17.5	140	78	M16 x 55	4
DN50	230	165	125	102	17.5	145	101	M16 x 60	4
DN65	290	185	145	122	17.5	156	102	M16 x 60	4
DN80	310	200	160	138	17.5	180	108	M16 x 65	8
DN100	350	220	180	158	17.5	225	136	M16 x 70	8
DN125	400	250	210	188	17.5	255	155	M16 x 75	8
DN150	480	285	240	212	22	290	175	M20 x 75	8

Ordering information

			Close-off Pressure kPa					
			Spring return		Non spring return			
Codes *	Body size	K_{VS}	FA-2000-741x 2200 N	VA1x20 ** 2000 N	RA-3100-8126 1200 N	RA-3100-8226 1700 N	VA1125 ** 2500 N	VA78xx 1000 N
VG83E1S1N	DN40	25			1600	---		1600
VG83F1S1N	DN50	40	---	1600			1600	
VG83G1S1N	DN65	63						
VG83H1S1N	DN80	100			---	1600		---
VG83J1S1N	DN100	160		1500				
VG83K1S1N	DN125	250	1600	1400			1500	
VG83L1S1N	DN150	350		1000			1400	

Notes
* For factory mounted valve actuators just add "+M" to the actuator ordering code.
** For fluid temperature >140 °C the extension kit VA1000-EP must be mounted.

Manufacturer reserves the right to change specifications without prior notice

Plant valves

VG1000 threaded
DN15...50, PN40

The VG1000 series ball valves are used for the water control
of air treatment systems in Heating, Ventilating and Air Conditioning
(HVAC) systems.
They are operated by direct or remote mounted spring return
and non spring return actuators.

Features

▶ Forged brass body

▶ K_{VS} 1...63

▶ 2-way, 3-way mixing and diverting configurations

▶ Inherent equal percentage flow characteristic
  in the in-line port of all valves

▶ BSPP female threaded body connections

▶ **Service**
  Hot and cold water:
  –30...140°C with 8 Nm non spring return
  –30...95°C with 4 Nm non spring return
  (140°C with M9000–561 thermal barrier)
  –30...100°C with 3 Nm and 8 Nm spring return
  (140°C with M9000–561 thermal barrier)

  Water with glycol to max 50% volume

  Steam to max 103 kPa at 121°C with 8 Nm non spring return
  Steam to max 103 kPa at 121°C with 4 Nm non spring return,
  3 Nm and 8 Nm spring return with thermal barrier

▶ M9000–525-5 linkage kit available
  for field mounting to M9108 series electric actuators

Two-way valve   Three-way valve

Ordering information

Codes	Body size	K_{VS} (Control port)	K_{VS} (By-pass port)
VG1x05AD	DN15	1.0	0.63
VG1x05AE		1.6	1.0
VG1x05AF		2.5	1.6
VG1x05AG		4.0	2.5
VG1x05AL		6.3	4.0
VG1x05AN		10	5.0
VG1x05BL	DN20	6.3	4.0
VG1x05BN		10	5.0
VG1x05CN	DN25	10	6.3
VG1x05CP		16	8.0
VG1x05DP	DN32	16	10.0
VG1x05DR		25	12.5
VG1x05ER	DN40	25	16
VG1x05ES		40	20
VG1x05FS	DN50	40	25.0
VG1x05FT		63	31.5

Dimensions in mm

Body size	A	B	C	D	E
DN15	17	31	67	9	33
DN20			75		38
DN25	19	33	92		46
DN32	26	44	109		54
DN40	29	48	119		59
DN50	37	53	139		74

Johnson Controls

Plant valves

VG1000 threaded

Valves and actuators combinations

ACTUATOR TYPE

	Non-Spring Return				Spring Return															
	VA9104		VA9310			VA9203									VA9208						

CONTROL INPUT (top header, per column):
On/Off and Floating Point · Proportional 0 (2) to 10 VDC · On/Off and Floating Point · On/Off, Floating and Proportional Point · On/Off and Floating Point · On/Off and Floating Point · On/Off · On/Off · Proportional 0 (2) to 10 VDC · On/Off and Floating Point · On/Off · On/Off · On/Off · Proportional 0 (2) to 10 VDC

ACTUATOR OPTIONS

| POWER SUPPLY | 24 V AC | 100–230 V AC | 24 V AC / DC | 100–230 V AC | 24 V AC / DC | 24 V AC / DC | 24 V AC / DC | 100…230 V AC | 24 V AC / DC | 24 V AC / DC | 24 V AC / DC | 230 V AC | 24 V AC / DC |

Auxiliary Switches:
- 1 SPDT, 5.0(2.9) A @ 240 V ② ②
- 2 SPDT, 5.0(2.9) A @ 240 V ② ②

Position Feedback:
- 0(2) to 10VDC Position Feedback

ACTUATOR CODE:
VA9104-IGA-1S · VA9104-GGA-1S · VA9104-IUA-1S · VA9310-HGA-1 · VA9310-AUA-1 · VA9203-AGA-1Z · VA9203-AGB-1Z · VA9203-BGA-1 · VA9203-BGB-1 · VA9203-BUA-1 · VA9203-BUB-1 · VA9203-GGA-1Z · VA9203-GGB-1Z · VA9208-AGA-1 · VA9208-AGC-1 · VA9208-BGA-1 · VA9208-BGC-1 · VA9208-BDA-1 · VA9208-BDC-1 · VA9208-GGA-1 · VA9208-GGC-1

Notes
① x = 3: Spring Return Port A Open
   x = 5: Spring Return Port A Closed
② Available only as an external Kit.
   Not present in the assembly.
   Separetely order: **M9300-1** for 1 SPDT
   M9300-2 for 2 SPDT

Pressure Drop - kPa (bar)										DN mm	Kvs Control Port (Bypass Port)	VALVE BODY CONFIGURATION	
2 (0.02)	5 (0.05)	10 (0.1)	25 (0.25)	50 (0.5)	100 (1)	200 (2)	300 (3)	400 (4)	500 (5)			2-WAY	3-WAY
0,14	0,22	0,32	0,50	0,71	1,00	1,41	1,73	2,00	2,24	15	1,0 (0,63)	VG1205AD	VG1805AD
0,23	0,36	0,51	0,80	1,13	1,60	2,26	2,77	3,20	3,58		1,6 (1,0)	VG1205AE	VG1805AE
0,35	0,56	0,79	1,25	1,77	2,50	3,54	4,33	5,00	5,59		2,5 (1,6)	VG1205AF	VG1805AF
0,57	0,89	1,26	2,00	2,83	4,00	5,66	6,93	8,00	8,94		4,0 (2,5)	VG1205AG	VG1805AG
0,89	1,41	1,99	3,15	4,45	6,30	8,91	10,91	12,60	14,09		6,3 (4,0)	VG1205AL	VG1805AL
1,41	2,24	3,16	5,00	7,07	10,00	14,14	17,32	20,00	22,36		10 (5,0)	VG1205AN	VG1805AN
0,89	1,41	1,99	3,15	4,45	6,30	8,91	10,91	12,60	14,09	20	6,3 (4,0)	VG1205BL	VG1805BL
1,41	2,24	3,16	5,00	7,07	10,00	14,14	17,32	20,00	22,36		10 (5,0)	VG1205BN	VG1805BN
1,41	2,24	3,16	5,00	7,07	10,00	14,14	17,32	20,00	22,36	25	10 (6,3)	VG1205CN	VG1805CN
2,26	3,58	5,06	8,00	11,31	16,00	22,63	27,71	32,00	35,78		16 (8,0)	VG1205CP	VG1805CP
2,26	3,58	5,06	8,00	11,31	16,00	22,63	27,71	32,00	35,78	32	16 (10,0)	VG1205DP	VG1805DP
3,54	5,59	7,91	12,50	17,68	25,00	35,36	43,30	50,00	55,90		25 (12,5)	VG1205DR	VG1805DR
3,54	5,59	7,91	12,50	17,68	25,00	35,36	43,30	50,00	55,90	40	25 (16)	VG1205ER	VG1805ER
5,66	8,94	12,65	20,00	28,28	40,00	56,57	69,28	80,00	89,44		40 (20)	VG1205ES	VG1805ES
5,66	8,94	12,65	20,00	28,28	40,00	56,57	69,28	80,00	89,44	50	40 (25,0)	VG1205FS	VG1805FS
8,91	14,09	19,92	31,50	44,55	63,00	89,10	109,12	126,00	140,87		63 (31,5)	VG1205FT	VG1805FT

CONTROL INPUT (left side vertical label)

FACTORY ASSEMBLED VALVE + ACTUATOR COMBINATIONS MATRIX (right side vertical label)

FLUID TEMPERATURE LIMITS / **FACTORY ASSEMBLY CODE**

| Water −30° to 100 °C | 5A4IGA · 5A4GGA · 5A4IUA · 510HGA · 510AUA · 5x3AGA · 5x3AGB · 5x3BGA · 5x3BGB · 5x3BUA · 5x3BUB · 5x3GGA · 5x3GGB · 5x8AGA · 5x8AGC · 5x8BGA · 5x8BGC · 5x8BDA · 5x8BDC · 5x8GGA · 5x8GGC |
| Water −30° to 140 °C / Steam Max 103 kPa | 6A4IGA · 6A4GGA · 6A4IUA · 610HGA · 610AUA · 6x3AGA · 6x3AGB · 6x3BGA · 6x3BGB · 6x3BUA · 6x3BUB · 6x3GGA · 6x3GGB · 6x8AGA · 6x8AGC · 6x8BGA · 6x8BGC · 6x8BDA · 6x8BDC · 6x8GGA · 6x8GGC |

VALVE CODE + FACTORY ASSEMBLY CODE → MOTORIZED VALVE ASSEMBLY CODE

Example: VG1805CP + 533GGB

Virtual Branch eCatalogue
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Johnson
Controls

HVAC control products
Valves

Plant valves

VG1000 flanged

DN65...150, PN16

The VG1000 series control ball valves are used for the water control of air treatment systems in ventilation and air conditioning units as well as heating system.

They are operated by remote mounted spring return and non spring return actuators.

Features

▶ 2-way and 3-way mixing

▶ Body rating PN 16

▶ Hot water, chilled water, 50/50 glycol solutions and 172 kPa saturated steam for HVAC Systems

▶ Valve fluid temperature limits -18 to 140 °C

▶ Maximum close-off pressure
2-way: 689 kPa / 3-way: 345 kPa

▶ Maximum recommended operating pressure drop
207 kPa for quiet service

▶ Flow characteristics
2-way: Equal percentage (according EN60534-2-4)
3-way: Equal percentage (according EN60534-2-4)
Flow characteristics of Inline port (Coil) and linear percentage flow characteristics of angle port (By-pass)

▶ Rangeability greater than 500:1

▶ Leakage
2 and 3-way: 0.01% of maximum flow, control port, ANSI/FCI 70-2, Class 4
3-way: 1% of maximum flow, by-pass port

Dimensions in mm

Valve size	A	B	C	F	Holes for flange	Holes diameters	Bolt
DN65	92.5	145	290	149	4	19	M16x60
DN80	100	155	310	159	8	19	M16x65
DN100	110	175	350	179	8	19	M16x70

Manufacturer reserves the right to change specifications without prior notice

Johnson Controls

Plant valves

VG1000 flanged

Ordering information

Assemblies of valves with proportional actuators

Spring return function	---		•	
Supply voltage	24 VAC/DC			
Torque	24 Nm		20 Nm	
Running time	125 s		150 s	
Spring return time power off	---		26 s	
Control signal				
VDC	0 - 10 / 2 - 10			
mA	0 - 20 / 4 - 20			
Switches	---	2 x SPDT	---	2 x SPDT
Feedback				
VDC	0 - 10 / 2 - 10			
Actuator codes	M9124-GGA-1N	M9124-GGC-1N	M9220-HGA-1	M9220-HGC-1
Linkage codes	M9000-518		M9000-519	
Ordering code suffix for assemblies	+ 524GGA	+ 524GGC	+ 530HGA (Spring opens) / + 550HGA (Spring closes)	+ 530HGC (Spring opens) / + 550HGC (Spring closes)

Valve codes	Body size	K$_{VS}$ (Control port)	K$_{VS}$ (By-pass port)	Valid combinations of valves, linkages and actuators			
2-way models							
VG12E5GT	DN65	63	---	•	•	•	•
VG12E5GU	DN65	100	---	•	•	•	•
VG12E5HU	DN80	100	---	•	•	•	•
VG12E5HW	DN80	180	---	•	•	•	•
VG12E5JV	DN100	150	---	•	•	•	•
3-way models							
VG18E5GT	DN65	63	40	•	•	•	•
VG18E5GU	DN65	100	63	•	•	•	•
VG18E5HU	DN80	100	63	•	•	•	•
VG18E5HW	DN80	180	75	•	•	•	•
VG18E5JV	DN100	150	75	•	•	•	•

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Plant valves

VG1000 flanged

Ordering information
Assemblies of valves with foating and ON/OFF actuators

Spring return function		---			•			
Supply voltage		24 VAC / DC	230 VAC		24 VAC / DC			230 VAC		
Torque		24 Nm			20 Nm					
Running time		125 s			150 s			24 – 57 s		
Spring return time power off		---			20 s			11...50 s		
Control signal		Floating and ON/OFF			ON/OFF					
Switches		--- / 2 x SPDT	--- / 2 x SPDT		--- / 2 x SPDT		--- / 2 x SPDT		--- / 2 x SPDT	
Feedback		---								
Actuator codes		M9124-AGA-1N	M9124-AGC-1N	M9124-ADA-1N	M9124-ADC-1N	M9220-AGA-1	M9220-AGC-1	M9220-BGA-1	M9220-BGC-1	M9220-BDA-1	M9220-BDC-1
Linkage codes		M9000-518			M9000-519					
Ordering code suffix for assemblies		+524AGA +524AGC +524ADA +524ADC			+530AGA (Spring Opens) / +550AGA (Spring Closes)	+530AGC (Spring Opens) / +550AGC (Spring Closes)	+530BGA (Spring Opens) / +550BGA (Spring Closes)	+530BGC (Spring Opens) / +550BGC (Spring Closes)	+530BDA (Spring Opens) / +550BDA (Spring Closes)	+530BDC (Spring Opens) / +550BDC (Spring Closes)

Valve codes	Body size	K_{VS} (Control port)	K_{VS} (By-pass port)	Valid combinations of valves, linkages and actuators									
2-way models													
VG12E5GT	DN65	63	---	•	•	•	•	•	•	•	•	•	•
VG12E5GU		100	---	•	•	•	•	•	•	•	•	•	•
VG12E5HU	DN80	100	---	•	•	•	•	•	•	•	•	•	•
VG12E5HW		180	---	•	•	•	•	•	•	•	•	•	•
VG12E5JV	DN100	150	---	•	•	•	•	•	•	•	•	•	•
3-way models													
VG18E5GT	DN65	63	40	•	•	•	•	•	•	•	•	•	•
VG18E5GU		100	63	•	•	•	•	•	•	•	•	•	•
VG18E5HU	DN80	100	63	•	•	•	•	•	•	•	•	•	•
VG18E5HW		180	75	•	•	•	•	•	•	•	•	•	•
VG18E5JV	DN100	150	75	•	•	•	•	•	•	•	•	•	•

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Plant valves

VFB butterfly valves

DN25...500, PN16

VFB butterfly valves series are specifically designed for a wide range of Heating, Ventilating, and Air Conditioning (HVAC) applications, including two-position and modulating control of hot, chilled, or condenser water, and 50/50 glycol solutions.

All valves are factory tested for bubble-tight shutoff at 100% of the fully-rated pressure.

These valves are also bidirectional, allowing positive shutoff with the flow in either direction.

Features

▶ Low seating/unseating torques
   Reduce actuator torque and size requirements, particularly with lower-pressure rated valves
▶ Bubble-tight shutoff
   Ensures positive closure when needed
▶ Broad range of pre-assembled actuators
   Offers a wide selection for new and replacement electric and pneumatic actuators
▶ High-integrity components
   Provide quality valve assemblies, combining long cycle life with optimal engineered functional designs
▶ Fluid temperature limits
   –29 °C to 121 °C
▶ Flow characteristics
   Modified equal percentage

Plant valves

VFB butterfly valves

Dimensions in mm

Two-way valve

Valve size (mm)	Valve size (inch)	A	B	C	D	E	F	M	N	G	H	J	Valve net weight** (kg)	Top flange ISO 5211	K*	Number of holes on flange	K*	Number of holes on flange	K*	Number of holes on flange
																PN6		PN10		PN16
25	1	60	30	32	43	25	65	50	7	10	8	25	1	F05	75	4 x M10	85	4 x M12	85	4 x M12
32	1-¼	70	32	41	53	25	65	50	7	10	8	25	1,15	F05	90	4 x M12	100	4 x M16	100	4 x M16
40	1-½	80	32	47	55	25	65	50	7	10	8	25	2.75	F05	100	4 x M12	110	4 x M16	110	4 x M16
50	2	94	42	51	56	140	90	70	10	14	10	32	3.05	F07	110	4 x M12	125	4 x M16	125	4 x M16
65	2-½	106	45	64	63	152	90	70	10	14	10	32	4.05	F07	130	4 x M12	145	4 x M16	145	4 x M16
80	3	124	45	76	71	159	90	70	10	14	10	32	4.3	F07	150	4 x M16	160	8 x M16	160	8 x M16
100	4	154	51	102	87	178	90	70	10	16	11	32	4.85	F07	170	4 x M16	180	8 x M16	180	8 x M16
125	5	179	55	127	102	190	90	70	10	19	13	32	7.2	F07	200	8 x M16	210	8 x M16	210	8 x M16
150	6	206	55	146	115	203	90	70	10	19	13	32	9.5	F07	225	8 x M16	240	8 x M20	240	8 x M20
200	8	267	59	197	146	241	150	125	14	22	16	32	12	F07	280	8 x M16	295	8 x M20	295	12 x M20
250	10	324	67	248	181	273	150	125	14	30	22	51	17	F12	335	12 x M16	350	12 x M20	355	12 x M24
300	12	378	77	298	206	311	150	125	14	30	22	51	20	F12	395	12 x M20	400	12 x M20	410	12 x M24
350	14	433	78	337	238	346	150	125	14	35	10x10***	51	23	F12	445	12 x M20	460	16 x M20	470	16 x M24
400	16	488	102	387	273	375	150	125	14	35	10x10***	51	27	F12	495	16 x M20	515	16 x M24	525	16 x M27
450	18	536	114	438	305	406	210	165	21	50	10x12***	64	30	F16	---	---	565	20 x M24	585	20 x M27
500	20	591	127	489	356	436	210	165	21	50	10x12***	64	33	F16	---	---	650	20 x M24	650	20 x M30

Note
* Disc chordal dimension at valve face.
** Net weight is for valve only (no actuator).
*** Key: the key is needed to link the actuator. It is inside the package of the valve. Dimensions in mm (high x width).

Plant valves

VFB butterfly valves

Dimensions in mm

Ten-position manual handle　　　　　　　　　　*Gear-operated manual hand wheel*

Valve size (mm)	Valve size (inch)	Codes *	A	B	C
25 to 40	1/2" to 1-1/2"	VF-998-100	196	60	25
50 to 80	2" to 3"	VF-998-101	270	80	32
100	4"	VF-998-102	270	80	32
125 to 150	5" to 6"	VF-998-103	270	80	32
200	8"	VF-998-104	298	80	32
250 to 300	10" to 12"	VF-998-105	298	80	51

Valve size (mm)	Valve size (inch)	Codes *	A	B	C
50 to 150	2" to 6"	VF-998-303	90	136	203
200	8"	VF-998-304	150	190	203
250 to 300	10" to 12"	VF-998-305	150	190	203
350 to 400	14" to 16"	VF-998-307	150	303	305
450 to 500	18" to 20"	VF-998-308	210	379	305

Note
* Kit includes a manual gear operator, adaptor (if required), and mounting hardware.

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Plant valves

VFB butterfly valves

Ordering information

Codes	Body size	Valve size (inch)	K_{VS} value	Max Δp (kPa) Close-off pressure
High pressure close-off (12 Bar from DN50 to DN300, 10 Bar all other sizes)				
VFB025H	DN25	1	52	1000
VFB032H	DN32	1 ¼	72	
VFB040H	DN40	1 ½	126	
VFB050H	DN50	2	124	1200
VFB065H	DN65	2 ½	243	
VFB080H	DN80	3	397	
VFB100H	DN100	4	723	
VFB125H	DN125	5	1083	
VFB150H	DN150	6	1591	
VFB200H	DN200	8	2852	
VFB250H	DN250	10	4670	
VFB300H	DN300	12	6946	
VFB350H	DN350	14	9063	1000
VFB400H	DN400	16	12044	
VFB450H	DN450	18	14804	
VFB500H	DN500	20	19212	
Low pressure close-off (3,5 Bar from DN100 to DN500)				
VFB100L	DN100	4	723	350
VFB125L	DN125	5	1083	
VFB150L	DN150	6	1591	
VFB200L	DN200	8	2852	
VFB250L	DN250	10	4670	
VFB300L	DN300	12	6946	
VFB350L	DN350	14	9063	
VFB400L	DN400	16	12044	
VFB450L	DN450	18	14804	
VFB500L	DN500	20	19212	

Plant valves

VFB butterfly valves

Ordering codes

VFB butterfly valves with M9000 actuators assembly

VFB | xxx | x | + | 5xx | x | x | x

	Auxiliary switches	
A	=	None
C	=	2 Auxiliary switches
	Power supply	
G	=	24 VAC/DC
D	=	230 VAC
	Control	
A	=	Floating
B	=	ON/OFF
G	=	Proportional
H	=	Proportional with span offset
	Factory mounted electric actuators	
516	=	M9116 non spring return
524	=	M9124 non spring return
530	=	M9220 spring return open configuration
550	=	M9220 spring return close configuration

Actuator		
	Close-off	
H	=	High pressure close-off
L	=	Low pressure close-off
	Valve size	
025	=	DN25, 1 inch
032	=	DN32, 1-1/4 inch
040	=	DN40, 1-1/2 inch
050	=	DN50, 2 inch
065	=	DN65, 2-1/2 inch
080	=	DN80, 3 inch
100	=	DN100, 4 inch

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Plant valves

Ordering information

VBF valves with M9000 actuators and necessary linkage code - Available combination

Valves				Non spring return		Spring return
				Torque (Nm)		
				16	24	20
Codes	DN	Inches	MAX Close-off pressure (bar)	M9116	M9124	M9220
VFB025H	25	1"	12	M9100-100A		M9200-100A
VFB032H	32	1-1/4"	12	M9100-100A		M9200-100A
VFB040H	40	1-1/2"	12	M9100-100A	---	M9200-100A
VFB050H	50	2"	12	M9100-100B		M9200-100B
VFB065H	65	2-1/2"	12	M9100-100B		M9200-100B
VFB080H	80	3"	12	---	M9100-100B	M9200-100B
VFB100L	100	4"	3.5		M9100-100C	M9200-100C

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Plant valves

VFB butterfly valves

Ordering codes

VFB butterfly valves with VA-9070 actuators assembly

VFB [xxx] [x] + 7 [x] [x] [x]

		Power supply	
1	=	24 VAC	
2	=	230 VAC	
		Factory mounted electric actuators *	
2	=	VA-9072-xx Series	68 Nm actuators
5	=	VA-9075-xx Series	226 Nm actuators
7	=	VA-9077-xx Series	565 Nm actuators
8	=	VA-9078-xx Series	735 Nm actuators
A	=	VA-907A-xx Series	1470 Nm actuators
B	=	VA-907B-xx Series	2034 Nm actuators
		Control	
0	=	Proportional	
2	=	ON/OFF & Floating	

		Actuator	
		Close-off	
H	=	High pressure close-off	
L	=	Low pressure close-off	
		Valve size	
025	=	DN25, 1 inch	
032	=	DN32, 1-¼ inch	
040	=	DN40, 1-½ inch	
050	=	DN50, 2 inch	
065	=	DN65, 2-½ inch	
080	=	DN80, 3 inch	
100	=	DN100, 4 inch	
125	=	DN125, 5 inch	
150	=	DN150, 6 inch	
200	=	DN200, 8 inch	
250	=	DN250, 10 inch	
300	=	DN300, 12 inch	
350	=	DN350, 14 inch	
400	=	DN400, 16 inch	
450	=	DN450, 18 inch	
500	=	DN500, 20 inch	

* See VA-9070 Product Bulletin for more details

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Plant valves

VFB butterfly valves

Ordering information

VBF valves with VA-9070 series actuators - Available combination

				Power supply 230 VAC					Power supply 24 VAC		
				Torque (Nm)							
JCI VFB valves				68	226	735	1470	2034	68	226	565
Valves codes	DN	Inches	MAX close-off pressure (bar)	VA-9072	VA-9075	VA-9078	VA-907A	VA-907B	VA-9072	VA-9075	VA-9077
VFB025H	25	1	12	•	---	---	---	---	•	---	---
VFB032H	32	1-¼	12	•	---	---	---	---	•	---	---
VFB040H	40	1-½	12	•	---	---	---	---	•	---	---
VFB050H	50	2	12	•	---	---	---	---	•	---	---
VFB065H	65	2-½	12	•	---	---	---	---	•	---	---
VFB080H	80	3	12	•	---	---	---	---	•	---	---
VFB100H	100	4	12	•	---	---	---	---	•	---	---
VFB125H	125	5	12	•	---	---	---	---	•	---	---
VFB150H	150	6	12	•	---	---	---	---	•	---	---
VFB200H	200	8	12	---	•	---	---	---	---	•	---
VFB250H	250	10	12	---	---	•	---	---	---	---	•
VFB300H	300	12	10	---	---	•	---	---	---	---	•
VFB350H	350	14	10	---	---	•	---	---	---	---	---
VFB400H	400	16	10	---	---	---	•	---	---	---	---
VFB450H	450	18	10	---	---	---	•	---	---	---	---
VFB500H	500	20	10	---	---	---	---	•	---	---	---
VFB100L	100	4	3.5	•	---	---	---	---	•	---	---
VFB125L	125	5	3.5	•	---	---	---	---	•	---	---
VFB150L	150	6	3.5	•	---	---	---	---	•	---	---
VFB200L	200	8	3.5	---	•	---	---	---	---	•	---
VFB250L	250	10	3.5	---	•	---	---	---	---	•	---
VFB300L	300	12	3.5	---	---	•	---	---	---	---	•
VFB350L	350	14	3.5	---	---	•	---	---	---	---	•
VFB400L	400	16	3.5	---	---	•	---	---	---	---	•
VFB450L	450	18	3.5	---	---	•	---	---	---	---	•
VFB500L	500	20	3.5	---	---	•	---	---	---	---	---

See VA-9070 Product Bulletin for more details.

European product catalogue 2017

Pressure independent valves

VP1000

DN15...32, PN25
DN40...50, PN16

VP1000 pressure independent control valve is a combination of a differential pressure regulator and a regulating valve for flow adjustment.

VP1000 valve allows to adjust the flow rate also in case of partial load of the system and it always ensures a stable adjustment of the supply connected to it. The differential pressure regulator corrects any differential pressure variation. This leads to a considerable reduction in temperature variations and adjustment movements and to the extension of the life of the moving devices connected to it.

VP1000 valves offer a remarkable adjustment flexibility. In combination with Johnson controls actuators they can be set to a specific flow rate value and they allow precise modulating control. The valves always guarantee a suitable flow rate, therefore avoiding too high energy consumption.

Since VP1000 valve performs the functions of two valves (balancing and adjustment), the installation costs are considerably reduced. The automatic flow rate limitation eliminates system adjustment costs. Since adjustment is very easy to perform, design flow rates can be modified at any time and at low costs.

Since it is not necessary to adjust the valve after its installation, the valve can work immediately after it has been assembled, for example, on the floors where works are already finished.

In order to adjust the flow rate, just set the selected value using the adjustment knob.

Since flow rate is the only parameter to be considered, choosing the suitable valve is easy and fast. VP1000 valve maximum adjustment matches the maximum flow rate allowed by the pipe size, on the basis of the values established by international standards.

Features

▶ K_{VS} calculation in not necessary
▶ Valve authority calculation is not required
▶ Specific devices or knowledge are not necessary
▶ Compact design that allows installing the valve also in small spaces such as fan-coils or narrow supply spaces
▶ Flow rate adjustment without disassembling the actuators

VP1000 Ball Valve

VP1000 Valve

Ordering codes

VP1 | 0 | x | x | xx

AA	= 150 l/h (DN15)
AE	= 600 l/h (DN15)
AG	= 780 l/h (DN15)
AJ	= 1000 l/h (DN20)
AN	= 1500 l/h (DN20)
AU	= 2200 l/h (DN25)
AW	= 2700 l/h (DN25 or DN32)
AY	= 3000 l/h (DN32)
BB	= 6000 l/h (DN40)
BC	= 9000 l/h (DN40)
BD	= 11000 l/h (DN40) or 12000 l/h (DN50)
BF	= 18000 l/h (DN50)

A	= ½"
B	= ¾"
C	= 1"
D	= 1" ¼
E	= 1" ½
F	= 2"
G	= 2" ½

0	= Pressure port Included*
1	= No pressure port Included*

0	= Thread BSPP

Note
* On the DN50 Ball Valve, the pressure port are always included despite the Codes VP101xxx

Pressure independent valves

VP1000

Dimensions in mm

DN15 - DN20

Size	A	B	C	D	E
DN15	47	115	25	99	120
DN20				108	

Size	A	B	C	D	E
DN15	80	166	25	99	130
DN20				108	

Pressure independent valves

Size	A	B	C	D	E
DN15	75	143	25	99	127
DN20				108	

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Pressure independent valves

Dimensions in mm

DN25 – DN32

Size	A	B	C	D *
DN25	47	152	38	134
DN32				

* Dimensional data without fittings

Size	A	B	C	D *
DN25	80	193	38	134
DN32				

* Dimensional data without fittings

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Johnson Controls

Pressure independent valves

Dimensions in mm

DN40 – DN50

Codes	Size	A	B	C	D	E
VP101DBB	DN40	230	89	180	156	23.6
VP101EBB	DN40	230	89	180	156	23.6
VP101EBC	DN40	230	89	180	156	23.6
VP101EBD	DN40	230	89	180	156	23.6
VP101FBD	DN50	264	97	221	198	28
VP101FBF	DN50	264	97	221	198	28

Code	Size	A	B	C	D	E	F	G ISO-228
VP101GBF	DN50	202	97	221	198	19	114	G 2.1/2"

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Pressure independent valves

Axial models - Techinical specifications

DN15 - DN20

	VP10xAAA	VP10xAAE	VP10xAAG	VP10xBAJ	VP10xBAN
Flow rate max.	150 l/h - 0,042 l/s	600 l/h - 0,167 l/s	780 l/h - 0,217 l/s	1000 l/h - 0,278 l/s	1500 l/h - 0,417 l/s
Accuracy 0 ÷ 1 bar	± 5%				
Start-up max.	20 kPa - 0,20 bar			25 kPa - 0,25 bar	
ΔP max.	600 kPa - 6 bar				
Leakage	Class IV IEC 60534-4				
Temperature	-10 ÷ 120 °C				
Working pressure max.	2500 kPa - 25 Bar				
Fittings	Female BSPP Rp ½" EN 10226-1			Female BSPP Rp ¾" EN 10226-1	

DN25 - DN32

	VP100CAU	VP100CAW	VP100DAW	VP100DAY
Flow rate max.	2200 l/h - 0,611 l/s	2700 l/h - 0,750 l/s		3000 l/h - 0,833 l/s
Accuracy 0 ÷ 1 bar	± 5%			
Start-up max.	25 kPa - 0,25 bar			
ΔP max.	600 kPa - 6 bar			
Leakage	0,01% of flow rate			
Temperature	-10 ÷ 120 °C			
Working pressure max.	2500 kPa - 25 Bar			
Fittings	Female BSPP Rc 1" EN 10226-1		Female BSPP Rc 1 ¼" EN 10226-1	

Assembly codes

Following actuators are available

VA-707x ON/OFF thermal *;

VA-709x thermal 0...10 VDC *;

VA-748x floating and proportional electric.

Note
* VA-707x and VA-709x are suitable for valves DN15 and DN20 only

Pressure independent valves

Ball models - Technical specifications

DN40 - DN50

	VP101DBB	VP101EBB	VP101EBC	VP101EBD	VP101FBD	VP101FBF	VP101GBF
Flow Rate max.	6000 l/h – 1,667 l/s		9000 l/h – 2,5 l/s	11000 l/h – 3,056 l/s	12000 l/h – 3,33 l/s	18000 l/h – 5,00 l/s	
Accuracy 0 ÷ 1 bar	± 5%						
Start-up max.	30 kPa – 0,30 bar		25 kPa – 0,25 bar	30 kPa – 0,30 bar		35 kPa – 0,35 bar	
ΔP max.	600 kPa – 6 bar						
Leakage	Class VI IEC 60534-4						
Temperature	–10 ÷ 120 °C						
Working Pressure max.	1600 kPa – 16 bar						
Fittings	Rc 1 ¼" union female EN 10226-1	Rc 1 ½" union female EN 10226-1		Rc 2" union female EN 10226-1			Rc 2 ½" male EN 10226-1

Assembly codes

Codes	Description
+5A8GGA *	M9108-GGA-5, 8 Nm Non Spring Return Actuator, 24 V AC/DC, Proportional Control
+5A8GGC *	M9108-GGA-5, 8 Nm Non Spring Return Actuator, 24 V AC/DC, Proportional Control, two auxiliary switches
+538GGA	VA9208-GGA-1, 8 Nm Spring Return Actuator, 24 V AC/DC, Proportional Control, assembled in Spring Open Valve configuration.
+538GGC	VA9208-GGA-1, 8 Nm Spring Return Actuator, 24 V AC/DC, Proportional Control, two auxiliary switches, assembled in Spring Open Valve configuration.
+558GGA	VA9208-GGA-1, 8 Nm Spring Return Actuator, 24 V AC/DC, Proportional Control, assembled in Spring Close Valve configuration.
+558GGC	VA9208-GGA-1, 8 Nm Spring Return Actuator, 24 V AC/DC, Proportional Control, two auxiliary switches, assembled in Spring Close Valve configuration.

Note
* The M9000-525-5 linkage is part of the assembly.

Pressure independent valves

VPA

DN50...150, PN16

VPA pressure independent control valve is a combination of a differential pressure regulator and a regulating valve for flow adjustment.

VPA valves offer a remarkable adjustment flexibility. In combination with VAP actuators they can be set to a specific flow rate value and they allow precise modulating control. The valves always guarantee a suitable flow rate, therefore avoiding too high energy consumption.

Since VPA valve performs the functions of two valves (balancing and adjustment), the installation costs are considerably reduced.
The automatic flow rate limitation eliminates system adjustment costs. Since adjustment is very easy to perform, design flow rates can be modified at any time and at low costs.

Features

▶ The max. flow of VPA valve could be set according to the requirement. The flow can be set easily by the actuator potentiometer.

▶ The built-in balancing tube has more compact structure and can avoid damages during shipping and installation compared to the external tube.

▶ Valve body is made of ductile iron material, with anticorrosion treatment on the surface

▶ High close-off pressure with very low leakage rate

▶ Linear actuator with high control accuracy provides the equal percentage flow curve

Dimensions in mm

DN	B	D	D2	D4	K	L1	L2	L3	H1	H	Weight (kg)
50	20	Ø 165	4 - Ø 18	Ø 99	Ø 125	230	115	136	95	461	19
65	20	Ø 185	4 - Ø 18	Ø 118	Ø 145	290	145	155	115	500	28
80	20	Ø 200	8 - Ø 18	Ø 132	Ø 160	310	155	167	148	698	36
100	22	Ø 220	8 - Ø 18	Ø 156	Ø 180	350	181	181	150	710	54
125	22	Ø 250	8 - Ø 18	Ø1 84	Ø 210	400	200	197	158	745	68
150	24	Ø 285	8 - Ø 22	Ø 211	Ø 240	480	240	222	198	810	89

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Pressure independent valves

Ordering information

Valves	DN (mm)	in.	PN	Closing pressure (bar)	Flow rate			Stroke (mm)	Actuators	ΔP Range (kPa)
					m³/h	l/s	GPM			
VPA050-C	50	2″	16	16	13	3.64	57	20	VAP1000-24-C	35~400
VPA065-C	65	2-½″	16	16	21	5.8	92	20	VAP1000-24-C	35~400
VPA080-C	80	3″	16	16	28	7.8	123	40	VAP3000-24-C	35~400
VPA100-C	100	4″	16	16	50	13.9	219	40	VAP3000-24-C	35~400
VPA125-C	125	5″	16	16	90	25.0	396	40	VAP3000-24-C	35~400
VPA150-C	150	6″	16	16	145	40.3	638	40	VAP3000-24-C	35~400

Note
Valve closes when valve stem retracts.

Terminal unit valve actuators

VA-708x

Thermal ON/OFF control

The VA-708x terminal unit valve actuators series provide ON/OFF and DAT control in HAVC application.

The compact design of these actuators make them suitable for installations in confined spaces, such as fan-coil applications.

The VA-708x actuators are designed for field mounting onto all Johnson Controls terminal unit valves: VG3000, VP1000 (see pertinent product bulletins).

Features

▶ 24 VAC/DC and 230 VAC power supply
▶ ON/OFF or DAT controls
▶ NC version (stem retracts when energized)
▶ NO version (stem extends when energized)
▶ Easy mounting solution
▶ Factory mounted cable 1,5 m
▶ Models with auxiliary switch

Dimensions in mm

52.2 mm
47.5 mm
44.1 mm
7.0 mm
50.3 mm

VA-708x actuator

52.2 mm
48.4 mm
44.3 mm
7.0 mm
50.3 mm

VA-7088-2xC actuator

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Terminal unit valve actuators

VA-708x

Ordering information

Codes	Supply voltage	Action control	Force	Stroke	Factory setting	Mounting thread	Protection class	Packaging	Power consumption		Auxiliary Switches
									Continuous	Start-up	
VA-7081-21	24 VAC/VDC	ON/OFF or DAT	100 N	5.0 mm	**Normally closed** (stem retracts when energized) 2 m cable lenght	M28x1.5	IP54	Single packaged in carton box	1 W	<300 mA during max 2 min.	---
VA-7088-21						M30x1.5					
VA-7081-23	230 VAC					M28x1.5				<550 mA during 100 ms. max	
VA-7088-23						M30x1.5					
VA-7080-21	24 VAC/VDC				**Normally open** (stem extends when energized) 2 m cable lenght	M28x1.5				<300 mA during max 2 min.	
VA-7087-21						M30x1.5					
VA-7080-23	230 VAC					M28x1.5				<550 mA during 100 ms. max	
VA-7087-23						M30x1.5					
VA-7088-21C	24 VAC/VDC				**Normally closed** (stem retracts when energized) 2 m cable lenght	M30x1.5				<300 mA during max 2 min.	•
VA-7088-23C	230 VAC									<550 mA during 100 ms. max	•

Accessories (order separately)

Codes	Description
VA50	Adapter for VG6000
VA64	Adapter for VP1000

Spare parts

Codes	Description
VA80	Standard Adapter M30 x 1.5 for VG3000 and V5000, included in the product package
VA53H	Standard Adapter M28 x 1.5 for VG5000 and VG4000, included in the product package

Adapter selection guide for Johnson Controls valves

Valve	Actuator	Adapter	Note
VG3000	VA-7087-2x	---	Included in the actuator packaging
	VA-7088-2x	---	Included in the actuator packaging
V5000	VA-7087-2x	---	Included in the actuator packaging
	VA-7088-2x	---	Included in the actuator packaging
VG6000	VA-7087-2x	VA50	To be ordered separately
	VA-7088-2x	VA50	To be ordered separately
VP1000	VA-7087-2x	VA64	To be ordered separately
	VA-7088-2x	VA64	To be ordered separately
VG5000	VA-7080-2x	---	Included in the actuator packaging
	VA-7081-2x	---	Included in the actuator packaging
VG4000	VA-7080-2x	---	Included in the actuator packaging
	VA-7081-2x	---	Included in the actuator packaging

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Terminal unit valve actuators

VA-7090

Thermal 0...10 V control

The VA-709x series terminal unit valve actuators provides proportional control in HAVC application.

The compact design of these actuators make them suitable for installations in confined spaces, such as fan-coil applications.

The VA-709x actuators are designed for field mounting onto all Johnson Controls terminal unit valves: VG6000, V5000, VP1000 *(see pertinent bulletins).*

Moreover, thanks to an innovative fixing system, the VA-709x is suitable for almost all the terminal unit valves in the market.

Features

▶ 24 VAC power supply
▶ 0...10 V control signal
▶ NC version (stem retracts when energised)
▶ NO version (stem extends when energized)
▶ Easy mounting solution
▶ Factory mounted cable 2 m

Dimensions in mm

	h (max)	h (min)
Normally closed	66	59
Normally open	64	59

Ordering information

Codes	Supply voltage	Action control	Force	Stroke (mm)	Factory setting	Mounting thread	Protection class	Packaging	Power consumption	
									Continuous	Start-up
VA-7090-21	24 VAC	0...10 V	125 N	4.5	Normally open	M28x1.5	IP54	Single packaged in carton box	2 W	250 mA
VA-7091-21					Normally closed					
VA-7097-21					Normally open	M30x1.5				
VA-7098-21					Normally closed					

Accessories (order separately)

Codes	Description	Packaging
0550390001	Elevated Bayonet Nut M30x1.5 with normal and short insert	
0550390101	Elevated Bayonet Nut M28x1.5 with normal and short insert	Single packaged in Plastic Bag
0550390201	Elevated Bayonet Nut M30x1 with normal and short insert	

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Terminal unit valves actuators

VA-7480

Motorized floating and proportional control

The VA-748x series provides floating or proportional control in HVAC applications. The compact design of this actuator makes it suitable for installation in confined spaces, such as fan coil, chilled ceiling, manifolds, etc.
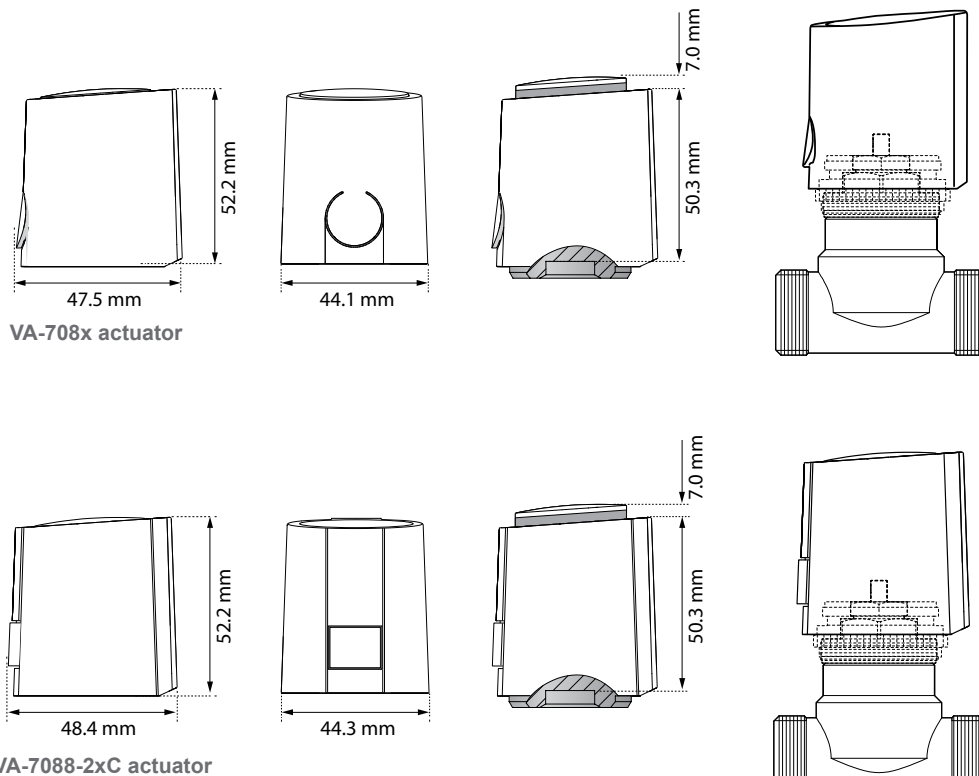
The VA-748x series actuator is designed for field mounting onto VG6000, V5000 and VP1000 terminal unit valves *(see pertinent bulletin)*.

Due to the innovative concept of different strokes setting the VA-748x can be installed over most of the terminal unit valve in the market.

Features

▶ 24 VAC/VDC and 230 VAC power supply
▶ Floating and proportional control
▶ Threaded nut M28x1.5 and M30x1.5
▶ Auto stroke detection
▶ Configurable stroke
▶ Configurable to direct and reverse action
▶ Configurable analog inputs
▶ Max mechanical stroke 6.3 mm

Dimensions in mm

Ordering information

Codes	Control type	Power supply	Running time	Nominal force	Factory stroke configuration	Cable length	Mounting thread nut	Upper mechanical end Stroke
VA-7480-0011	Floating	24 VAC	13 sec/mm	120 N	---	1.5 m (PVC)	M28x1.5	16.3
VA-7481-0011			8 sec/mm					
VA-7480-0001			13 sec/mm				M30x1,5	
VA-7481-0001			8 sec/mm					
VA-7480-4001			13 sec/mm					14.5
VA-7480-4003		230 VAC	13 sec/mm					
VA-7480-0013			13 sec/mm				M28x1.5	16.3
VA-7481-0013			8 sec/mm					
VA-7480-0003			13 sec/mm				M30x1,5	
VA-7481-0003			8 sec/mm					
VA-7482-0011	Proportional	24 VAC/VDC	8 sec/mm				M28x1.5	
VA-7482-1001					3.2 mm		M30x1,5	
VA-7482-2001					4.3 mm			
VA-7482-3001					6.0 mm			
VA-7482-5001					2.8 mm			14.5
VA-7482-6001					5.3 mm			
VA-7482-7001					5.8 mm			
VA-7482-8201				160 N	Auto stroke detection	2 m (Halogen Free)		16.3
VA-7482-9201								14.5

Note
Models available with special cable lenght and reverse action factory set (Please refere to the Product Bulletin)

Non spring return plant valve actuators

VA-7150

Floating and proportional control

The VA-7150 series synchronous motor driven actuator provides floating or proportional control of valves with up to 19 mm stroke in heating, ventilation and air conditioning applications.

This compact, non-spring return actuator has 500 N nominal thrust and responds to a variety of input signals. The VA-7150 series can be easily installed on site or ordered pre-fitted to VG7000, VGS800 and VG9000 flanged valve series in accordance with the specified maximum close-off pressure ratings.

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

Dimensions in mm

Ordering information

Codes	Supply voltage (50/60 Hz)	Action control	Protection class	Coupler type
VA-7150-1001	24 VAC	Floating	IP40	Threaded
VA-7150-1003	230 VAC			
VA-7150-8201	24 VAC			Slotted
VA-7150-8203	230 VAC			
VA-7152-1001	24 VAC	Proportional 0...10 V		Threaded
VA-7152-8201				Slotted

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Non spring return plant valve actuators

VA-7200

Floating and proportional control

The VA-720x series synchronous motor driven actuator provides floating or proportional control of valves, with up to 19 mm 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, VG9000 and VGS800 Series valves in accordance with the specified maximum close-off pressure ratings.

Features

▶ 1000N force output compact unit
▶ Magnetic clutch
▶ Signal fail "safe position"

Dimensions in mm

Ordering information

Codes	Supply voltage (50/60 Hz)	Control		Motor rating	Protection class
For VG7000 series valves					
VA-7200-1001	24 VAC	Floating		5 W	IP42
VA-7202-1001		Proportional 0...10 VDC / 0(4)...20 mA			
For VG8000 / VG9000 / VGS8000					
VA-7200-8201	24 VAC	Floating		5 W	IP42
VA-7202-8201		Proportional 0...10 VDC / 0(4)...20 mA			

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Johnson
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HVAC control products
Actuators

Non spring return plant valve actuators

VA-7700

Floating and proportional control

The VA-7700 series provides floating and proportional control
and can be mounted onto VG7000, VGS800 and VG9000 valves.

Features

▶ 24 VAC and 230 VAC power supply
▶ Floating and proportional control
▶ Manual override
▶ LED operating status display
▶ Self calibrating
▶ IP54 enclosive protection

2x M20
Ø 6...12 mm
131
87
91
150
167
152
159

Dimensions in mm

Ordering information

Mounting onto VG7000 series valves

Codes	Supply voltage (50/60Hz)	Action control	Force	Stroke	Full stroke time	Protection class	Power consumption
VA-7700-1001	24 VAC	Floating	500 N	20 mm	190 s	IP54	2.4 VA
VA-7700-1003	230 VAC						
VA-7740-1001	24 VAC						
VA-7740-1003	230 VAC						
VA-7706-1001	24 VAC	Proportional					4.4 VA
VA-7746-1001							

Mounting onto VGS8000 and VG9000 series valves

Codes	Supply voltage (50/60Hz)	Action control	Force	Stroke	Full stroke time	Protection class	Power consumption
VA-7700-8201	24 VAC	Floating	500 N	20 mm	190 s	IP 54	2.4 VA
VA-7700-8203	230 VAC						
VA-7740-8201	24 VAC						
VA-7740-8203	230 VAC						
VA-7706-8201	24 VAC	Proportional					4.4 VA
VA-7746-8201							

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HVAC control products
Actuators

Non spring return plant valve actuators

VA7810

Floating and proportional control

The VA7810 non spring return actuator with 1000 N thrust for valves in heating, ventilation and air conditioning applications is available for floating or proportional control.
All models have manual override as standard and provide stroke capabilities of 7 mm to 25 mm. Proportional models are self-calibrating.

The actuator is intended for use with Johnson Controls VG7000 and VGS800 threaded valves as well as VG9000, VG8000 and VG8300 flanged valves. All valves should be fitted in accordance with the maximum close-off pressure ratings specified.

Valve-actuators can be ordered as separate units or as a factory fitted valve / actuator combinations.

Features
▶ Proportional actuators are self calibrating
▶ All models can also be used as floating and ON/OFF actuators
▶ Force controlled motor shut-off
▶ Manual override as standard
▶ IP54 enclosure protection
▶ Delivered with fitted 1.5 m cable and wire terminals
▶ Status LED
▶ Models with optional aux. switches or 2 kΩ feedback potentiometer
▶ Control-Signal failure - stem to pre-determined position
▶ Stroke position indicator

Dimensions in mm

Ordering information

Mounting onto VG7000 series valves

Codes	Supply voltage (50/60Hz)	Action control	Force	Stroke	Full stroke time	Protection class	Power consumption	Spring return action	Accessories factory mounted
VA-7810-ADA-xx	230 VAC	ON/OFF or floating	1000 N	25 mm	150 s	IP54	8 VA	---	---
VA-7810-ADC-xx									2 aux switches
VA-7810-AGA-xx	24 VAC						3 VA		---
VA-7810-AGC-xx									2 aux switches
VA-7810-AGH-xx									2 KΩ pot
VA-7810-GGA-xx		ON/OFF, floating or proportional			150 s (selectable 75 s)		6 VA		---
VA-7810-GGC-xx									2 aux switches

Note
* : xx = 11 Actuator with threaded coupler for VG7000 Valves
12 Actuator with clamp coupler for VG8000, VG9000, VGS800 Valves

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Johnson
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HVAC control products
Actuators

Non spring return plant valve actuators

VA1000

Floating and proportional control

The VA1000 valve actuators are used to control valves in HVAC systems. They are of modular construction so that the required type of control signal is achieved simply by fitting a module with the required function in-situ. It can be mounted onto VG8000, VG8300 and VG9000 series valves.

Features

▶ 24 VAC and 230 VAC power supply
▶ Floating and proportional control
▶ Manual override
▶ Automatic stem coupling
▶ Actuator fixed to valve with one ring nut
▶ Self adjusting, automatic stroke adjustment, calibrated pressure control at the end positions
▶ 2 aux. switches, feedback potentiometer and split range unit available
▶ IP66
▶ Selectable characteristic curve
▶ Selectable running time

Dimensions in mm

	VA1125-GGA-1	VA1220-GGA-1 & VA1420-GGA-1
H1	60	73

Ordering information

Codes	24 V actuators	Power consumption	Protection class	Nominal stroke
VA1125-GGA-1	2500N; Non-spring return	20.5 VA	IP66	49 mm

Accessories modules for on site installation

Codes	Description
VA1000-M230N	AC 230 V module
VA1000-M100N	AC 100 V module
VA1000-P2	2 KΩ feedback potentiometer
VA1000-S2	2 SPDT aux. switches
VA1000-SRU	Split range unit module for proportional actuators only
VA1000-EP	Extension kit for applications with temperatures greater than 140 °C up to 200 °C

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Non spring return plant valve actuators

FA-3000
Floating and proportional control

The FA-3300 heavy duty series provides floating or proportional control
and can be mounted with VG8000 flanged valves.

Features

▶ 24 VAC and 230 VAC power supply
▶ Floating and proportional control
▶ Manual override
▶ Special clamp coupler
▶ Uses synchronous motor with calibrated pressure limit switches

Dimensions in mm

Ordering information

Codes	Supply voltage (50/60Hz)	Action control	Force	Stroke	Full stroke time	Protection class	Power consumption	Accessories factory mounted
FA-3300-7416	24 VAC	Floating	6000 N	42 mm (max 45)	150 s	IP65	37 VA	---
FA-3303-7416								2 aux switches and 2 KΩ pot
FA-3304-7416								135 Ω pot
FA-3341-7416		Proportional					42 VA	2 aux switches
FA-3300-7411	230 VAC	Floating					37 VA	---
FA-3303-7411								2 aux switches and 2 KΩ pot
FA-3304-7411								135 Ω pot

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Non spring return plant valve actuators

RA-3000

Floating and proportional control

The RA-3000 series synchronous motor-driven reversible actuators are available for 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 2kOhm feedback potentiometer, auxiliary switches and hand crank are available.

Features

▶ Uses synchronous motor with pressure switches
▶ Special clamp coupler quick-fit systems
▶ 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

Dimensions in mm

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

Ordering information

Codes *	Hand crank **	Actuator force	Supply voltage	Nominal stroke	Protection class
RA-30xx-7126	---	1600 N	24 V, 50/60 Hz	13 mm	
RA-31xx-7126	•				
RA-30xx-7127	---		230 V, 50/60 Hz		
RA-31xx-7127	•				
RA-30xx-7226	---	1800 N	24 V, 50/60 Hz	25 mm	
RA-31xx-7226	•				
RA-30xx-7227	---		230 V, 50/60 Hz		
RA-31xx-7227	•				IP54
RA-30xx-7325	---	3000 N	24 V, 60 Hz	42 mm	
RA-31xx-7325	•				
RA-30xx-7326	---		24 V, 50 Hz		
RA-31xx-7326	•				
RA-30xx-7327	---		230 V, 50 Hz		
RA-31xx-7327	•				
RA-30xx-7328	---		230 V, 60 Hz		
RA-31xx-7328	•				

Note
* : xx = 00 None
03 2 auxiliary switches and 2 KW feedback potentiometer
05 2 auxiliary switches and 135 Ω feedback potentiometer
41 Built-in positioner 0...10 VDC and 2 auxiliary switches (only 24 VAC models)

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Non spring return plant valve actuators

VA9104-xGA-1S
(Joventa BAD1.4 / BAD1 / BMD1.2)

*4 Nm, ON/OFF, floating and proportional control
Rotary actuators for ball valves*

The electric actuator series have been developed for operation of ball valves.

These synchronous, motor driven actuators are used to provide accurate positioning on VG1000 series DN15, DN20 and DN25 ball valves.

Features

▶ ON/OFF, floating with timeout and proportional control
▶ Load-independent runnin time
▶ Up to 5 actuators in parallel operation possible
▶ Manual release button
▶ 1.2 m PVC cable
▶ Selectable direction of rotation
▶ Automathic shut-off at end position

Minimum Clearance Required
89

Two-way valve   Three-way valve   Two-way valve   Three-way valve

Dimensions in mm

Valve size (DN)	A	B	C	D	E	F	G
DN15	98	17	31	129	64	9	32
DN20	98	17	31	133	71	9	36
DN25	100	19	33	141	87	9	43

Ordering information

Codes		Running time	Control signals	Supply voltage (50/60Hz)
Johnson Controls	Joventa			
VA9104-AGA-1S	BAD1.4	72 s	Floating without timeout	24 VAC
VA9104-IGA-1S	BAD1	72 s	ON/OFF and floating with timeout	24 VAC
VA9104-IUA-1S	BAD2	72 s	ON/OFF and floating with timeout	AC 100 to 240 V
VA9104-GGA-1S	BMD1.2	72 s	Proportional 0(2)...10 VDC 0(4)...20 mA	24 VAC

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Non spring return plant valve actuators

VA9300

(Joventa BMS1.10 / BAS2.10 / BASx.08x)

*8 and 10 Nm, ON/OFF, floating and proportional control
Rotary actuators for ball valves*

The VA9300 Series Electric Non Spring Return Actuators are used to provide accurate positioning on Johnson Controls® VG1000 Series DN15 up to DN50 ball valves in Heating, Ventilating and Air Conditioning (HVAC) applications.

Features

▶ Universal model: On/Off, floating and proportional
▶ High speed actuator model
▶ Optional Auxiliary Switch & potentiometer feedback
▶ Direct-Coupled Design
▶ Rugged IP54 Rated Enclosure
▶ Electronic stall detection
▶ Microprocessor-controlled Brushless DC Motor

89
80
115

Optional thermal barrier

163

Dimensions in mm

Manufacturer reserves the right to change specifications without prior notice

Non spring return plant valve actuators

VA9300
(Joventa BMS1.10 / BAS2.10 / BASx.08x)

Ordering information

Codes		Running time	Control signals	Supply voltage (50/60Hz)
Johnson Controls	Joventa			
VA9310-HGA-1	BMS1.10	35 s	ON/OFF, Floating and Proportional	24 VAC/DC
VA9310-AUA-1	BAS2.10	35 S	ON/OFF and Floating	85 to 264 VAC
VA9308-AGA-1Z	BAS1.08Z	8 s	ON/OFF and Floating	24 VAC/DC
VA9308-AUA-1Z	BAS2.08Z	8 s	ON/OFF and Floating	85 to 264 VAC

Accessories (order separately)

Codes	Description
M9300-1	Auxiliary switch kit (Single pole, double-throw)
M9300-2	Auxiliary switch kit (Two single pole, double-throw)
M9300-140	Feedback potentiometer 140 ohms
M9300-1k	Feedback potentiometer 1k ohms
M9300-2k	Feedback potentiometer 2k ohms
M9300-10k	Feedback potentiometer 10k ohms
M9000-200	Commissioning tool that provides a control signal to drive 24 V ON/OFF, floating, proportional and resistive electric actuators (quantity 1)
M9000-342	Weather shield kit for VG1000 series ball application of VA9104, VA9310, VA9203 and VA9208 series electric Non spring return actuators (quantity 1)
M9000-561	Thermal barrier kit. Extends the VA9104, VA9310, VA9203 and VA9208 series electric Non spring return actuators applications to include low pressure steam (quantity 1)
M9300-100	Threaded conduit adapters for 1/2 in. electrician's fittings

European product catalogue 2017

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Rotary actuators for butterfly valves

VA-9070

68 – 2430 Nm, ON/OFF, floating and proportional control
Rotary actuators for butterfly valves

The actuator is specially developed for use with VFB butterfly valves in the HVAC industry.

These bidirectional actuators are direct mounted on VFB valves without any linkage. A single VA-9070 provides 68, 226, 565, 735, 1470 and 2034 Nm torque depending on the model.
With a power supply of 24 VAC or 230 VAC the actuators can be controlled in ON/OFF, floating or proportional configuration.
Two isolated auxiliary switches and an electrical heater are standard in these series. The protection class is IP65 to ensure a dust-proof and shower-proof from all angles.

An hand operation is standard. When hand operation is active, a yellow ring is displayed and the actuator motor is not operative. the position indicator is clearly recognizable all around.

The opening and closing speed is independently adjustable in the proportional application.

Features

▶ Exact positioning ensures precise flow control
▶ Complete opening and closing from 100% to 0
▶ Range from 68 Nm to 2034 Nm
▶ Self-regulating heater as standard
▶ Construction optimized for operation with butterfly valves.
▶ Two isolated auxiliary switches as standard

Key codes

VA-907 x - x x

	Controls
3	= Modulating control
4	= ON/OFF and floating control
	Power supply
1	= 24 VAC
2	= 230 VAC
	Torque
2	= 68 Nm actuators
5	= 226 Nm actuators
7	= 565 Nm actuators
8	= 735 Nm actuators
A	= 1470 Nm actuators
B	= 2034 Nm actuators

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Rotary actuators for butterfly valves

Dimensions in mm

Valves with VA-9072 / VA-9075 / VA-9077 / VA-9078 actuators

Actuator model	F	G	H	J	S	T	R	U	Top flange
VA-9072	130	191	142	48	---	---	---	---	F07
VA-9075	165	257	198	64	---	---	---	---	F07/F12

Valves with VA-907A / VA-907B actuators

Actuator model	F	G	H	J	S	T	R	U	Top flange
VA-9077 / VA-9078	183	307	241	74	---	---	---	---	F12/F16
VA-907A / VA-907B	317	307	241	206	155	323	305	203	F12/F16

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Non spring return plant valve actuators

VAP1000 - VAP3000

VAP linear actuators
for VPA pressure independent flanged valves

The VAP actuators have been specifically designed to drive the VPA pressure independent valve.

They provide 1000N or 3000N according with the valve dimensions. The actuators are used to control the valve and to set the maximum desired flow.

Features

▶ Linear actuator with high control accuracy provides the equal percentage flow curve

▶ Actuator has manual function that allows for manual positioning of the valve

▶ The potentiometer on the actuator is use to set the maximun flow of the VPA Valve

▶ They provide 1000N or 3000N according with the valve dimensions.

▶ In the VAP300-24-C model, a led display gives several function information

▶ 0-10 VDC or 4-20 mA setpoint and feedback

VAP1000-24-C

VAP3000-24-C

Dimensions in mm

Ordering information

Actuator model	Force	Power supply	Control signal	Manual override	Running speed	Weight (kg)
VAP1000-24-C	1000N	24 VAC	0(2) ~ 10 V,0(4)~20 mA	●	3.85s / mm (50Hz)	1.7
VAP3000-24-C	3000N	24 VAC	0(2) ~ 10 V,0(4)~20 mA	●	3.2s / mm (50Hz)	5.2

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Spring return plant valve actuators

VA7820 - VA7830

Floating and proportional control

The VA78x0 spring return actuator with 1000 N thrust for valves
in heating, ventilation and air conditioning applications is available
for floating or proportional control.
All models have manual override as standard and provide stroke
capabilities of 7 mm to 25 mm.
Proportional models are self-calibrating.

The actuator is intended for use with Johnson Controls VG7000
and VGS800 threaded valves as well as VG9000, VG8000 and VG8300
flanged valves. All valves should be fitted in accordance
with the maximum close-off pressure ratings specified.
Valve-actuators can be ordered as separate units or as a factory
fitted valve / actuator combinations.

Features

▶ Proportional actuators are self calibrating
▶ All models can also be used as floating and ON/OFF actuators
▶ Force controlled motor shut-off
▶ Manual override as standard
▶ IP54 enclosure protection
▶ Delivered with fitted 1.5 m cable and wire terminals
▶ Status LED
▶ Control-Signal failure - stem to pre-determined position
▶ Stroke position indicator
▶ Spring return functions

150 min.

212

231

115

Dimensions in mm

Ordering information

Codes	Supply voltage (50/60Hz)	Action control	Force	Stroke	Full stroke time	Protection class	Power consumption	Spring return action	Accessories factory mounted
VA7820-GGA-xx	24 VAC	ON/OFF, Floating or Proportional	1000 N	25 mm	150 s (selectable 75 s)	IP54	11 VA	Actuator stem retracts	---
VA7820-GGC-xx									2 aux switches
VA7830-GGA-xx								Actuator stem extend	---
VA7830-GGC-xx									2 aux switches

Note
* : xx = 11 Actuator with threaded coupler for VG7000 valves
12 Actuator with clamp coupler for VG8000, VG9000, VGS800 Valves

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Spring return plant valve actuators

VA1000

Floating and proportional control

The VA1000 valve actuators are used to control valves in HVAC systems. They are of modular construction so that the required type of control signal is achieved simply by fitting a module with the required function in-situ.

It can be mounted onto VG8000, VG8300 and VG9000 series valves.

Features

▶ 24 VAC and 230 VAC power supply
▶ Floating and proportional control
▶ Manual override
▶ Automatic stem coupling
▶ Actuator fixed to valve with one ring nut
▶ Self adjusting, automatic stroke adjustment, calibrated pressure control at the end positions
▶ 2 aux. switches, feedback potentiometer and split range unit available
▶ IP66
▶ Selectable characteristic curve
▶ Selectable running time

Dimensions in mm

	VA1125-GGA-1	VA1220-GGA-1 & VA1420-GGA-1
H1	60	73

Ordering information

Codes	24 V actuators	Power consumption	Protection class	Nominal stroke
VA1220-GGA-1	2000N; Spring return retracts	17 VA	IP66	49 mm
VA1420-GGA-1	2000N; Spring return extends			

Accessories modules for in-situ installation

Codes	Description
VA1000-M230N	AC 230 V module
VA1000-M100N	AC 100 V module
VA1000-P2	2 KΩ feedback potentiometer
VA1000-S2	2 SPDT aux. switches
VA1000-SRU	Split range unit module for proportional actuators only
VA1000-EP	Extension kit for applications with temperatures greater than 140°C up to 200°C

Spring return plant valve actuators

FA-2000

Floating and proportional control

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 (H, N, V) series 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 mechanism (spring return)
▶ Visible calibration ring on stem coupling
▶ Positioner with adjustable starting point, span and direct/reverse action
▶ Electrically operated manual override
▶ Quick-fit coupling clamp

FA-22, FA-25

162
541 with positioner 586
Ø 120
Ø 54
Ø 120

FA-23, FA-24, FA-26, FA-27

162
Ø 120
Ø 54
Ø 120

FA-23 / FA-26
575 with positioner 612

FA-24 / FA-27
511 with positioner 548

Dimensions in mm

Ordering information

Codes *	Supply Voltage (50 Hz)	Action control	Spring return function	Nominal thrust	Nominal stroke	Protection class	Power consumption	Emergency shut of speed
FA-22xx-7516	24 VAC	Floating and Proportional	Stem fully extended	2.4 kN	25 mm	IP54	6.1 VA	≤ 81
FA-25xx-7516			Stem fully retracted					
FA-23xx-7416			Stem fully extended	2.2 kN	42 mm			≤ 201
FA-26xx-7416			Stem fully retracted					
FA-24xx-7116			Stem fully extended	2 kN	13 mm			≤ 51
FA-27xx-7116			Stem fully retracted					

Note
* **xx = 00** None
   01 2 Auxiliary switches
   02 2 KΩ feedback potentiometer
   03 2 KΩ feedback potentiometer and 2 auxiliary switches

04 135 Ω feedback potentiometer
40 Built-in electronic positioner 0...10 V / 0(4)...20 mA
41 Built-in electronic positioner 0...10 V / 0(4)...20 mA and 2 auxiliary switches

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Rotary actuators for ball valves

VA9203
(Joventa BxFx.03SZ)

3 Nm, ON/OFF, floating and proportional control
Rotary actuators for ball valves

The VA9203 series electric spring return actuators are direct-mount actuators.

These bidirectional actuators are used to provide accurate positioning on Johnson Controls® VG1000 Series DN15 up to DN25 ball valves in Heating, Ventilating and Air Conditioning (HVAC) applications.

One Integral line voltage auxiliary switch, available only on the VA9203-xxB-1(Z) models, indicate end-stop position, or perform switching functions within the selected rotation range.

A graduated scale from 0% to 100% and a position indicator provide visual indication of the valve's opening.

When power fails during service, the mechanical spring return system open or close the valve ports.

The series includes the following control options:

ON/OFF, 24 V AC/DC, 100 to 240 VAC power

ON/OFF and floating point, 24 V AC/DC power

Proportional, 24 V AC/DC power, for 0(2) to 10 VDC or 0(4) to 20 mA control.

Features
▶ 3 Nm rated torque
▶ Mechanical spring return system
▶ Direct-coupled design
▶ Reversible mounting
▶ Rugged IP54 rated enclosure
▶ Electronic stall detection
▶ Double-insulated construction
▶ Microprocessor controlled brushless DC Motor (-AGx and -GGx models)
▶ External mode selection switch (-AGx and -GGx models)
▶ Integral cables with colored and numbered conductors
▶ Optional integrated auxiliary switch
▶ Override control (proportional models only)
▶ UL, CE, and C-Tick Compliance
▶ Manufacturing under International Standards Organization (ISO) 9001 Quality Control Standards.

VA9203 mounted on VG1000

89
Clearance required

82   73

Port marking locations

Dimensions in mm

Valve size mm (DN)	A	B	C	D	E	F	G
DN15	117	17	31	167	67	9	33
DN20	117	17	31	171	75	9	38
DN25	119	19	33	180	92	9	46

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Rotary actuators for ball valves

VA9203

(Joventa BxFx.03SZ)

Ordering information

Codes		Torque	Running time		Control signals	Supply voltage (50/60Hz)	1 Auxiliary Switch
Johnson Controls	Joventa		Motor	Spring			
VA9203-GGA-1Z	BMF1.03Z	3 Nm	90 s	12...17 s	Proportional	24 V AC/DC	---
VA9203-GGB-1Z	BMF1.03SZ						•
VA9203-AGA-1Z	BBF1.03Z				ON/OFF and Floating		---
VA9203-AGB-1Z	BBF1.03SZ						•
VA9203-BGA-1	BAF1.03		53...71 s	19...23 s	ON/OFF		---
VA9203-BGB-1	BAF1.03S						•
VA9203-BUA-1	BAF2.03					100 to 230 VAC	---
VA9203-BUB-1	BAF2.03S						•

Accessories (order separately)

Codes	Description
M9000-200	Commissioning tool that provides a control signal to drive 24 V ON/OFF, floating, proportional and/or resistive electric actuators
M9000-560	Ball valve linkage kit for applying M9203 and M9208 series actuators to VG1000 series valves (quantity 1)
M9000-561	Thermal barrier extends M(VA)9104, M(VA)9203 and M(VA)9208 series electric spring return actuator applications to include low pressure steam (quantity 1)
M9000-341	Weathershield kit for VG1000 series ball valve application of M(VA)9104, M(VA)9203 and M(VA)9208 series electric spring return actuators (quantity 1)
M9000-607	Position indicator for VG1000 series ball valve applications (quantity 5)

Rotary actuators for ball valves

VA9208
(Joventa BxFx.08S)

8 Nm, ON/OFF, floating and proportional control
Rotary actuators for ball valves

The VA9208 series electric spring return actuators are direct-mount actuators.

These bidirectional actuators are used to provide accurate positioning on Johnson Controls® VG1000 Series DN32 up to DN50 ball valves in Heating, Ventilating and Air Conditioning (HVAC) applications.

Two integral line voltage auxiliary switches are available only on the VA9208-xxC-1 models, indicate end-stop position, or perform switching functions within the selected rotation range.

A graduated scale from 0% to 100% and a position indicator provide visual indication of the valve's opening.

When power fails during service, the mechanical spring return system open or close the valve ports.

The series includes the following control options:

ON/OFF, 24 V AC/DC, 230 V AC power

ON/OFF and floating control, 24 V AC/DC power

Proportional, 24 V AC/DC power, for 0(2) to 10 VDC or 0(4) to 20 mA control

Features

▶ 8 Nm rated torque
▶ Mechanical spring return system
▶ Direct-coupled design
▶ Reversible mounting
▶ Rugged IP54 rated enclosure
▶ Electronic stall detection
▶ Double-insulated construction
▶ Microprocessor controlled brushless DC motor (-AGx and -GGx models)
▶ External mode selection switch (-AGx and -GGx models)
▶ Integral cables with colored and numbered conductors
▶ Optional integrated auxiliary switches
▶ UL, CE, and C-Tick Compliance
▶ Manufacturing under International Standards Organization (ISO) 9001 Quality Control Standards.

VA9208 mounted on VG1000

89
Clearance required

99   73

Port marking locations

Dimensions in mm

Valve size mm (DN)	A	B	C	D	E	F	G
DN32	195	26	44	184	109	9	54
DN40	200	29	48	189	119	9	59
DN50	204	37	53	195	139	9	74

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Rotary actuators for ball valves

VA9208
(Joventa BxFx.08S)

Ordering information

| Codes | | Torque | Running time | | Control signals | Supply voltage (50/60Hz) | 2 Auxiliary Switches |
Johnson Controls	Joventa		Motor	Spring			
VA9208-GGA-1	BMF1.08	8 Nm	150 s	17...25 s	Proportional	24 V AC/DC	- - -
VA9208-GGC-1	BMF1.08S						•
VA9208-AGA-1	BBF1.08				ON/OFF and Floating		- - -
VA9208-AGC-1	BBF1.08S						•
VA9208-BGA-1	BAF1.08		53...71 s	13...26 s	ON/OFF		- - -
VA9208-BGC-1	BAF1.08S						•
VA9208-BDA-1	BAF2.08					230 VAC	- - -
VA9208-BDC-1	BAF2.08S						•

Accessories (order separately)

Codes	Description
M9000-200	Commissioning tool that provides a control signal to drive 24 V ON/OFF, floating, proportional and/or resistive electric actuators
M9000-560	Ball valve linkage kit for applying M9203 and M9208 series actuators to VG1000 series valves (quantity 1)
M9000-561	Thermal barrier extends M(VA)9104, M(VA)9203 and M(VA)9208 series electric spring return actuator applications to include low pressure steam (quantity 1)
M9000-341	Weathershield kit for VG1000 series ball valve application of M(VA)9104, M(VA)9203 and M(VA)9208 series electric spring return actuators (quantity 1)
M9000-607	Position Indicator for VG1000 Series ball valve applications (quantity 5)

Non spring return damper actuators

M910x-xGA-xS
(Joventa DAB / DAD / DMD)
2 and 4 Nm, ON/OFF, floating and proportional control

The small family electric damper actuator series have been developed to operate small air dampers in ventilation and air conditioning systems. The compact design make this actuator highly versatile.

Features
▶ Floating, ON/OFF and proportional control
▶ Load-independent running time
▶ Up to 5 actuators in parallel operation possible
▶ Actuators available with PVC cable
   or with plug-in terminal block connection
▶ Simple direct mounting with universal adapter
   for fitting to Ø 8...13 mm or with 8...10 mm square shaft.
   45 mm minimum shaft length
▶ Selectable direction of rotation
▶ Manual release button

Dimensions in mm

Ordering information

Codes						
Johnson Controls	Joventa	Torque	Running time	Control signals	Supply voltage (50/60Hz)	Connection
M9102-AGA-1S	DAB1.4	2 Nm	36 s	Floating without timeout	AC 24 V	PVC-cable
M9102-AGA-5S	DAB1.4C					Terminal block
M9102-IGA-1S	DAB1			ON/OFF and floating with timeout		PVC-cable
M9102-IGA-5S	DAB1C					Terminal block
M9104-AGA-1S	DAD1.4	4 Nm	72 s	Floating without timeout		PVC-cable
M9104-AGA-5S	DAD1.4C					Terminal block
M9104-IGA-1S	DAD1			ON/OFF and floating with timeout		PVC-cable
M9104-IGA-5S	DAD1C					Terminal block
M9104-IUA-5S	DAD2				AC 100 to 240 V	PVC-cable
M9104-GGA-1S	DMD1.2			Proportional 0...10 VDC	AC 24 V	PVC-cable
M9104-GGA-5S	DMD1.2C					Terminal block

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Non spring return damper actuators

M9304-xxx-1N
(Joventa DAN / DAN2 / DMN)
4 Nm, ON/OFF, floating and proportional control

The silence electric damper actuator series have been developed to operate small and medium air dampers in ventilation and air conditioning systems. The compact design and universal adapter fitted with limitation of rotation angle make this actuator highly versatile.

A key feature of the design is the Johnson Controls® stem adapter which also incorporates angle-of-rotation limiting and position indication.

Features
▶ ON/OFF, floating and proportional control
▶ Load-independent running time
▶ Up to 5 actuators in parallel operation possible
▶ Plug-in terminal block connection
▶ Simple direct mounting with universal adapter for fitting to Ø 6 mm to 16 mm shaft or with M9000-ZxxDN adapter kit for 8, 10, 11 and 12 mm square shaft. 45 mm min shaft length
▶ Selectable direction of rotation
▶ Limitation of rotation angle
▶ Manual release button
▶ 2 adjustable auxiliary switches
▶ Automatic shut-off at end position (overload switch)
▶ Energy saving at end positions
▶ Actuators available with 1 m halogen-free cable

Dimensions in mm

Ordering information

Codes		Torque	Running time	2 x adjustable auxiliary contacts	Supply voltage (50/60Hz)
Johnson Controls	**Joventa***				
M9304-AGA-1N	DAN1N			---	24 VAC/DC
M9304-AGC-1N	DAN1.SN			•	
M9304-ADA-1N	DAN2N			---	230 VAC
M9304-ADC-1N	DAN2.SN			•	
M9304-AKA-1N	DAN5N	4 Nm	35 s	---	48 VDC
M9304-AKC-1N	DAN5.SN			•	
M9304-BDA-1N	DAN2.C			---	230 VAC
M9304-BDC-1N	DAN2.SC			•	
M9304-GGA-1N	DMN1.2N			---	24 VAC/DC
M9304-GKA-1N	DMN5.2N			---	48 VAC/DC

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

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Johnson
Controls

HVAC control products
Actuators

Non spring return damper actuators

M9300
(Joventa DM1.10 / DA2.10 / DAx.08x)
8 and 10 Nm, ON/OFF, floating and proportional control

The M9300 Series Electric Non-Spring Return Actuators provide control of dampers in HVAC Systems with 8 or 10 Nm rated torque.

These bidirectional actuators do not require a damper linkage and are easily installed on round shafts or square shafts.

An optional line voltage auxiliary switch kits can be field installed to indicate an end-stop position or perform switching functions within the selected rotation range.

Features
▶ Universal model: ON/OFF, floating and proportional
▶ High speed actuator model
▶ Optional Auxiliary Switch & potentiometer feedback.
▶ 8 and 10 Nm Rated Torque
▶ Self-Calibrating to Adjust Stroke
▶ Electronic stall detection
▶ Microprocessor-controlled Brushless DC motor

Non spring return damper actuators

M9300

(Joventa DM1.10 / DA2.10 / DAx.08x)

Ordering information

Codes		Torque	Running time	Control signals	Supply voltage (50/60Hz)
Johnson Controls	Joventa				
M9310-HGA-1	DM1.10	10 Nm	35 s	ON/OFF, floating and proportional	24 VAC/DC
M9310-AUA-1	DA2.10	10 Nm	35 s	ON/OFF and floating	85 to 264 VAC
M9308-AGA-1Z	DA1.08Z	8 Nm	8 s	ON/OFF and floating	24 VAC/DC
M9308-AUA-1Z	DA2.08Z	8 Nm	8 s	ON/OFF and floating	85 to 264 VAC

Accessories (order separately)

Codes	Description
M9300-140	Feedback potentiometer 140 ohms
M9300-1k	Feedback potentiometer 1k ohms
M9300-2k	Feedback potentiometer 2k ohms
M9300-10k	Feedback potentiometer 10k ohms
M9000-200	Commissioning tool that provides a control signal to drive 24 V ON/OFF, floating, proportional, and resistive electric actuators (quantity 1)
M9000-322	NEMA 4x weathershield kit for damper application of M9104, M9310, M9203, and M9208 series electric actuators (quantity 1)
M9000-342	Weather shield kit for VG1000 series ball application of VA9104, VA9310, VA9203, and VA9208 series electric non-spring return actuators (quantity 1)
M9000-400	Jackshaft linkage adapter Kit (quantity 1)
M9310-500	Ball valve linkage kit for applying M9310 series electric actuators to VG1000 series valves (quantity 1)
M9000-561	Thermal barrier kit. Extends the VA9104, VA9310, VA9203 and VA9208 series electric non spring return actuators applications to include low pressure steam (quantity 1)
M9000-604	Replacement anti-rotation bracket Kit for M9310, M9203, M9208, M9210 and M9220 series electric actuators
M9000-606	Position indicator for M3000 kits (quantity 5)
M9300-100	Threaded conduit adapters for 1/2 in. electrician's fittings
M9310-100	Remote mounting kit with crankarm kit (quantity 1)
M9310-600	Coupler

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Johnson
Controls

HVAC control products
Actuators

Non spring return damper actuators

M9100

(Joventa DAS-DMS / DA-DM / DAL-DML / DAG-DMG)

8, 16, 24 and 32 Nm,
ON/OFF, floating and proportional control

The M9100 series electric actuators are direct-mount actuators. These bidirectional actuators do not require a damper linkage, and are easily installed on round shafts or square shafts using the standard shaft clamp included with the actuator.

A single M9100 series electric non spring return actuator provides 8, 16, 24 or 32 Nm torque depending on the model. Two integral line voltage auxiliary switches, available only on the M91xx-xxC models, indicate end stop position or performs switching functions within the selected rotation range.

M9100 series actuators provide 90° of rotation. A graduated scale from 0° to 90° and a position indicator provide visual indication of stroke.

Features

▶ Direct-coupled design
▶ Selectable direction of rotation
▶ Electronic stall detection
▶ Double-insulated construction
▶ Load independent
▶ Optional integrated auxiliary switches
▶ Manufactured under International Standards Organization (ISO) 9001 Quality Control Standards

Dimensions in mm

Non spring return damper actuators

M9100
(Joventa DAS-DMS / DA-DM / DAL-DML / DAG-DMG)

Ordering information

Codes		Running time	Control signals	2 x auxiliary contacts	Feedback potentiometer	Supply voltage (50/60Hz)
Johnson Controls	Joventa*					
8 Nm						
M9108-AGA-1N	DAS1			---	---	
M9108-AGC-1N	DAS1.S			●	---	
M9108-AGE-1N	DAS1.P1			---	1 KOhm	24 VAC/DC
M9108-AGD-1N	DAS1.P2			---	140 Ohm	
M9108-AGF-1N	DAS1.P4		ON/OFF and floating	---	2 KOhm	
M9108-ADA-1N	DAS2			---	---	
M9108-ADC-1N	DAS2.S			●	---	
M9108-ADE-1N	DAS2.P1	30 s		---	1 KOhm	100 ... 230 VAC
M9108-ADD-1N	DAS2.P2			---	140 Ohm	
M9108-ADF-1N	DAS2.P4			---	2 KOhm	
M9108-GGA-1N	DMS1.1		Proportional 0(2)...10 VDC / 0(4)...20 mA	---	---	24 VAC/DC
M9108-GGC-1N	DMS1.1S			●	---	
M9108-GDA-1N	DMS2.2		Proportional 0(2)...10 VDC	---	---	
M9108-GDC-1N	DMS2.2S			●	---	230 VAC
M9108-GDA-1N1	DMS2.5		Proportional 0(4)...20 mA	---	---	
M9108-GDC-1N1	DMS2.5S			●	---	
16 Nm						
M9116-AGA-1N	DA1			---	---	
M9116-AGC-1N	DA1.S			●	---	
M9116-AGE-1N	DA1.P1			---	1 KOhm	24 VAC/DC
M9116-AGD-1N	DA1.P2			---	140 Ohm	
M9116-AGF-1N	DA1.P4		ON/OFF and floating	---	2 KOhm	
M9116-ADA-1N	DA2			---	---	
M9116-ADC-1N	DA2.S			●	---	
M9116-ADE-1N	DA2.P1	80 s		---	1 KOhm	100 ... 230 VAC
M9116-ADD-1N	DA2.P2			---	140 Ohm	
M9116-ADF-1N	DA2.P4			---	2 KOhm	
M9116-GGA-1N	DM1.1		Proportional 0(2)...10 VDC / 0(4)...20 mA	---	---	24 VAC/DC
M9116-GGC-1N	DM1.1S			●	---	
M9116-GDA-1N	DM2.2		Proportional 0(2)...10 VDC	---	---	
M9116-GDC-1N	DM2.2S			●	---	230 VAC
M9116-GDA-1N1	DM2.5		Proportional 0(4)...20 mA	---	---	
M9116-GDC-1N1	DM2.5S			●	---	

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

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Non spring return damper actuators

M9100
(Joventa DAS-DMS / DA-DM / DAL-DML / DAG-DMG)

Ordering information

Codes		Running time	Control signals	2 x auxiliary contacts	Feedback potentiiometer	Supply voltage (50/60Hz)
Johnson Controls	Joventa*					
24 Nm						
M9124-AGA-1N	DAL1			---	---	
M9124-AGC-1N	DAL1.S			•	---	
M9124-AGE-1N	DAL1.P1			---	1 KOhm	24 VAC/DC
M9124-AGD-1N	DAL1.P2			---	140 Ohm	
M9124-AGF-1N	DAL1.P4		ON/OFF and floating	---	2 KOhm	
M9124-ADA-1N	DAL2			---	---	
M9124-ADC-1N	DAL2.S			•	---	
M9124-ADE-1N	DAL2.P1	125 s		---	1 KOhm	100 ... 230 VAC
M9124-ADD-1N	DAL2.P2			---	140 Ohm	
M9124-ADF-1N	DAL2.P4			---	2 KOhm	
M9124-GGA-1N	DML1.1		Proportional 0(2)...10 VDC 0(4)...20 mA	---	---	24 VAC/DC
M9124-GGC-1N	DML1.1S			•	---	
M9124-GDA-1N	DML2.2		Proportional 0(2)...10 VDC	---	---	
M9124-GDC-1N	DML2.2S			•	---	230 VAC
M9124-GDA-1N1	DML2.5		Proportional 0(4)...20 mA	---	---	
M9124-GDC-1N1	DML2.5S			•	---	
32 Nm						
M9132-AGA-1N	DAG1			---	---	
M9132-AGC-1N	DAG1.S			•	---	
M9132-AGE-1N	DAG1.P1			---	1 KOhm	24 VAC/DC
M9132-AGD-1N	DAG1.P2			---	140 Ohm	
M9132-AGF-1N	DAG1.P4		ON/OFF and floating	---	2 KOhm	
M9132-ADA-1N	DAG2	140 s		---	---	
M9132-ADC-1N	DAG2.S			•	---	
M9132-ADE-1N	DAG2.P1			---	1 KOhm	100 ... 230 VAC
M9132-ADD-1N	DAG2.P2			---	140 Ohm	
M9132-ADF-1N	DAG2.P4			---	2 KOhm	
M9132-GDA-1N	DMG2.2		Proportional 0(2)...10 VDC	---	---	230 VAC
M9132-GDC-1N	DMG2.2S			•	---	
M9132-GGA-1N	DMG1.1	200 s	Proportional 0(2)...10 VDC 0(4)...20 mA	---	---	24 VAC/DC
M9132-GGC-1N	DMG1.1S			•	---	

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

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Spring return damper actuators

M9203
(Joventa DxF1.03S-Z)

3 Nm, ON/OFF, floating and proportional control

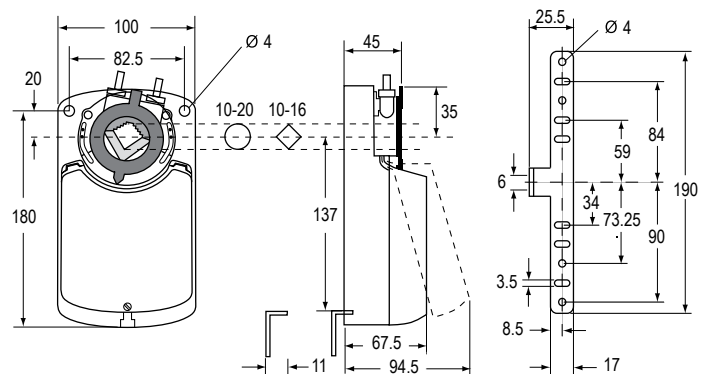The M9203 series electric spring return actuators are direct-mount actuators.
These bidirectional actuators do not require a damper linkage, and are easily installed on round shafts or square shafts using the standard shaft clamp included with the actuator.

A single M9203 series electric spring return actuator provides 3 Nm running and spring return torque.
An integral line voltage auxiliary switch, available only on the M9203-xxB-1(Z) models, indicates end stop position, or performs switching functions within the selected rotation range.

M9203 Series Actuators provide 95° of rotation. A graduated scale from –5° to 90° and a position indicator provide visual indication of stroke. When power fails during service, the mechanical spring return system provides rated torque to the connected equipment, returning it to the home position.

The series includes the following control options:

ON/OFF, 24 V, 100 to 240 VAC power

ON/OFF and floating point, 24 V power

Proportional, 24 V power, for 0(2) to 10 VDC or 0(4) to 20 mA control signal.

Features
▶ 3 Nm rated torque
▶ Direct-coupled design
▶ Reversible mounting
▶ Electronic stall detection
▶ Double-insulated construction
▶ Microprocessor-controlled brushless DC motor (-AGx and GGx types)
▶ External mode selection switch (-AGx and -GGx types)
▶ Integral cables with colored and numbered conductors
▶ Optional Integrated Auxiliary Switch
▶ Override control (proportional models only)
▶ Manufactured under International Standards Organization (ISO) 9001 Quality Control Standards

Dimensions in mm

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Spring return damper actuators

M9203
(Joventa DxF1.03S-Z)

Ordering information

Codes		Torque	Running time	Control signals	Supply voltage (50/60Hz)	1 Auxiliary Switch
Johnson Controls	Joventa					
M9203-AGA-1	DBF1.03		150 s	ON/OFF and Floating	24 V AC/DC	---
M9203-AGB-1	DBF1.03S					•
M9203-AGA-1Z	DBF1.03Z		90 s			---
M9203-AGB-1Z	DBF1.03SZ					•
M9203-BGA-1	DAF1.03		60 s	ON/OFF		---
M9203-BGB-1	DAF1.03S					•
M9203-BUA-1	DAF2.03	3 Nm			100–240 V AC	---
M9203-BUB-1	DAF2.03S					•
M9203-BUA-1Z	DAF2.03Z		27 s			---
M9203-BUB-1Z	DAF2.03SZ					•
M9203-GGA-1	DMF1.03		150 s	Proportional	24 V AC/DC	---
M9203-GGB-1	DMF1.03S					•
M9203-GGA-1Z	DMF1.03Z		90 s			---
M9203-GGB-1Z	DMF1.03SZ					•

Accessories (order separately)

Codes	Description
M9000–321	Weathershield kit for damper application of M9203 and M9208 series electric spring return actuators (quantity 1)
M9000–341	Weathershield kit for VG1000 series ball valve application of M(VA)9104, M(VA)9203 and M(VA)9208 series electric spring return actuators (quantity 1)
M9000–400	Jackshaft linkage adapter kit (quantity 1)
M9000–560	Ball valve linkage kit for applying M9203 and M9208 series electric actuators to VG1000 series valves (quantity 1)
M9000–561	Thermal barrier kit for M9000–560 ball valve linkage. Extends M(VA)9104, M(VA)9203 and M(VA)9208 series electric spring return actuators applications to include low pressure steam (quantity 1)
M9000–604	Replacement anti-rotation bracket Kit for M9203, M9208, M9210 and M9220 series electric spring return actuators (quantity 1)
M9000–606	Position indicator for damper applications (quantity 5)
M9000–607	Position indicator for VG1000 series ball valve applications (quantity 5)
M9203–100	Remote mounting kit with crankarm kit (quantity 1)
M9203–110	Universal mounting kit without Crankarm kit (quantity 1)
M9203–115	Universal mounting kit with crankarm kit (quantity 1)
M9203–150	Crankarm kit (quantity 1)
M9203–250	Remote mounting kit with crankarm kit and damper linkage for D1300 dampers (quantity 1)
M9203–601	Replacement standard coupler kit (with retainer) for mounting M9203 series electric spring return actuators (quantity 1)
M9203–602	Replacement retainer for M9203 series electric spring return actuators (quantity 5)
M9203–603	Adjustable stop kit for M9203 series electric spring return actuators (quantity 1)

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Spring return damper actuators

M9208-xxx-1
(Joventa DBF1.08 / DAFx.08 / DMF1.08)
8 Nm, ON/OFF, floating and proportional control

The spring return electric damper-actuator series has been specially developed for the motorized operation of air dampers in air conditioning systems.

When the control signal is applied the actuator drives the damper to the operational position, while evenly tensioning the integrated spring.
After a power failure the stored energy in the spring immediately brings the damper to the safety position.

Manual operation is automatically cancelled when the actuator is in electrical operation.

The compact design and universal adapter fitted with limitation of rotation angle make this actuator highly versatile.

Features
▶ ON/OFF and floating control signal
▶ Up to 5 actuators in parallel operation possible
▶ Electrical connection with halogen-free cable
▶ Simple direct mounting with universal adapter
on Ø 8 mm to 16 mm shaft
or 6 mm to 12 mm square shaft.
An optional M9208-600 Jackshaft coupler kit
is available for 12 to 19 mm round shafts,
or 10 mm to 14 mm square shafts
▶ Limitation of rotation angle
▶ Manual positioning with crank handle
▶ 2 auxiliary switches, 1 adjustable

Dimensions in mm

Ordering information

Codes		Torque	Running time		Control signals	2 x auxiliary contacts	Supply voltage (50/60Hz)
Johnson Controls	Joventa		Motor	Spring			
M9208-AGA-1	DBF1.08N	8 Nm	150 s	17...25 s	ON/OFF or floating	- - -	24 VAC / 24 VDC
M9208-AGC-1	DBF1.08SN					•	
M9208-BGA-1	DAF1.08N		55...71 s	13...26 s	ON/OFF	- - -	24 VAC
M9208-BGC-1	DAF1.08SN					•	
M9208-BDA-1	DAF2.08N		55...71 s			- - -	230 VAC
M9208-BDC-1	DAF2.08SN					•	
M9208-GGA-1	DMF1.08N		150 s	17...25 s	Proportional 0...10 VDC 2...10 VDC	- - -	24 VAC / 24 VDC
M9208-GGC-1	DMF1.08SN					•	

Spring return damper actuators

M9220-xxx-1
(Joventa DAFx.20 / DBF1.20 / DMF1.20)
20 Nm, ON/OFF, floating and proportional control

The M9220 Series Actuators are direct mount, spring return electric that provide reliable control of dampers and valves in Heating, Ventilating, and Air Conditioning (HVAC) systems.

The Actuators are available for use with ON/OFF, floating, and proportional controllers. These bidirectional actuators do not require a damper linkage, and are easily installed on dampers.

Features
▶ ON/OFF, floating and proportional control
▶ Two or three models mounted in tandem deliver twice or triple the torque
▶ Up to 5 actuators in parallel operation possible
▶ Optional adjustable end stops.
  The optional adjustable end stops are used to shorten the actuator stroke electronic stall detection throughout entire rotation range that extends the life of the actuator by deactivating the actuator motor when an overload condition is detected
▶ Integrated cables halogen-free cables
▶ IP54 (NEMA2)
▶ Rated aluminium enclosure
▶ Easy-to-use locking manual override with auto release and crank storage
▶ Energy saving at end position
▶ Two integral gold auxiliary switches (xxC Models)

Dimensions in mm

Ordering information

Codes		Torque	Running time		Control signals	2 x auxiliary contacts	Supply voltage (50/60Hz)
Johnson Controls	Joventa		Motor	Spring			
M9220-AGA-1	DBF1.20	20 Nm	150 s	20 s	ON/OFF and floating	---	AC/DC 24 V
M9220-AGC-1	DBF1.20S					•	
M9220-BDA-1	DAF2.20		25...57 s	11...15 s	ON/OFF	---	230 VAC
M9220-BDC-1	DAF2.20S					•	
M9220-BGA-1	DAF1.20					---	AC/DC 24 V
M9220-BGC-1	DAF1.20S					•	
M9220-GGA-1	DMF1.20		150 s	26 s	Proportional 0(2)...10 VDC	---	
M9220-GGC-1	DMF1.20S					•	
M9220-HGA-1	DHF1.20				Proportional 0(2)...10 VDC with span offset	---	
M9220-HGC-1	DHF1.20S					•	

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Safety damper actuators

S9208-BxC-33x
(Joventa SAFx.08Sx/12)

8 Nm, ON/OFF control

The S9208 security fire electric, spring return damper actuator series has been specially developed for the motorized operation of fire protection dampers.

When the control signal is applied the actuator drives the damper to the operational position, while evenly tensioning the integrated spring.

After a power failure the stored energy in the spring immediately brings the damper to the safety position.

Manual operation is automatically cancelled when the actuator is in electrical operation.

Features
▶ ON/OFF control signal
▶ 12 mm square shaft and 10 mm, 8 mm adapter inside the package
▶ Connection with halogen–free cable
▶ ST1.72E temperature sensor.
  Switch point of temperature sensor ca. 72°C
▶ Actuator temperature sensor to monitor ambient sensor.
▶ Low noise level
▶ Manual positioning with crank handle
▶ 2 fixed auxiliary switches (8° and 83°)

Dimensions in mm

Ordering information

Codes		Supply voltage (50-60Hz)	Description
Johnson Controls	**Joventa**		
S9208-BGC-33	SAF1.08S/12	24 VAC / VDC	Without sensor
S9208-BGC-33A	SAF1.08SA/12		With ambient thermosensor
S9208-BGC-33B	SAF1.08SB/12		With duct sensor
S9208-BGC-33C	SAF1.08SC/12		With duct and ambient sensors
S9208-BDC-33	SAF2.08S/12	230 VAC	Without sensor
S9208-BDC-33A	SAF2.08SA/12		With ambient thermosensor
S9208-BDC-33B	SAF2.08SB/12		With duct sensor
S9208-BDC-33C	SAF2.08SC/12		With duct and ambient sensors

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Johnson
Controls

Pneumatic valve actuators

MP8000

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 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

Dimensions in mm

Ordering information

Codes	Positioner and hand wheel
MP822C50-20	---
MP822C60-20	DA positioner
MP822C70-20	DA positioner and hand wheel
MP822C80-20	Hand wheel
MP832C50-20	---
MP832C60-20	DA positioner
MP832C70-20	DA positioner and hand wheel
MP832C80-20	Hand wheel

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Pneumatic valve actuators

PA-2000

The PA-2000 pneumatic valve actuators series is available for ON/OFF control.

The actuator can be combined with VG8000 and VG8300 series in accordance with the maximum close-off pressure ratings specified.

The fail safe position of the PA-2000 can be changed in-situ with a conversion kit.

Features

▶ Manual override
▶ Reversible action in-situ
▶ Accessories available

Ordering information

Codes *	Handwheel	Spring range	Diaphram area	Stroke
PA-20x0-32y2	---	20 - 50 kPa	150 cm^2	13 mm
PA-21x0-32y7	•	70 - 100 kPa		
PA-20x0-33y2	---	20 - 50 kPa	300 cm^2	25 mm
PA-21x0-33y7	•	70 - 100 kPa		
PA-20x0-36y2	---	20 - 50 kPa	600 cm^2	42 mm
PA-21x0-36y7	•	70 - 100 kPa		
PA-20x0-37y2	---	20 - 50 kPa		25 mm
PA-21x0-37y7	•	70 - 100 kPa		

Notes
* = **x:** 0 = Without positioner
3 = With positioner (PR10)

y: 1 = DA actuator stem extends
2 = RA Actuator stem retracts

Dimensions in mm

Carbon dioxide

CD-2xx-E00-00

Wall mount – CO$_2$ and temperature transmitter

The CD-2xx-E00-00 series is a wall mount transmitter for measuring the CO$_2$ levels and the relevant temperature within Heating, Ventilation and Air Conditioning applications.

The CD-2xx Series incorporates a single beam dual wavelength NDIR CO$_2$ sensor, which compensates for ageing effects, is highly insensitive to pollution and offers outstanding long term stability.

A multiple point CO$_2$ and T factory adjustment procedure leads to excellent CO$_2$ measurement accuracy over the entire T working range.

This compact wall-mounted device produces 0 to 10 V or 4 to 20 mA signals and it is designed to work as part of any HVAC control system.

This new CO$_2$ transmitter is easy to install, offers a full 3-year warranty, and requires no maintenance or field calibration.

Features

▶ Power supply 15...35 VDC / 24 VAC
▶ 0...10 V or 4...20 mA CO$_2$ and temperature output
▶ Models with display
▶ Snap-on enclosure
▶ Outstanding long-term stability
▶ CO$_2$ factory calibration certificate

Dimensions in mm

Ordering information

Codes	CO$_2$ Output	CO$_2$ working range	Temperature output	Temperature working range	Display	Calibration certificate
CD-200-E00-00	0...10 V	0...2000 ppm	0...10 V	0...50 °C	---	•
CD-201-E00-00					•	•
CD-220-E00-00	4...20 mA		4...20 mA		---	•
CD-221-E00-00					•	•

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Carbon dioxide

CD-3xx-E00-00

Wall mount – CO$_2$, relative humidity and temperature transmitter

The CD-3xx-E00-00 series is a wall mount transmitter for measuring the CO$_2$ levels, the relevant humidity and the temperature within Heating, Ventilation and Air Conditioning applications.

The CD-3xx series incorporates a single beam dual wavelength NDIR CO$_2$ sensor, which compensates for ageing effects, is highly insensitive to pollution and offers outstanding long term stability.

A multiple point CO$_2$ and T factory adjustment procedure leads to excellent CO$_2$ measurement accuracy over the entire T working range.

The CD-3xx room sensor are designed to work as part of any HVAC control system.

This new CO$_2$ transmitter is easy to install and requires no maintenance or field calibration.

Features

▶ Power supply 15...35 VDC / 24 VAC
▶ 0...10 V CO$_2$ and relative humidity output
▶ 0...10 V and Pt1000 temperature output on the same device
▶ Models with display
▶ Snap-on enclosure
▶ Outstanding long-term stability
▶ CO$_2$ factory calibration certificate

85

100

26

Dimensions in mm

Ordering information

Codes	CO$_2$ output	CO$_2$ working range	RH% output	RH% working range	Temperature output	Temperature working range	Display	Calibration certificate
CD-310-E00-00	0...10V	0...2000 ppm	0...10 V	10...90 % RH	0...10V and Pt 1000	0...50 °C (active model)	---	•
CD-311-E00-00							•	•

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Carbon dioxide

CD-Pxx

Duct mount

The CD-Pxx series duct mount CO_2 sensors feature a carbon dioxide (CO_2) transmitter for measuring and transmitting CO_2 levels, ranging from 0 to 2,000 parts per million (ppm), within Heating Ventilating and Air Conditioning (HVAC) CO_2 applications.

Specific HVAC CO_2 applications include Demand Control Ventilation (DCV), fresh air and indoor Air Quality (IAQ), and rooftop air handling economizer controls system.

The device produce 0 to 10 V (default) 0 to 20 mA or 4 to 20 mA signal.

Features

▶ Power supply: 20 to 30 VAC (18 to 30 VDC), class 2
▶ Response time (0 to 63%): 1 minute
▶ Accuracy at 25 °C: ± 30 ppm + 2.0% of reading
▶ Operating temperature range: –5 to 45 °C
▶ Humidity range: 0 to 85%

* This dimensions is approximate; it varies with the number of turns used to tughten the connector to the case.

Dimensions in mm

Ordering information

Codes	Description
CD-P00-00-0	Duct mount CO_2 transmitter
CD-PR0-00-0	Duct mount CO_2 transmitter with relay

Replacement Parts

Codes	Description
ACC-CD-R	Relay output module for use in CD-P00-00-0 or CD-PR0-00-0
ACC-CD-CFK1	Conduit adaptor kit

Accessories

Codes	Description
ACC-CD-S	Relay setpoint software kit; includes software and interface cable to reset the on and off relay setpoints for CD-PR0-00-0

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Johnson
Controls

Dew Point

HX-9100

The HX-9100 dew point sensor provides warning signal in case of condensation on surfaces such as cold water pipes, cool ceilings and windows.

The HX-9100 can be powered at 15 VDC or 24 VAC, it detects the dew point condition providing an on/off signal to an analog or a digital input of the controller that will override functions in order to prevent the condensation on cooled surfaces.

Features

▶ Supply voltage: 15 VDC ± 10% or 24 Vac ± 15%
▶ Action: 0...10 VDC or ON/OFF
▶ Hysteresis: 1%
▶ Output: 0.5 VDC max @ RH>90 %
▶ Protection class: IP44

lenght 1.5 mt

50

lenght 1.5 mt

Dimensions in mm

Ordering information

Codes	Action	Output at condensation	Cable lenght	Power supply
HX-9100-8001	ON/OFF	Open collector closed, 0.5 VDC max @ RH >90%	1.5 m	15 VDC ±10%
HX-9100-9001	0...10 VDC	≤ +0.5 VDC @ RH >90%		
HX-9100-9024	ON/OFF	Open collector closed, 0.5 VDC max @ RH >90%		24Vac ±15% 24Vdc ±15%
HX-9100-9324	ON/OFF	Open collector closed, 0.5 VDC max @ RH >90%	3 m	

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Differential pressure

DP7000 - DP2500 - DP0250

The DP low differential pressure transmitter series is an accurate and cost competitive solution for measuring low pressures of air and non-aggressive gases in order to monitor and control pressures in building automation, HVAC and clean room systems.

Features

- ▶ Power supply 24 VAC/VDC
- ▶ Pressure range: 8 different ranges in one device (see the table)
- ▶ Output signal: 0...10 VDC or 4...20 mA
- ▶ Automatically autozero point adjusting
- ▶ Response time selectable
- ▶ 2 rows x 12 characters digit display
- ▶ Back-light display
- ▶ Protection class: IP54
- ▶ Configurable measuring unit (Pa, kPa, mbar, inch WC, mm WC, psi)
- ▶ Factory Calibration Certificate available on request

Dimensions in mm

90.0   36.0
95.0
71.5

Ordering information

Ordering Codes	Packaging	Operating range (Pa)	Auto zero	Display	Output signal	Enclosure	Supply voltage	Span point adjustment
DP7000-R8	Single	0...1000 0...1500 0...2000 0...2500 0...3000 0...4000 0...5000 0...7000	---		0...10 VDC or 4...20 mA	IP54	24 VAC / VDC	---
DP7000-R8-01	Bulk		---	---				
DP7000-R8-AZ	Single		•					
DP7000-R8-AZ-01	Bulk		•					
DP7000-R8-D	Single		---	•				
DP7000-R8-AZ-D	Single		•	•				
DP2500-R8	Single	-100...+100 0...100 0...250 0...500 0...1000 0...1500 0...2000 0...2500	---					---
DP2500-R8-01	Bulk		---	---				
DP2500-R8-AZ	Single		•					
DP2500-R8-AZ-01	Bulk		•					
DP2500-R8-D	Single		---	•				
DP2500-R8-AZ-D	Single		•	•				
DP0250-R8-AZ	Single	0...25 0...50 0...100 0...250 -25...+25 -50...+50 -100...+100 -150...+150	•	---				
DP0250-R8-AZ-01	Bulk		•	•				
DP0250-R8-AZ-D	Single		•	---				
DP0250-R8-AZS	Single		•	•				•
DP0250-R8-AZ-DS	Single		•	---				•

Accessory kit

Code	Description
T00199	DP Transmitter accessory kit, 2 fixing screws, 2 plastic tube connectors and 2 m tube ⌀ 4/7 mm

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Differential pressure

DP7000 - DP2500 - DP0250

Factory calibration certificates

On request, the DP7000, DP2500 and DP0250 transmitter can be provided with the Factory calibration certificate for a specific pressure range setting.

The certificate will report:

- Date and validity
- Device type and calibration range
- Device ID
- Test report on 3 measurement points

The calibration test performed in the factory ensures the accuracy of the pressure readings measured by the sensor. A calibration certificate is provided with any error measured in the test declared. This error value can be used when configuring the analog input channel for the sensor. Select the error at the nearest value the pressure sensors is expected to be typically measuring, this should normally be mid-range, and use this as the offset when setting up the analog input channel. This will ensure the sensor provides the greatest accuracy possible at the normal operating condition.

How to order a DP with Calibration certificate

The calibration certificate performed in the factory can be provided for a specific pressure range only. To determine the ordering code please select the Certificate required from the table below. Take into consideration that pressure range changes from one model to another.

		DP7000	DP2500	DP0250
DPxxxx-	C1	0...1000 Pa	-100...+100 Pa	0...25 Pa
	C2	0...1500 Pa	0...100 Pa	0...50 Pa
	C3	0...2000 Pa	0...250 Pa	0...100 Pa
	C4	0...2500 Pa	0...500 Pa	0...250 Pa
	C5	0...3000 Pa	0...1000 Pa	-25...+25 Pa
	C6	0...4000 Pa	0...1500 Pa	-50...+50 Pa
	C7	0...5000 Pa	0...2000 Pa	-100...+100 Pa
	C8	0...7000 Pa	0...2500 Pa	-150...+150 Pa

For Display or Autozero options then add:

- **D** Display
- **AZ** Autozero Option
- **AZ-D** Autozero and Display

Note

i.e. **DP0250-C3-AZ** DP0250 with autozero with Calibration certified for 0...100 Pa range setting

DP2500-C3-AZ-D DP2500 with autozero and Display with Calibration certified for 0...250 Pa range setting

DP7000-C3 DP7000 Calibration certified for 0...2000 Pa range setting

Plant humidity

HT-1300

Duct mount

Specially designed for HVAC, the HT-1300 duct mount humidity sensor is a cost effective, highly accurate and reliable solution for measuring relative air humidity and temperature.

The enclosure minimizes installation cost and provides outstanding protection against contamination and condensation, thus ensuring flawless operation.

The HT-130x-UD1 employs the new humidity/temperature sensor with excellent long-term stability and resistance to pollutants. Long term performance is granted by the PTFE membrane fitted to the standard protection cap, suitable for most common HVAC applications.
The standard protection cap can be replaced with a series of alternative protection caps specially designed for harsh environments.

Features
▶ Power supply 15...35 VDC / 24 VAC ±20%
▶ Humidity range 0...100%
▶ Humidity output 0...10 VDC
▶ Humidity accuracy 2,5% from 10 to 95% RH
▶ Temperature outputs 0...10 VDC or Pt 1000
▶ Duct probes length 200 mm
▶ Protection caps for harsh environment application
▶ Protection class: IP65
▶ Inspection Certificate according EN 10204:2004

Protection caps for harsh enviroment

46

~205

Ø 12

101

80.6

Dimensions in mm

Plant humidity

Ordering information

HT-1300 Plant Humidity sensors

Codes	Humidity working range	Humidity output	Humidity accurancy	Temperature working range	Temperature output	Calibration certificate	Supply voltage
HT-1301-UD1	10...95 %	0...10 VDC	2,5 %	–15...60 °C	0...10 VDC	•	15 to 35 VDC or 24 VAC ±20%
HT-1302-UD1				0...40 °C		•	
HT-1306-UD1				–15...60 °C	Pt1000	•	

Filter caps for harsh environments - Accessories

Codes	Description	Application
HT-1300-CAP-103	Stainless steel sintered filter cap	For industrial, agriculture, barns
HT-1300-CAP-105	PTFE sintered filter cap	For chemical and very polluted environment
HT-1300-CAP-106	Polycarbonate body with stainless steel wire mesh filter cap	For dryers and humidifiers
HT-1300-CAP-115	Catalytic filter in PTFE filter caps	For pharm, biotech, high oxygen concentration, sterilization with H2O2

Standard filter cap - Accessory

Code	Description
HT-1300-UD1-KIT	Kit of 10 pcs: Mounting flange, cable gland, screws/fishers, gasket and standard protection Cap, PTFE membrane for dusty and building automation applications.

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Plant temperature

TS-6300

The TS-6300 series temperature sensors provide a passive signal that corresponds to the air or water temperature Heating, Ventilation and Air Conditioning (HAVC) applications.

They are passive resistive signal NTC K2, NTC K10, Pt100 or Pt1000 related to the sensed temperature. The TS-6300 temperature sensor series has been designed to work as a part of any HVAC control system.

Features

▶ Wide range of mounting types and signal outputs
▶ Different length of tubes and wells for duct and immersion applications
▶ Bayonet mounting system
▶ For immersion applications, well can be mounted before duct sensor is mounted
▶ IP54 ingress protection (except cable sensor)
▶ IP67 ingress protection for cable sensor

Dimensions in mm

95 mm
79.3 mm
53.2 mm
85 mm
Ø 5 mm

L = For this dimensions please refer to the "Ordering information" (next page)

L

Duct and ceiling

95 mm
79.3 mm
53.2 mm
85 mm
Ø 5 mm

Outdoor

50 mm
Ø 6.0 mm
1.5 m Cable

Cable

95 mm
79.3 mm
53.2 mm
85 mm
Ø 5 mm
20 - 90 mm

Strap-on

95 mm
79.3 mm
53.2 mm
Ø 5 mm
1.5 m
85 mm

Remote

European product catalogue 2017

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Plant temperature

TS-6300

Ordering information

Codes	Output	Mounting type	Lenght (mm)	Temperature range
TS-6370D-A11	0...10 VDC	Duct / immersion	138	−40...+50 °C
TS-6370D-B11			192	
TS-6370D-C11			290	
TS-6370D-D11			446	
TS-6370D-A12			138	−20...+40 °C
TS-6370D-B12			192	
TS-6370D-C12			290	
TS-6370D-D12			446	
TS-6370D-A13			138	0...+40 °C
TS-6370D-B13			192	
TS-6370D-C13			290	
TS-6370D-D13			446	
TS-6370D-A14			138	0...+100 °C
TS-6370D-B14			192	
TS-6370D-C14			290	
TS-6370D-D14			446	
TS-6330D-A10	2K2 NTC	Duct / immersion	138	−40...+120 °C
TS-6330D-B10			192	
TS-6330D-C10			290	
TS-6330D-D10			446	
TS-6340D-A10	10K NTC		138	
TS-6340D-B10			192	
TS-6340D-C10			290	
TS-6340D-D10			446	
TS-6350D-A10	Pt100		138	
TS-6350D-B10			192	
TS-6350D-C10			290	
TS-6350D-D10			446	
TS-6360D-A10	Pt1000		138	
TS-6360D-B10			192	
TS-6360D-C10			290	
TS-6360D-D10			446	
TS-6370R-F01	0...10 VDC	Remote sensor	1.5 m cable lenght	−40...+50 °C
TS-6370R-F03				0...+40 °C
TS-6370R-F04				0...+100 °C
TS-6330K-F00	2K2 NTC	Cable sensor		−40...+100 °C
TS-6340K-F00	10K NTC			
TS-6360K-F00	Pt1000			
TS-6370E-001	0...10 VDC	Outdoor	---	−40...+50 °C
TS-6370E-002				−20...+40 °C
TS-6330E-000	2K2 NTC	Outdoor		−40...+70 °C
TS-6340E-000	10K NTC			
TS-6350E-000	Pt100			
TS-6360E-000	Pt1000			
TS-6370S-002	0...10 VDC	Strap-on		−20...+40 °C
TS-6370S-004				0...+100 °C
TS-6330S-000	2K2 NTC	Strap-on		−40...+100 °C
TS-6340S-000	10K NTC			
TS-6350S-000	Pt100			
TS-6360S-000	Pt1000			
TS-6370C-E13	0...10 VDC	Ceiling	36	0...+40 °C
TS-6330C-E10	2K2 NTC	Ceiling		−40...+70 °C
TS-6340C-E10	10K NTC			
TS-6350C-E10	Pt100			
TS-6360C-E10	Pt1000			

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Plant temperature

TS-6300

Ordering information

Outdoor sensor grey

Codes	Output	Mounting type	Operating range
TS-6330E-050	2K2 NTC		
TS-6340E-050	10K NTC		−40...+70 °C
TS-6350E-050	Pt100	Outdoor grey enclosure	
TS-6360E-050	Pt1000		
TS-6370E-051	0...10 VDC		−40...+50 °C
TS-6370E-052			−20...+40 °C

Accessories

Codes	Lenght (mm)	Material	Mounting thread	PN
TS-6300W-E200	50 *			
TS-6300W-D200	80			
TS-6300W-F200	120	Brass/Copper	R 1/2"	PN16
TS-6300W-G200	150			
TS-6300W-H200	200			
TS-6300W-I200	260			
TS-6300W-E300	50 *			
TS-6300W-D300	80			
TS-6300W-F300	120		R 1/2"	
TS-6300W-G300	150			
TS-6300W-H300	200			
TS-6300W-I300	260	Stainless steel		PN25
TS-6300W-E400	50 *			
TS-6300W-D400	80			
TS-6300W-F400	120			
TS-6300W-G400	150		G 1/2"	
TS-6300W-H400	200			
TS-6300W-I400	260			

TS-6300D-000	Duct flange kit
TS-6300W-900	Retrofitting thermowell adapter kit

Note
* for cable sensor only

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Pressure

PT-5217

Liquid or air pressure transmitter

The PT-5217 pressure transmitter accurately measures pressure and converts the measurement into a standard proportional 0...10 V signal.

The PT-5217 is especially adapted to measure relative and absolute pressure of liquid and gases.

The pressure transmitter consists of a piezoresistive ceramic measuring cell with a diaphragm, installed in a stainless steel housing.

Features

▶ Compact, rugged construction
▶ Negligible temperature influence on accuracy
▶ Low hysteresis
▶ High accuracy
▶ Direct mounting, 1.5 m cable included
▶ Splash proof enclosure

Dimensions in mm

Ordering information

Codes	Operating range	Enclosure	Supply voltage
PT-5217-7011	0...100 kPa	IP67	24 VAC +15% / −15%, 50/60 Hz or 12...33 VDC, < 7 mA
PT-5217-7101	0...1000 kPa		

Accessories (order separately)

Codes	Description
EQ-6056-7000	Mounting kit for plastic hose 4 x 6 mm
EQ-0100-7001	Mounting kit for DIN rail

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Room humidity

HT-1000

Wall mount

The HT-1000 series room humidity sensors provide active sensing of relative humidity and on specific models, also active/passive sensing of temperature in HVAC applications.

It features a polymer capacitance humidity sensing element and provides within either ±2% or ±4% accuracy a voltage output signal proportional 0 to 100% relative humidity.

The HT-1000 series room humidity sensors are designed for use with any type of Johnson Controls or third party HVAC controllers.

Features

▶ Supply voltage: 15 VAC / 24 VAC
▶ Output RH%: 0...10 VDC
▶ Output Temperature: 0...10 VDC, NTC K2, Pt1000
▶ Protection class: IP30

80
80
25
32

Dimensions in mm

Ordering information

Codes	Humidity range	Humidity output	Humidity accuracy	Temperature range	Temperature output	Supply voltage
HT-1201-UR			±2%	0...40°C	0...10 VDC	
HT-1300-UR				---	---	12 to 30 VDC 24 VAC ±15%
HT-1301-UR	0...100% RH	0...10 VDC	±4%	0...40°C	0...10 VDC	
HT-1303-UR					NTC K2	
HT-1306-UR				0...60°C	Pt1000	

Room Temperature

RS-1100

Room command module

The RS-1100 room command modules are designed for use with any type of Johnson Controls or third party HVAC controllers that can accept a 0...10 V signal directly proportional to the sensed temperature.

Models are available with and without LCD display, room temperature setpoint adjustment dial, temporary occupied override function and fan speed button.

RS-1180

RS-1140

RS-1160 / RS-1190

Features
▶ Power supply
  15 VDC (all models)
  24 VAC / VDC (only models with display)
▶ 0...10 VDC temperature output
▶ Remote temperature setpoint adjustment,
▶ Occupancy override function, (models with or without display)
▶ Room enclosures 80 x 80 mm
▶ Protection class: IP30
▶ Fan speed button

Comfort / Stand-by button

Mode LED

LCD display with back-light

Dial for Temperature setpoint adjustment

Fan speed override

RS-1140-0000

RS-1160-0005

RS-1180-0000

Dimensions in mm

Ordering information

Codes	Temperature output	LCD display	Setpoint dial scale	Temporary occupancy ovveride function	Fan speed override
RS-1140-0000	0...10 VDC	---	---	---	---
RS-1160-0000		---	12...28 °C	Pushbutton	---
RS-1160-0005		---	+/-		---
RS-1180-0000		•	12...28 °C	Integrated	---
RS-1180-0005		•	+/-		---
RS-1190-0000		---	12...28 °C	---	---
RS-1190-0005		---	+/-		---
RS-1180-0002		•	12...28 °C	Integrated	•
RS-1180-0007		•	+/-	Integrated	•

Accessories (order separately)

Codes	Description
TM-1100-8931	Plastic surface mounting kit
TM-9100-8900	Special tool for opening enclosure

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Room temperature

TE-7000

Room command module

The TE-7000 room command module is designed for use with Johnson Controls VAV Modular Assembly.

The module has an NTC temperature sensor, a dial for setpoint adjustment within the range of 12 to 28 °C or –3 to +3K, and an occupancy button with an LED indicator.

If the VAV controller is not already in occupied mode, as shown by the LED indicator, the occupant may press the occupancy button to obtain comfort control for a set period of time, normally defaulted to one hour.

The module also has a built-in connector for a PC with the software to test and commission the VAV modular assembly and the air supply system.

Features

▶ Power supply: +15 Vdc
▶ Temperature sensor: NTC
▶ Occupancy override button
▶ Protection class: IP30
▶ Remote setpoint adjustment

Dimensions in mm

Ordering information

Codes	Color	Setpoint dial range
TE-7000-8002	Off-white / Gray base	12 to 28 °C
TE-7000-8002-W	White / White base	
TE-7000-8003	Off-white / Gray base	–3 to +3 K
TE-7000-8003-W	White / White base	

Note
Add **"-K"** to code for setpoint dial with serrated edge, e.g. TE-7000-8002-K, TE-7000-8002-WK

Accessories (order separately)

Ordering Codes	Description
TE-7000-8900	Service tool connector cable (1.5 m) (for use with IU-9100 converter)
TM-9100-8900	Special tool (to open module)
TM-9100-8901	Dial-Stop screws kit (bag og 100 self-tapping screws)
TM-9100-8902	Serrated knob kit (bag of 10 knobs) – Off-white
TM-9100-8902-W	Serrated knob kit (bag of 10 knobs) – white

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HVAC control products
Sensors

Room temperature

TM-1100

Room command module

The TM-1100 series of room command modules are designed for use with the TC-9102, TC-9109 and TCU series of DDC terminal unit controllers.

The setpoint dial enables the room occupant to adjust the working set point of the controller within the range of 12...28 °C or −3...+3°, 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.

A LED indicator shows the current operating mode.
For TC-9102 and TCU fan coil unit controllers, a room command module with a 3-speed fan override is available. Models without a temperature sensing element are provided for application where the temperature sensor is mounted inside the fan coil unit.

Features

▶ Passive sensor
▶ NTC K2 temperature output
▶ Remote temperature setpoint adjustment
▶ 3-speed fan override
▶ Occupancy override button
▶ Room enclosures 80 x 80 mm
▶ Protection class: IP30

TM-1140-0000

TM-1160-0007 and TM-1170-0007

Dimensions in mm

Ordering information

Codes	Built-in sensing element	Temperature setpoint dial scale	Fan speed override	Occupancy button
TM-1140-0000	NTC K2	---	---	---
TM-1150-0000				
TM-1160-0000		12...28 °C		
TM-1160-0005		+/−		
TM-1160-0002		12...28 °C	3-speed fan override	•
TM-1160-0007		+/−		
TM-1170-0005	Without		---	
TM-1170-0007			3-speed fan override	
TM-1190-0000	NTC K2	12...28 °C	---	---
TM-1190-0005		+/−		

Accessories (order separately)

Codes	Description
TM-1100-8931	Plastic base for surface mount
TE-9100-8501	Unit mount NTC K2 temperature sensor (1.5 m cable)
TM-9100-8900	Special tool for opening enclosure

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Sensors

Room temperature

TM-2100
Room command module

The TM-2100 series of room command modules are designed for use with the FCC and Facility Explorer series of DDC terminal unit controllers. The setpoint dial enables the room occupant to adjust the working set point of the controller within the range of 12...28 °C or −3...+3°, 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.

A LED indicator shows the current operating mode.
A Room Command Module with a 3-speed fan override adjuster is available.

Features

▶ Passive sensor
▶ NTC 10K temperature output
▶ Remote temperature setpoint adjustment
▶ 3-speed fan override
▶ Occupancy override button
▶ Room enclosures 80 x 80 mm
▶ Protection class: IP30

TM-2140-0000

TM-2160-0007 and TM-2170-0007

Dimensions in mm

Ordering information

Codes	Built-in sensing element	Temperature setpoint dial scale	Fan speed override	Occupancy button
TM-2140-0000	NTC 10K	---	---	---
TM-2150-0000				
TM-2160-0000		12–28 °C		
TM-2160-0005		+/–		•
TM-2160-0002		12–28 °C	3-speed fan override	
TM-2160-0007		+/–		
TM-2190-0000		12–28 °C	---	---
TM-2190-0005		+/–		

Accessories (order separately)

Codes	Description
TM-1100-8931	Plastic base for surface mount
TE-9100-8502	Unit mount NTC K10 temperature sensor (1.5 m cable)
TM-9100-8900	Special tool for opening enclosure

99

Room temperature

TM-3100
Room command module

The TM-3100 series room temperature sensor provide passive sensing of temperature in HVAC application.

The TM-3100 is equipped with a Pt1000 class A sensing element and provides an output proportional signal to the measured ambient temperature.

The TM-3100 series room temperature sensor is designed for use with the Facility Explorer series and with the Field Equipment controller series.

Features
▶ Passive sensor
▶ Pt1000
▶ Room enclosure: 80 x 80 mm
▶ Protection Class: IP30

Dimensions in mm

Ordering information

Codes	Built-in Sensing Element	Temperature Setpoint Dial Scale	Fan Speed Override	Occupancy Button
TM-3140-0000	Pt 1000	---	---	---

Accessories (order separately)

Codes	Description
TM-1100-8931	Plastic base for surface mount
TM-9100-8900	Special tool for opening enclosure

Manufacturer reserves the right to change specifications without prior notice

Room temperature

NS

Network room command module

The NS series network sensors are designed to function directly with Metasys® system Field Equipment Controllers (FECs), Input/Output Modules (IOMs), Variable Air Volume (VAV) Modular Assembly (VMA16) Controllers.

The majority of NS series network zone sensors monitor room temperature; however, options are available to also monitor zone humidity, carbon dioxide (CO_2), local temperature setpoint adjustments and other variables. This data is transmitted to a controller on the Sensor Actuator (SA) Bus.

Features

▶ BACnet® Master-Slave/Token-Passing (MS/TP) protocol communication: provides compatibility with Metasys system field controllers and Facility Explorer programmable controllers in a proven communication network

▶ Backlit Liquid Crystal Display (LCD) available on some models: provides real-time status of the environment with backlighting activated during user interaction

▶ Simple temperature setpoint adjustment available on some models: enables to change the setpoint with the turn of a dial

▶ Temporary occupancy available on some models: provides a timed override command, which temporarily initiates an alternate mode

▶ Field selectable default display setting on some models: allows to toggle between temperature and RH on the display and set the desired default for continuous viewing

▶ Fahrenheit/Celsius (F/C) button available on some models: toggles the display temperature between degrees Celsius and degrees Fahrenheit

Dimensions in mm

Mode LED

Comfort / stand-by button

Room temperature

NS

Ordering information

Surface mounting - Temperature only models

Codes	LCD display	Setpoint adjustment	W/C Warmer and Cooler (+-3°C)	Occupation button	PIR Occupancy	F/°C scale toggle	Fan control	Screw terminals	Modular jack	Address switches
				Size - Height x Width: 80 x 80 mm - Temperature 0...40 °C						
NS-ATA7001-0	●	●	---	●	---	---	---	---	●	---
NS-ATA7002-0	●	●	---	●	---	---	---	●	---	---
NS-ATA7003-0	●	●	---	●	---	---	---	●	---	●
NS-ATA7004-2 [1]	●	●	---	●	---	---	---	●	●	●
NS-ATB7001-0	●	●	---	●	---	●	---	---	●	---
NS-ATB7002-0	●	●	---	●	---	●	---	●	---	---
NS-ATB7003-0	●	●	---	●	---	●	---	●	---	●
NS-ATC7001-0	●	●	---	●	---	---	●	---	●	---
NS-ATC7002-0	●	●	---	●	---	---	●	●	---	---
NS-ATC7005-2 [1]	●	●	---	●	---	---	●	●	●	---
NS-ATD7001-0	●	●	---	●	---	●	●	---	●	---
NS-ATD7002-0	●	●	---	●	---	●	●	●	---	---
NS-ATF7001-0	●	---	●	●	---	●	---	---	●	---
NS-ATF7002-0	●	---	●	●	---	●	---	●	---	---
NS-ATN7001-0	---	---	---	---	---	---	---	---	●	---
NS-ATN7001-2 [1]	---	---	---	---	---	---	---	---	●	---
NS-ATN7003-0	---	---	---	---	---	---	---	●	---	●
NS-ATN7003-2 [1]	---	---	---	---	---	---	---	●	---	●
NS-ATN7004-2 [1]	---	---	---	---	---	---	---	●	●	●
NS-ATP7001-0	---	---	●	●	---	---	---	---	●	---
NS-ATP7001-2 [1]	---	---	●	●	---	---	---	---	●	---
NS-ATP7002-0	---	---	●	●	---	---	---	●	---	---
NS-ATP7002-2 [1]	---	---	●	●	---	---	---	●	---	---
NS-ATP7003-0	---	---	●	●	---	---	---	●	---	●
NS-ATP7003-2 [1]	---	---	●	●	---	---	---	●	---	●
NS-ATV7001-0 [2]	●	●	---	●	---	●	[3]	---	●	---
NS-ATV7002-0 [2]	●	●	---	●	---	●	[3]	●	---	---

Note
[1] Models without Johnson Controls logo
[2] VAV Balancing feature
[3] Fan button is replaced by a light bulb button for the VAV balancing process

Johnson Controls

Room temperature

NS

Ordering information

Surface mounting – Temperature only models

Codes	LCD display	Setpoint adjustment	W/C Warmer and Cooler (+-3°C)	Occupation button	PIR Occupancy	F/°C scale toggle	Fan control	Screw terminals	Modular jack	Address switches
				Size – Height x Width: 120 x 80 mm – Temperature 0...40 °C						
NS-BTB7001-0	●	●	---	●	---	●	---	---	●	---
NS-BTB7001-2 [1]	●	●	---	●	---	●	---	---	●	---
NS-BTB7002-0	●	●	---	●	---	●	---	●	---	---
NS-BTB7003-0	●	●	---	●	---	●	---	●	---	●
NS-BTB7003-2 [1]	●	●	---	●	---	●	---	●	---	●
NS-BTF7001-0	●	---	●	●	---	●	---	---	●	---
NS-BTF7002-0	●	---	●	●	---	●	---	●	---	---
NS-BTL7003-0	---	---	---	●	---	---	---	●	---	●
NS-BTN7001-0	---	---	---	---	---	---	---	---	●	---
NS-BTN7001-2 [1]	---	---	---	---	---	---	---	---	●	---
NS-BTN7003-0	---	---	---	---	---	---	---	●	---	●
NS-BTN7003-2 [1]	---	---	---	---	---	---	---	●	---	●
NS-BTP7001-0	---	---	●	●	---	---	---	---	●	---
NS-BTP7001-2 [1]	---	---	●	●	---	---	---	---	●	---
NS-BTP7002-0	---	---	●	●	---	---	---	●	---	---
NS-BTP7002-2 [1]	---	---	●	●	---	---	---	●	---	---
NS-BTP7003-0	---	---	●	●	---	---	---	●	---	●
NS-BTV7001-0 [2]	●	●	---	●	---	●	[3]	---	●	---
NS-BTV7002-0 [2]	●	●	---	●	---	●	[3]	●	---	---
NS-MTB7001-0	●	●	---	●	●	●	---	---	●	---
NS-MTB7002-0	●	●	---	●	●	●	---	●	---	---
NS-MTB7004-2 [1]	●	●	---	●	●	●	---	●	---	●
NS-MTL7001-0	---	---	---	●	●	---	---	---	●	---
NS-MTL7002-0	---	---	---	●	●	---	---	●	---	---
NS-MTN7004-2 [1]	---	---	---	---	●	---	---	●	●	●

Note
[1] Models without Johnson Controls logo
[2] VAV Balancing feature
[3] Fan button is replaced by a light bulb button for the VAV balancing process

103
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Room temperature

NS

Ordering information

Surface mounting - Temperature only models, Black version

Codes	Display	Setpoint adjustment	W/C Warmer and Cooler (+-3°C)	Occupation button	PIR Occupancy	F/°C scale toggle	Fan control	Screw terminals	Modular jack	Address switch
Size - Height x Width: 80 x 80 mm - Temperature 0...40 °C										
NS-ATA7002-3	•	•	---	•	---	---	---	•	---	---
Size - Height x Width: 120 x 80 mm - Temperature 0...40 °C										
NS-BTB7001-3	•	•	---	•	---	•	---	---	•	---

Note
An Occupancy override button is available on NS-xxP and NS-xxL models. Others model display Occupancy override through the set-point adjustment interface.

Handheld VAV balancing tool

Codes	Description
NS-ATV7003-0	Handheld VAV balancing tool

Room temperature

NS

Ordering information

Surface mounting - Temperature and humidity models (without RH% display)

Codes	Display Temperature only	Humidity accuracy	Setpoint adjustment	Warmer and cooler (+-3°C)	Occupation button	PIR Occupancy	F/°C scale toggle	Fan control	Screw terminals	Modular jack	Address switches
			Size - Height x Width: 80 x 80 mm - Temperature 0...40 °C								
NS-AHA7001-0	•	3%	•	---	•	---	---	---	---	•	---
NS-AHA7002-0	•	3%	•	---	•	---	---	---	•	---	---
NS-AHA7004-2 [1]	•	3%	•	---	•	---	---	---	•	•	•
NS-AHB7001-0	•	3%	•	---	•	---	•	---	---	•	---
NS-AHB7002-0	•	3%	•	---	•	---	•	---	•	---	---
NS-AHB7003-0	•	3%	---	---	•	---	•	---	•	---	•
NS-AHN7001-0	---	3%	---	---	---	---	---	---	---	•	---
NS-AHN7001-2 [1]	---	3%	---	---	---	---	---	---	---	•	---
NS-AHN7003-0	---	3%	---	---	---	---	---	---	•	---	•
NS-AHN7004-2 [1]	---	3%	---	---	---	---	---	---	•	•	•
NS-AHP7001-0	---	3%	---	•	•	---	---	---	---	•	---
NS-APA7001-0	•	2%	•	---	•	---	---	---	---	•	---
NS-APA7002-0	•	2%	•	---	•	---	---	---	•	---	---
NS-APB7001-0	•	2%	•	---	•	---	•	---	---	•	---
NS-APB7002-0	•	2%	•	---	•	---	•	---	•	---	---
NS-APB7003-0	•	2%	•	---	•	---	•	---	•	---	•
			Size - Height x Width: 120 x 80 mm - Temperature 0...40 °C								
NS-BHB7001-0	•	3%	•	---	•	---	•	---	---	•	---
NS-BHB7002-0	•	3%	•	---	•	---	•	---	•	---	---
NS-BHB7003-0	•	3%	•	---	•	---	•	---	•	---	•
NS-BHN7001-0	---	3%	---	---	---	---	---	---	---	•	---
NS-BHN7001-2 [1]	---	3%	---	---	---	---	---	---	---	•	---
NS-BHN7003-0	---	3%	---	---	---	---	---	---	•	-	•
NS-BHP7001-0	---	3%	---	•	•	---	---	---	---	•	-
NS-BHP7003-0	---	3%	---	•	•	---	---	---	•	-	•
NS-BPB7001-0	•	2%	•	---	•	---	•	---	---	•	---
NS-BPB7002-0	•	2%	•	---	•	---	•	•	•	---	---
NS-BPB7003-0	•	2%	•	---	•	---	•	---	•	---	•
NS-MHB7004-2 [1]	•	3%	•	---	•	•	•	---	•	•	•
NS-MHL7001-0	---	3%	---	---	•	•	---	---	•	•	•
NS-MHL7002-0	---	3%	---	---	•	•	---	---	•	-	---
NS-MHN7004-2 [1]	---	3%	---	---	---	•	---	---	•	•	•

Note
[1] Models without Johnson Controls logo

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Room temperature

NS

Ordering information

Surface mounting - Temperature and humidity models (Display temperature or RH% - Field selectable)

Codes	Display	Humidity accuracy	Setpoint adjustment	W/C Warmer and cooler (+-3°C)	Occupation button	PIR Occupancy	F/°C scale toggle	Fan Control	Screw terminals	Modular jack	Address switches
Size - Height x Width: 80 x 80 mm - Temperature 0...40 °C											
NS-AHR7101-0	•	3%	•	---	•	---	•	---	---	•	---
NS-AHR7102-0	•	3%	•	---	•	---	•	---	•	---	---
NS-AHR7103-0	•	3%	•	---	•	---	•	---	•	---	•
NS-APR7101-0	•	2%	•	---	•	---	•	---	---	•	---
NS-APR7102-0	•	2%	•	---	•	---	•	---	•	---	---
Size - Height x Width: 120 x 80 mm - Temperature 0...40 °C											
NS-BHR7101-0	•	3%	•	---	•	---	•	---	---	•	---
NS-BHR7103-0	•	3%	•	---	•	---	•	---	•	---	•

Flush mount - Temperature only models

Codes	Display	Screw Terminals	Modular jack	Address switches
Size - Height x Width: 114 x 70 mm - Temperature 0...40 °C				
NS-FTN7003-0	---	•	---	•
NS-FTN7003-2 [1]	---	•	---	•

Surface mounting - PIR Occupancy only models

Codes	PIR Occupancy	Screw terminals	Modular jack	Address switches
Size - Height x Width: 120 x 80 mm				
NS-MNN7001-0	•	---	•	---
NS-MNN7003-0	•	•	---	•
NS-MNN7004-2 [1]	•	•	•	•

Surface mounting - CO_2 Occupancy only models

Codes	Range (PPM)	Screw terminals	Modular jack	Address switches
Size - Height x Width: 120 x 80 mm				
NS-BCN7004-0	2.000	•	•	•
NS-BCN7004-2 [1]	2.000	•	•	•

Duct Mounting - Discharge air sensors

Codes	Screw terminals + cable (3 m length)	Probe length (mm)	Address switches
Size - Height x Width: 76 x 76 mm - Temperature -10...60 °C			
NS-DTN7043-0	•	102	•
NS-DTN7043-2 [1]	•	102	•
NS-DTN7083-0	•	203	•
NS-DTN7083-2 [1]	•	203	•

Note
[1] Models without Johnson Controls logo

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Wireless room sensor

WRS

Proprietary wireless protocol

The WRS Many-to-One and TE-7800 One-to-One wireless room temperature sensing system are designed to gather temperature and zone data from multiple wireless room temperature sensors, and distribute that data to multiple field controllers on a Metasys® network.

A Many-to-One WRS system consists of multiple WRS-TTx series wireless room temperature sensors communicating with one or more WRS-RTN series receivers.

The receivers collect wireless temperature, zone, and battery-condition data messages and route that data over Ethernet to a Network Automation Engine (NAE) or a Network Control Engine (NCE).

The NAE or NCE distributes the temperature and zone data to supported BACnet®, N2 and LONWORKS® controllers on Metasys networks.

A simple One-to-One wireless sensing system consists of one WRS-TTx series wireless room temperature sensor communicating single-zone temperature data to an associated TE-7800 series receiver. Up to four sensors can report to a single receiver to provide enhanced zone control.

Features

▶ Power supply: 24 VAC
▶ RF band: 2.4 GHZ ISM Bands
▶ Transmission range: 114 m max indoor line-of-sight 50 m practical average indoor
▶ Transmissions: every 60 seconds
▶ Ambient operating temperature: 0 to 50 °C
▶ Ambient operating humidity: 0 to 95% RH

Dimensions in mm

Ordering information

Codes	Description	Transmission power
WRS-RTN0000-1	Receiver for Many-to-One wireless room temperature sensing system, includes omnidirectional antenna	
TE-7820-1	Receiver with Zone Bus Interface for One-to-One wireless room temperature sensing system, interfaces with VMA1400 series controllers (only). Includes 1.8 m Zone Bus Interface cable and omnidirectional antenna	
TE-7830-1	Receiver with Analog Interface for One-to-One wireless room temperature sensing system, Interfaces with Specified Analog Digital controllers (Johnson Controls AS-AHU, AS-UNT, AS-VAV, DX-9100 or FXxx Series Controllers). Includes 1.8 m Analog Interface cable and omnidirectional antenna.	10 dBm (CE Mark)
WRS-TTP0000-1	Wireless room temperature sensor, warmer/cooler (+/-) set point adjustment	
WRS-TTR0000-1	Wireless room temperature sensor, no set point adjustment	
WRS-TTS0000-1	Wireless room temperature sensor, set point adjustment scale: 13 to 29 °C	

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Wireless room sensor

WRZ

ZigBee wireless protocol

The WRZ series wireless room sensors are designed to sense room/zone temperature and transmit wireless temperature control data. Some models also sense and transmit relative humidity.

In a ZFR1800 series wireless field bus system application, the sensors communicate with FEC16 Series, FEC26 series and VMA16 series controllers by means of the ZFR1811 router.

In wired field bus applications, the sensors communicate with a WRZ-7860 wireless receiver. The WRZ-7860 receiver transfers data to the controller by means of the Sensor Actuator (SA) communication bus. In a typical application, one WRZ series sensor reports to one WRZ-7860 receiver, but up to five WRZ series sensors can be associated with a single WRZ-7860 receiver for multi-sensor averaging or high/low temperature selection.

WRZ series sensor models are available with or without a Liquid Crystal Display (LCD). Depending on the sensor model, the WRZ series sensor can transmit sensed temperature, setpoint temperature, sensed humidity, occupancy status and PIR occupancy sensor and low battery conditions to an associated router or receiver. The WRZ series sensors are designed for indoor, intra-building applications only.

The WRZ sensors use direct-sequence, spread-spectrum RF technology, and operate on the 2.4 GHz Industrial, Scientific and Medical (ISM) band. The receiver meets the IEEE 802.15.4 standard for low power, low duty cycle RF transmitting systems.

Refer to the WRZ Series Wireless Room Sensors Product Bulletin (LIT-12011653) for important product application information.

Features

▶ Wireless RF design
▶ Integral wireless signal strength testing built into the sensor
▶ Easy installation and relocation
▶ Easily-applicable data types
▶ Simple, field adjustable DIP switches
▶ Optional, battery-powered WRZ-SST-110 wireless system survey tool
▶ High resistance to RF interference from other radio devices or RF noise sources
▶ User selectable default display for humidity models
▶ Display models
▶ Three temperature setpoint range options

Dimensions in mm

108
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Wireless room sensor

WRZ

Ordering information

Codes	Description
WRZ-THB0000-0	Wireless room temperature and humidity sensor with display, warmer/cooler (+/-) setpoint adjustment or setpoint adjustment scale: 13 to 27 °C, F/C button, relative humidity (RH) button and manual occupancy override button
WRZ-THN0000-0	Wireless room temperature and humidity sensor with battery level/signal strength LED and manual occupancy override button
WRZ-THP0000-0	Wireless room temperature and humidity sensor with warmer/cooler (+/-) setpoint adjustment and manual occupancy override button
WRZ-TTB0000-0	Wireless room temperature sensor with display, F/C button and manual occupancy override button
WRZ-TTD0000-0	Wireless room temperature sensor with display, F/C Button, fan speed control and manual occupancy override button
WRZ-TTP0000-0	Wireless room temperature sensor with warmer/cooler (+/-) setpoint adjustment, battery level/signal strength LED and manual occupancy override button
WRZ-TTR0000-0	Wireless room temperature sensor with battery level/signal strength LED, manual occupancy override button and no setpoint adjustment
WRZ-TTS0000-0	Wireless room temperature sensor with setpoint adjustment scale: 13 to 27 °C, battery level/signal strength LED and manual occupancy override button
WRZ-MNN0100-0	Wireless Zigbee™ sensor, occupancy (PIR)
WRZ-MTN0100-0	Wireless Zigbee™ sensor, occupancy (PIR), temperature, no display
WRZ-MHN0100-0	Wireless Zigbee™ sensor, occupancy (PIR), temperature, 3% relative humidity, no display
WRZ-MTB0100-0	Wireless sensor, occupancy (PIR), temperature, display, warmer/cooler dial, Fahrenheit/Celsius pushbutton, occupancy override
WRZ-SST-120	Wireless system survey tool

WRZ sensor model comparison

Sensor model	Temperature	3% Humidity	Display	F/°C button	Fan control	Occupancy override	PIR occupancy sensor	Setpoint adjustment dial *
WRZ-THB0000-0	•	•	•	•	---	•	---	CONFIG
WRZ-THN0000-0	•	•	---	---	---	•	---	NO DIAL
WRZ-THP0000-0	•	•	---	---	---	•	---	W/C
WRZ-TTB0000-0	•	---	•	•	---	•	---	CONFIG
WRZ-TTD0000-0	•	---	•	•	•	•	---	CONFIG
WRZ-TTP0000-0	•	---	---	---	---	•	---	W/C
WRZ-TTR0000-0	•	---	---	---	---	•	---	NO DIAL
WRZ-TTS0000-0	•	---	---	---	---	•	---	SCALED
WRZ-MNN0100-0	---	---	---	---	---	---	•	NO DIAL
WRZ-MTN0100-0	•	---	---	---	---	---	•	NO DIAL
WRZ-MHN0100-0	•	•	---	---	---	---	•	NO DIAL
WRZ-MTB0100-0	•	---	•	•	---	•	•	W/C

Note
* Warmer/cooler temperature offset (W/C), single-value in 13 to 29 °C range (SCALED), CONFIG - system-configured (available on display models only)

Electric fan coil thermostat

T125-E

Analog fan coil thermostats

T125 electric fan coil thermostats are designed to control heating, cooling, or air conditioning unit in commercial, industrial and residential installation.

Typical application includes the control of fan coil units, packaged terminal air conditioners and combination heating and cooling equipment. As part of the system that consists of a two-way or three-way valve and a multi-speed line voltage fan.

Features
▶ 220 V power supply
▶ Heating and Cooling mode
▶ 2-4 pipes configuration
▶ 3-speed fan override
▶ 86 x 86 mm room enclosures
▶ Temperature dial ranges 10...30 °C
▶ Relay output max. 5A

Dimensions in mm

Ordering information

Codes	Built-in NTC	Setpoint range	2 pipes (Heating or cooling)	4 pipes (Heating and cooling)	Outputs	
					PAT	On/Off
T125BAC-JS0-E	•	10...30 °C	•	---	•	•
T125FAC-JS0-E			---	•	---	•

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Electric fan coil thermostat

T5200-E

LCD digital fan coil thermostats

T5200-E LCD digital fan coil thermostats are designed to control heating, cooling, or year round air conditioning unit in commercial, industrial and residential installation.

Typical application includes the control of fan coil units, packaged terminal airconditioners and combination heating and cooling equipment. As part of the system that consists of a two-way or three-way valve and a multi-speed line voltage fan.

These aesthetic design thermostat features with backlit Liquid Crystal Display (LCD); an attractive white color in a compact size complements any decor.

The thermostat does not require any battery backup as setpoint and other parameters are stored in nonvolatile memory.

The intuitive operation makes the thermostat very user-friendly.

Features

▶ 85...260 VAC power supply
▶ Heating and cooling mode
▶ 2-4 pipes configuration
▶ 3-speed fan override
▶ 88 x 88 mm room enclosures
▶ Setpoint temperature 10...30 °C
▶ °C and °F changeable
▶ Relay output max. 5A
▶ Occupancy Mode

Dimensions in mm

Ordering information

Codes	Built-in NTC	Occupancy mode	Setpoint range	2 pipes (Heating or cooling)	4 pipes (Heating and cooling)	Outputs PAT	Outputs On/Off
T5200-TB-9JS0-E	•	•	10...30 °C	•	---	•	•
T5200-TF-9JS0-E		---		---	•	---	•

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Electric fan coil thermostat

T8000
Touch screen thermostats

The T8000 touch screen thermostats, are designed to control heating and cooling through air conditioning unit in commercial, industrial and residential installation.
Typical applications include the control of fan coil units, packaged terminal air conditioners and combination of heating and cooling equipment. As part of the system, the T8000 thermostats controls a two-way or three-way valve and a multi-speed line voltage fan.

T8000 Thermostat range offer solution with and without communication. The new model T8800 is designed to be connected to the Johnson Controls Buildng automation system Metasys thanks its BACnet MS/TO communication.

The T8000, with its large LCD touchscreen displays, provides the status of current working mode, the fan speed, the indoor temperature and the temperature set point.

Touch screen icons include:
Power on/off ⏻
Mode selection Ⓜ,
Fan speed selection ✿
Clock/Timer ◷
Two adjustment buttons ⋀ and ⋁.

Features
▶ Touch screen
▶ Stand alone or with BACnet MS/TP communication
▶ Backlit Liquid Crystal Display (LCD)
▶ 6 function keys
▶ Appearance
▶ Energy saving
▶ Installation, service and maintenance

T8200-TF20-9JR0 / T8200-TF20-9JS0

Dimensions in mm

Ordering information

Codes	Power	Mode	Remote sensor	Occupancy	Valves control	Fan controls	Working range	Communication
T8200-TBE0-9JR0	AC85-230 V, 50/60 Hz	2 pipe, cooling and heating	NTC 10K	---	On/Off	3 speed relays	0 ...45 °C	---
T8200-TBE0-9JS0			---	Contact (DI)				
T8200-TFE0-9JR0		4 pipe, cooling and heating	NTC 10K	---				
T8200-TFE0-9JS0			---					
T8800-TB20-9JS0 *	24 VAC	2 pipe, cooling and heating	NTC 10K	Contact (DI)				BACnet MS/TP
T8800-TF20-9JS0 *		4 pipe, cooling and heating						
T8800-TB21-9JS0 *		2 pipe, cooling and heating			Proportional (0...10V)			

Note
* Available in Spring 2017

Johnson Controls

Analog room controller

TC-8900 - PM-8900

Room thermostats

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

For applications without fan speed control the family includes stand alone units (TC-890x), local controllers (TC-893x) with remote setpoint module (ES-8930) and local controllers (TC-894x) with central setpoint module (ES-8940).

For applications with fan speed control the family includes the PM-8900 power modules in connection with TC-894x with or without central setpoint module (ES-8940).

Features

▶ 2-pipe, 2-pipe with change-over, 2-pipe with electrical coil or 4-pipe configurations with and withoput 3-speed fan override
▶ 80 x 80 mm room enclosures
▶ Temperature dial ranges 12...28 °C, +/-
▶ 24 VAC power supply for the TC-8900 controls, 230 VAC in connection the the PM-8900 power module

Dimensions in mm

Ordering information

TC-890x stand alone controllers

Codes	Built-in NTC K10 sensing element	Setpoint range	Input 0...10 V	Fan output	Outputs			
					PAT	0...10 V	DAT	On/Off
TC-8903-1131-WK					1	---	---	---
TC-8901-2131-WK	•				---	2	---	---
TC-8904-2131-WK					---	---	2	---
TC-8906-2131-WK		12...28 °C			---	---	---	2
TC-8903-1132-WK			---	---	1	---	---	---
TC-8901-2132-WK	---				---	2	---	---
TC-8904-2132-WK					---	---	2	---
TC-8906-2132-WK					---	---	---	2
TC-8903-1151-WK	•	0...40 °C			1	---	---	---
TC-8903-1152-WK					1	---	---	---
TC-8903-1183-WK	---	0...100%	•		1	---	---	---
TC-8901-2183-WK					---	2	---	---

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Analog room controller

TC-8900 - PM-8900

Ordering information

TC-893x local controllers with ES-8930-3031-WK remote setpoint module

Codes	Built-in NTC K10 sensing element	Setpoint range	Fan output	Outputs			
				PAT	0...10 V	DAT	On/Off
TC-8933-1112-W	---	---	---	1	---	---	---
TC-8931-2112-W				---	2	---	---
TC-8934-2112-W				---	---	2	---
TC-8936-2112-W				---	---	---	2
ES-8930-3031-WK	•	12...28 °C		---	---	---	---

TC-894x local controllers with ES-8940 central setpoint module

Codes	Built-in NTC K10 sensing element	Setpoint range	Fan output	Outputs			
				PAT	0...10 V	DAT	On/Off
TC-8943-1141-WK	•	+/-	---	1	---	---	---
TC-8941-2141-WK				---	2	---	---
TC-8944-2141-WK				---	---	2	---
TC-8946-2141-WK				---	---	---	2
ES-8940-4130-WK	---	12...28 °C		---	---	---	---

TC-894x local controllers with ES-8940 central setpoint module

Codes	Built-in NTC K10 sensing element	Setpoint range	Fan output	Outputs	Power module codes	Configuration
TC-8902-1031-WK	•	12...28 °C	3 Speed	1 x 0...10 VDC 1 x DAT 230 V 1 x DAT 24 V	PM-8902-0500 PM-8905-0300 PM-8905-0500	2 pipe with change over
TC-8907-1031-WK				1 x Relay 3A 230 V/24 V	PM-8907-0300	
TC-8902-2031-WK				2 x 0...10 VDC 2 x DAT 230 V 2 x DAT 24 V	PM-8902-0500 PM-8905-0300 PM-8905-0500	4 pipe
TC-8907-2031-WK				2 x Relay 3A 230 V/24 V	PM-8907-0300	
TC-8902-1032-WK	---			1 x 0...10 VDC 1 x DAT 230 V 1 x DAT 24 V	PM-8902-0500 PM-8905-0300 PM-8905-0500	2 pipe with change over
TC-8907-1032-WK				1 x Relay 3A 230 V/24 V	PM-8907-0300	
TC-8902-2032-WK				2 x 0...10 VDC 2 x DAT 230 V 2 x DAT 24 V	PM-8902-0500 PM-8905-0300 PM-8905-0500	4 pipe
TC-8907-2032-WK				2 x Relay 3A 230 V/24 V	PM-8907-0300	
TC-8942-2041-WK (only in connection with ES-8940-4130-WK)	•	+/- on local controller TC-89, 12...28 °C on ES-8940 central setpoint module		2 x 0...10 VDC 2 x DAT 230 V 2 x DAT 24 V	PM-8902-0500 PM-8905-0300 PM-8905-0500	
TC-8947-2041-WK (only in connection with ES-8940-4130-WK)				2 x Relay 3A 230 V/24 V	PM-8907-0300	

Electronic heating controller

ER65-DRW

Digital controller hot water and air unit

The controller is a digital device for domestic or residential heating units.

It covers water and air heating applications.

All-in-one design allows full flexibility to apply a single controller to many small heating applications.

The controller incorporates a comprehensive energy saving application, and can be connected to a supervisory system via its on board communications port.

Features

▶ Standard heating systems
▶ Compact design: up to 3 sensors, 2 digital inputs and 5 outputs in a 4 DIN modules housing
▶ Robust front panel for durability and long term use
▶ Removable plug connectors for quick mounting and wiring
▶ Direct 230 V supply: no external transformer required
▶ Embedded RS485: no additional communication card required
▶ Pre-set models and selectable options to extend controller options

Dimensions in mm

Ordering information

Code	Description
ER65-DRW-501C	Heating controller, sensor not included, compatible with the ER-NTC sensor line, Modbus communication

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Electro-pneumatic transducers

EP-1110

The EP-1110 is an electric to air pressure transducer designed to convert an electrical input signal into a pressure output with a linear relationship. It is using a force balance with moving coil system.

The input signal 0...+10 V or 0...20 mA is converted to an output signal 0,2...1 bar.

16
Sheet metal screw
BLSHR BZ 3.5x25

74.5

198 189.5

Mounting 2

8.5
62

BLSHR BZ 3.5x25

Spacer bolt 16 mm long

Dimensions in mm

Ordering information

Codes	Input	Output
EP-1110-7001	0...10 V (DC), Ri ≥ 1 kΩ, current through coil approx. 10 mA	20–100 kPa, linearly proportional to input
EP-1110-7002	2...10 V (DC), 0...10 V (DC), Ri ≥ 1 kΩ, current through coil approx. 10 mA	20–100 kPa, 3...100 kPa, linearly proportional to input
EP-1110-7003	0...20 mA (DC), Ri ≤ 450 Ω, current through coil approx. 10 mA	20–100 kPa, linearly proportional to input
EP-1110-7004	4...20 V (DC), 0...20 mA (DC), Ri ≤ 450 Ω, current through coil approx. 10 mA	20–100 kPa, 3...100 kPa, linearly proportional to input

European product catalogue 2017

Electro-pneumatic transducers

EP-2000

The EP-2000 electro-pneumatic transducer with motor drive 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 pneumatic devices or for electrical remote adjustement of the set point of pneumatic controllers.

A reversible synchronous motor drives a cam disk over a gear box. The direction of travel of the cam disk is transformed by a leaf spring into a change of force, which by a pneumatic force comparison system is converted into a control pressure change.

On models with position transmitter a positiometer is installed for electrical position feed back.

Features

▶ High linearity
▶ Low hysteresis
▶ high accuracy
▶ Small supply air influence
▶ Small air consumption
▶ High air capacity

Sheet metal screw
BLSHR BZ 3.5x25

Mounting 2

Spacer bolt 16 mm long

BLSHR BZ 3.5x25

Dimensions in mm

Ordering information

Codes	Limit switch and 2 kΩ feedback potentiometer	Accessories	Voltage supply (50/60 Hz)
EP-2000-7001		---	230 V
EP-2000-7004	120 seconds		24 V
EP-2000-7021		2 kΩ potentiometer	230 V
EP-2000-7024			24 V

European product catalogue 2017
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Electro-pneumatic transducers

EP-8000

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).

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

Dimensions in mm

Ordering information

Codes	Output	Input range	Factory output range kPa (psig)
EP-8000-1	Low volume (non-relay)	0.5...9 VDC	7...126 (1-18)
EP-8000-2	High volume (relay)	0.25...9.5 VDC	3.5...133 (0.5-19)
EP-8000-3	Low volume (non-relay)	4...20 mADC	21...105 (3-15)
EP-8000-4	High volume (relay)	4...20 mADC	21...105 (3-15)

Accessories

Codes	Description
R-3710 Series	0.18 mm restrictor (required for low volume models)
EP-8000-101	Electro-pneumatic transducer mounting kit
A-4000-8001	Inline air filter (required for all models)
JC 5361	Hypodermic needle test probe assembly

Johnson Controls

Metasys®

ADS-Lite
Metasys server lite

The Application and Data Server (ADS) Lite is an optional component of the Metasys system that manages the collection and presentation of large amounts of trend data, event messages, operator transactions, and system configuration data. As Site Director, the ADS-Lite provides secure communication to a network of Network Automation Engine (NAE) 35s, NAE45s, Network Control Engines (NCEs) and Network Integration Engines (NIEs). The ADS-Lite is available for purchase and use in Europe, Africa, and Latin America.

The new Metasys UI is designed to enhance our customers' productivity and effectiveness. It allows users to navigate by space to view summaries, trends, and activities, emulating the way they work every day. The new user interface is also optimized for all devices, enabling our customers to work smarter from any device and any location. Metasys UI 2.0 additionally provides graphics for spaces and equipment. Existing Graphics+ and Standard Graphics are easily configured for the Metasys UI. These and other enhancements continue to consolidate existing Metasys user interface products into a single, dramatically improved experience that is accessible from any device.

The Site Management Portal UI remains available on the ADS/ADX to provide comprehensive access to Metasys for experienced users and commissioning.

The ADS-Lite includes an Open Database Connectivity (ODBC) compliant database package for secure storage of historical and configuration data.

The Metasys system can communicate with cloud-based applications easily and securely. To make this connection, the Metasys system requires minor programming and setup by Johnson Controls. When you are connected, you can access multiple cloud-base applications and features. To learn more, please visit the Building Management page located on the Johnson Controls website.

Note: In this document, the term engine refers to all supported NAE35s, NAE45s, NCEs, and NIE, unless otherwise noted.
The ADS-Lite supports up to five engines in any combinations of NAE35, NAE45, NCE, or NIE29/39/49

Features
▶ Support of IT Standards and Internet Technologies
▶ Secure User Access
▶ Flexible System Navigation and Dynamic User Graphics
▶ Alarm and Event Management
▶ Long-Term Trend Data Storage

119
European product catalogue 2017
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Metasys®

ADS-Lite

Ordering information

Codes *	Description
MS-ADSLE5U-0	ADS-Lite New project software for up to 5 users
MS-ADSLE5U-6	ADS-Lite Upgrade project software: for up to 5 users, on site with a previous version of the Metasys software
MS-ADS05U-8	ADS-Lite to full ADS Migration project software: for up to 5 users, on site migrating from a previous major release of ADS-Lite, to the current release of full ADS

Note

* Availability: The ADS-Lite is available for purchase and use in Europe, Africa and Latin America.
   Refer to ADS Lite Product Bulletin (LIT-12011690) for important product application information.

Technical specifications

The following table lists by operating system the Microsoft® SQL Server® software editions that have been fully qualified by Johnson Controls for Release 8.0. You can select other combinations, but we recommend that you select from the following pairings.

Recommended Operating System and SQL Server combinations

Operating system	Database software			
	SQL Server 2014 Express SP1 (64-bit)	SQL Server 2012 Express SP3 (64-bit)	SQL Server 2008 Express R2 SP3 (64-bit)	SQL Server 2008 Express R2 SP3 (32-bit)
Windows® 10 Pro and Windows 10 Enterprise (64-bit)	•	---	---	---
Windows 8.1 Pro and Windows 8.1 Enterprise (64-bit)	•	•	•	---
Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (64-bit)	•	•	•	---
Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (32-bit)	---	---	---	•

Note

Microsoft SQL Server 2012 Express with SP3 is not an automatic Windows update.
The OS and SQL software must both be 32-bit or 64-bit. Microsoft SQL Server 2012 Express with SP3 is not an automatic Windows update.
For more information, refer to **https://support.microsoft.com/en-us/kb/2979597**.

Metasys®

ADS-Lite

Technical specifications

Application and Data Server-Lite system requirements

Recommended computer platform [1]	Intel® Core™ i7 processor, 4th generation or later
	2 x 320 GB hard disk (RAID 1)2 with 40 GB free space after installation of all prerequisite software and before installation of ADS-Lite software. Configure RAID 1 (mirroring) with disk write-caching turned on.
	Note: Prerequisite software includes the supported operating system, database software, .NET Framework, and any other software or service packs required for your ADS configuration.
	DVD drive
	Graphics adapter (1 GB RAM, ATI® Technologies or NVIDIA® Corporation, 64-bit compatible [for 64-bit operating systems], Small Form Factor [SFF] if required) [3]
Recommended memory	4 GB RAM minimum (32-bit systems)
	8 GB RAM minimum (64-bit systems)
Supported operating Systems [4] and database software	**Windows® 10 Pro and Windows 10 Enterprise Editions (64-bit)**
	Supports Microsoft SQL Server® 2014 Express with SP1 (64-bit), or Microsoft SQL Server 2012 Express with SP3 (64-bit)
	Note: Microsoft SQL Server 2012 Express with SP3 is not an automatic Windows update.
	For more information, refer to **https://support.microsoft.com/en-us/kb/2979597**.
	Windows 8.1 Pro and Windows 8.1 Enterprise Editions (64-bit)
	Supports Microsoft SQL Server® 2014 Express with SP1 (64-bit), Microsoft SQL Server 2012 Express with SP3 (64-bit), or Microsoft SQL Server 2008 R2 Express with SP3 (64-bit)
	Note: Microsoft SQL Server 2012 Express with SP3 is not an automatic Windows update.
	For more information, refer to **https://support.microsoft.com/en-us/kb/2979597**.
	Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (32-bit or 64-bit)
	Supports Microsoft SQL Server® 2014 Express with SP1 (64-bit), Microsoft SQL Server 2012 Express with SP3 (64-bit), or Microsoft SQL Server 2008 R2 Express with SP3 (32-bit or 64-bit)
	Note: The OS and SQL software must both be 32-bit or 64-bit. Microsoft SQL Server 2012 Express with SP3 is not an automatic Windows update.
	For more information, refer to **https://support.microsoft.com/en-us/kb/2979597**.
Supported operating Systems for Metasys Client Devices	Windows 10 Pro or Windows 10 Enterprise
	Windows 8.1 Pro or Windows 8.1 Enterprise
	Windows 7 Professional, Enterprise, or Ultimate Edition with SP1 (32-bit or 64-bit)
	Apple® OS X® 10.11 El Capitan
	Apple® OS X® 10.10 Yosemite
	Apple® OS X® 10.9 Mavericks
	Note:
	· In OS X, you cannot view Graphics+ graphics in the Site Management Portal UI.
	· Windows XP and Apple operating systems are supported for Metasys client computers only.
Supported Web Browser software for Metasys Client Devices	Windows Internet Explorer® version 11
	Note: Select the Use Microsoft compatibility lists option, found under Tools > Compatibility View Settings, to ensure that websites appear and function correctly.
	Google® Chrome™ version 30 or later
	Apple Safari® version 8.0 or later
	Other browsers, such as Mozilla® Firefox®, may also be used but are not fully supported.
	Note: You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log in to the Site Management Portal (SMP) user interface.
Supported Virtual Environments	Microsoft Hyper-V™, VMware®
Supported User Interfaces	Site Management Portal (SMP)
	Metasys UI
	Ready Access Portal

Additional software included with the ADS-Lite	CCT software	Launcher software
	Export Utility software	Microsoft SQL Server 2014 Express software with SP1
	Metasys Database Manager software	Metasys UI [5]
	Ready Access Portal software	SCT software

Optional hardware	Any network or local printer supported by the qualified Windows operating system
Optional software	Graphic Generation Tool

Note

[1] Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable.
Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information regarding computer/server recommendations.
[2] For best performance, use Serial Attached SCSI (SAS) hard drives, not Small Computer System Interface (SCSI) hard drives.
[3] For improved performance only when ADS and Ready Access Portal share the same computer.
[4] *Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for specific Microsoft Windows operating system settings that may be required for your Metasys system configuration.*
[5] *For more information on the Metasys UI, refer to the Metasys® UI Offline Installation Instructions (LIT-12011952).*

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Metasys®

ADX - ADS

Metasys server

The Application and Data Server (ADS) and Extended Application and Data Server (ADX) are optional components of the Metasys system that manage the collection and presentation of large amounts of trend data, event messages, operator transactions, and system configuration data. The ADS is an entry-level server that runs on personal computers and supports up to 5 users. The ADX is a larger scale system that runs on a server operating system to provide extended historical archiving and reporting capabilities. The ADX is offered in several models to support up to 10, 25, 50, or 100 users. As Site Director, the ADS/ADX provides secure communication to a network of Network Automation Engines (NAEs), Network Control Engines (NCEs), and Network Integration Engines (NIEs).

The new Metasys UI is designed to enhance our customers' productivity and effectiveness. It allows users to navigate by space to view summaries, trends, and activities, emulating the way they work every day. The new user interface is also optimized for all devices, enabling our customers to work smarter from any device and any location. Metasys UI 2.0 additionally provides graphics for spaces and equipment. Existing Graphics+ and Standard Graphics are easily configured for the Metasys UI. These and other enhancements continue to consolidate existing Metasys user interface products into a single, dramatically improved experience that is accessible from any device.

The Site Management Portal UI remains available on the ADS/ADX to provide comprehensive access to Metasys for experienced users and commissioning.

The ADS/ADX includes an Open Database Connectivity (ODBC) compliant database package for secure storage of historical and configuration data.

The ADS and ADX support virtual environments, including VMware® and Microsoft® Hyper-V™. *Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information.*

The Metasys system can communicate with cloud-based applications easily and securely. To make this connection, the Metasys system requires minor programming and setup by Johnson Controls.
When you are connected, you can access multiple cloud-based applications and features. To learn more, please visit the Building Management page located on the Johnson Controls website.

For the ADX, the Metasys Advanced Reporting System and Energy Essentials report on system configuration performance, energy usage, demand and cost.

Note
In this document, the term network engine refers to NAEs, NCEs and NIEs, unless otherwise noted.
Refer to the ADS Product Bulletin (LIT-1201525) for important product application information.

Features
▶ Support of IT Standards and Internet Technologies
▶ Secure User Access
▶ Flexible System Navigation and Dynamic User Graphics
▶ Alarm and Event Management
▶ Long-Term Trend Data Storage
▶ Optional Metasys Advanced Reporting System and Energy Essentials

Applications
Use an ADS when:
▶ The number of network engines becomes larger than a single network engine can handle efficiently as Site Director.
▶ Long-term historical data storage needs exceed the capacity of a typical network engine.
▶ The number of simultaneous users logging in exceeds the capacity of a single network engine.
The ADS supports up to 5 simultaneous users, and up to 10 to 14 NxE engines.
Refer to the Metasys System Configuration Guide (LIT-12011832).

Use an ADX when:
▶ The Metasys Advanced Reporting System, Energy Essentials, or the Metasys for Validated Environments (MVE), Extended Architecture application is required
▶ You need to support more than 5 simultaneous users. The ADX supports up to 10, 25, 50, or 100 users, and up to 1,000 NxE engines.
Refer to the Metasys System Configuration Guide (LIT-12011832).
▶ Any one of your data storage or access requirements is not met by an ADS.

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Metasys®

ADX - ADS

Ordering information

For complete ordering information, refer to the Metasys System Software purchase options Product Bulletin (LIT-12011703).

New or upgrade software

New software codes	Description	Upgrade software codes	Migration software codes
MS-ADS05U-0	Application and Data Server For up to 5 users	MS-ADS05U-6	MS-ADS05U-8
MS-ADX10U-0	Extended Application and Data Server For up to 10 users	MS-ADX10U-6	MS-ADX10U-8
MS-ADX10SQL-0	Extended Application and Data Server For up to 10 users Includes Microsoft® SQL Server 2012 with SP2 software	MS-ADX10SQL-6	MS-ADX10SQL-8
MS-ADXSWO-0	Extended Application and Data Server For up to 25 users	MS-ADXSWO-6	MS-ADXSWO-8
MS-ADXSWOSQL-0	Extended Application and Data Server For up to 25 users Includes Microsoft SQL Server 2012 with SP2 software	MS-ADXSWOSQL-6	MS-ADXSWOSQL-8
MS-ADX50U-0	Extended Application and Data Server For up to 50 users	MS-ADX50U-6	MS-ADX50U-8
MS-ADX50SQL2-0	Extended Application and Data Server For up to 50 users For use on server with dual processors or 8 cores [1] Includes Microsoft SQL Server 2012 with SP2 software	MS-ADX50SQL2-6	MS-ADX50SQL2-8
MS-ADX50SQL-0	Extended Application and Data Server For up to 50 users For use on server with single processor or 4 cores Includes Microsoft SQL Server 2012 with SP2 software	MS-ADX50SQL-6	MS-ADX50SQL-8
MS-ADX100U-0	Extended Application and Data Server For up to 100 users	MS-ADX100U-6	MS-ADX100U-8
MS-ADX100SQL2-0	Extended Application and Data Server For up to 100 users For use on server with dual processors or 8 cores [1] Includes Microsoft SQL Server 2012 with SP2 software	MS-ADX100SQL2-6	MS-ADX100SQL2-8

Note
1 Servers with dual processors or 8 cores are recommended for ADX 50 user and 100 user software.

123
European product catalogue 2017
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Metasys®

Operating Systems and SQL Server combinations

The following table lists by operating system the Microsoft® SQL Server® software editions that have been fully qualified by Johnson Controls for Release 8.0. You can select other combinations, but we recommend that you select from the following pairings.

Recommended Operating System and SQL Server combinations

Operating system	Database software								
	ADS					ADX			
	SQL 2014 Express, SP1, 64-bit	SQL 2014 Express, SP1, 32-bit	SQL 2008 R2 Express, SP3 64-bit	SQL 2008 R2 Express, SP3 32-bit	SQL 2008 Express, SP3 32-bit	SQL 2014, SP1, 64-bit	SQL 2012, SP3 64-bit	SQL 2008 R2, SP3 64-bit	SQL 2008 R2, SP3 32-bit
Windows® 10 Pro and Windows 10 Enterprise (64-bit)	•	---	•	---	---	---	---	---	---
Windows® 8.1 Pro and Windows 8.1 Enterprise (64-bit)	•	---	•	•	---	---	---	---	---
Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (64-bit)	•	---	•	•	---	---	---	---	---
Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (32-bit)	---	•	---	---	•	---	---	---	---
Windows Server® 2012 R2 Standard Edition (64-bit)	---	---	---	---	---	•	•	•	---
Windows Server 2012 Standard Edition (64-bit)	---	---	---	---	---	•	•	•	---
Windows Server 2008 R2 Standard and Enterprise Editions with SP1 (64-bit)	---	---	---	---	---	•	•	•	---

Note

The OS and SQL software must both be 32-bit or 64-bit. Microsoft SQL Server 2012 Express with SP3 is not an automatic Windows update.
For more information, refer to **https://support.microsoft.com/en-us/kb/2979597**.

Metasys®

ADX - ADS

Technical specifications

Application and Data Server (ADS) system requirements (5 users)

Recommended Computer Platform **1**	3.4 GHz Intel® Quad Core™ processor
	2 x 500 GB hard disk (RAID 1) **2** with 40 GB free space after installation of all prerequisite software and before installation of ADS software. Configure RAID 1 (mirroring) with disk write-caching turned on.
	DVD drive
	Note: Prerequisite software includes the supported operating system, database software, .NET Framework, and any other software or service packs required for your ADS configuration.
	Graphics card (1 GB RAM, ATI® Technologies or NVIDIA® Corporation, 64-bit compatible [for 64-bit operating systems], Small Form Factor [SFF] if required) **3**
Recommended Memory **4**	8 to 16 GB RAM (64-bit systems)
	4 GB RAM (32-bit systems)
Supported Operating Systems **5** and Database Software	**Windows® 10 Pro and Windows 10 Enterprise Editions (64-bit)**
	Supports Microsoft SQL Server® 2014 Express with SP1 (64-bit), or Microsoft SQL Server 2012 Express with SP3 (64-bit)
	Note: Microsoft SQL Server 2012 Express with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597.**
	Windows 8.1 Pro and Windows 8.1 Enterprise Editions (64-bit)
	Supports Microsoft SQL Server® 2014 Express with SP1 (64-bit), Microsoft SQL Server 2012 Express with SP3 (64-bit), or Microsoft SQL Server 2008 R2 Express with SP3 (64-bit)
	Note: Microsoft SQL Server 2012 Express with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597.**
	Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (32-bit or 64-bit)
	Supports Microsoft SQL Server 2014 Express with SP1 (32-bit or 64-bit), Microsoft SQL Server 2012 Express with SP3 (32-bit or 64-bit), or Microsoft SQL Server 2008 R2 Express with SP3 (32-bit or 64-bit)
	Note: The OS and SQL software must both be 32-bit or 64-bit. Microsoft SQL Server 2012 Express with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597.**
Supported Operating Systems for Metasys Site Management Portal Client Computer	Windows 10 Pro or Windows 10 Enterprise
	Windows 8.1 Pro or Windows 8.1 Enterprise
	Windows 7 Professional, Enterprise, or Ultimate Edition with SP1 (32-bit or 64-bit)
	Apple® OS X® 10.11 El Capitan
	Apple OS X 10.10 Yosemite
	Apple OS X 10.9 Mavericks
	Apple OS X 10.8 Mountain Lion
	Note:
	· In OS X, you cannot view Graphics+ graphics in the Site Management Portal UI.
	· Apple operating systems are supported for Metasys client computers only.
Supported Web Browser Software for Metasys Site Management Portal Client Computers	Windows Internet Explorer® version 11
	Note: In Internet Explorer 11, select the Use Microsoft compatibility lists option, found under Tools > Compatibility View Settings, to ensure that websites appear and function correctly.
	Apple Safari® version 8.0 or later.
	Other browsers, such as Google® Chrome™ and Mozilla® Firefox®, may also be used but are not fully supported.
	Note: You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log in to the Site Management Portal (SMP) user interface.
Supported Virtual Environments	Microsoft Hyper-V™, VMware®
Supported User Interfaces	Site Management Portal (SMP)
	Metasys UI
	Ready Access Portal

Additional Software Included with the ADS		
	CCT software	Launcher software
	Export Utility software	Microsoft SQL Server 2014 Express software with SP1 (64-bit)
	Metasys Database Manager software	Microsoft SQL Server 2008 R2 Express software with SP3 (32-bit and 64-bit)
	SCT software	Microsoft .NET Framework Version 3.5 SP1

Optional Hardware	Any network or local printer supported by the qualified Windows operating system
Optional Software	Graphic Generation Tool

Note
1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable.
Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information regarding computer/server recommendations.
2 For best performance, use Serial Attached SCSI (SAS) hard drives, not Small Computer System Interface (SCSI) hard drives.
3 For improved performance in configurations where ADS and Ready Access Portal share the same computer.
4 For best performance, use the maximum amount of memory that the computer allows.
5 *Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for specific Microsoft Windows operating system settings that may be required for your Metasys system configuration.*

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Metasys®

ADX - ADS

Technical specifications

Extended Application and Data Server System requirements (Unified ADX systems, 10 or 25 users)

Recommended Server Platform [1]	2.20 GHz E5 Series Intel Xeon® 6-Core single processor or better 2 x 600 GB hard disk (RAID 1) [2] with 40 GB free space after installation of all prerequisite software and before installation of ADS software. Configure RAID 1 (mirroring) with disk write-caching turned on. DVD drive **Note:** ADX prerequisite software includes the Windows operating system, SQL Server software, Windows .NET Framework, and any other software or SPs required by your ADX configuration.
Recommended Memory [3]	16 to 32 GB RAM
Supported Operating Systems [4] and database software	**Windows Server® 2012 R2 (64-bit) [5]** Supports Microsoft SQL Server 2014 with SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit) **Note:** Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to https://support.microsoft.com/en-us/kb/2979597.* **Windows Server 2012 (64-bit) [5]** Supports Microsoft SQL Server 2014 with SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit) **Note:** Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to https://support.microsoft.com/en-us/kb/2979597.* **Windows Server 2008 R2 with SP1 (64-bit) [6]** Supports Microsoft SQL Server 2014 with SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit) **Note:** Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to https://support.microsoft.com/en-us/kb/2979597.*
Supported Operating Systems for Metasys Site Management Portal Client Computer	Windows 10 Pro or Windows 10 Enterprise Windows 8.1 Pro or Windows 8.1 Enterprise Windows 7 Professional, Enterprise, or Ultimate Edition with SP1 (32-bit or 64-bit) Apple® OS X® 10.11 El Capitan Apple OS X 10.10 Yosemite Apple OS X 10.9 Mavericks **Note:** · In OS X, you cannot view Graphics+ graphics in the Site Management Portal UI. · Apple operating systems are supported for Metasys client computers only.
Supported Web Browser Software for Metasys Site Management Portal Client Computers	Windows Internet Explorer® version 11 Note: In Internet Explorer 11, select the Use Microsoft compatibility lists option, found under Tools > Compatibility View Settings, to ensure that websites appear and function correctly. Apple Safari® version 8.0 or later. Other browsers, such as Google® Chrome™ and Mozilla® Firefox®, may also be used but are not fully supported. **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log in to the Site Management Portal (SMP) user interface.
Supported Virtual Environments	Microsoft Hyper-V™, VMware®
Supported User Interfaces	Site Management Portal (SMP) Metasys UI Ready Access Portal

Additional software included with the ADX	CCT software	Microsoft SQL Server 2014 software with SP17
	Export Utility software	SCT software
	Metasys Database Manager software	Microsoft .NET Framework Version 3.5 SP1
	Launcher software	
	Note: The Metasys Advanced Reporting System requires an ADX. The SCT computer must be online and accessible to the ADX at all times.	

Optional hardware	Any network or local printer supported by the qualified Windows operating system
Optional software	Energy Essentials Graphic Generation Tool

Note

[1] Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information regarding computer/server recommendations.

[2] For best performance, use SAS hard drives (not SATA hard drives) that use RAID controllers with write-caching enabled.

[3] For best performance, use the maximum amount of memory. An ADX with 16 GB RAM has much greater performance than an ADX with only 4 GB RAM.

[4] *Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for specific Microsoft Windows operating system settings that may be required for your Metasys system configuration.*

[5] For SQL Server 2014 software or SQL Server 2012 software, you must purchase a SQL Server software license for each individual processor core (with a minimum of four core licenses). For example, if you have a single processor with dual cores, purchase four core licenses (the minimum) for SQL Server 2014 software or SQL Server 2012 software.

[6] For SQL Server 2008 R2 software, you must purchase a SQL Server software license for each individual processor you have. You do not need to purchase multiple licenses if you have a single processor divided into multiple cores. For example, if you have a single processor with dual cores, purchase one license for SQL Server software.

[7] SQL Server software is only included with the MS-ADX10SQL product.

Metasys®

ADX - ADS

Technical specifications

Extended Application and Data Server System requirements (Unified ADX Systems, 50 or 100 users) - (Part 1/2)

Recommended Server Platform [1]	Two processors: 2.20 GHz Intel Xeon® Dual Processors with a minimum of 8 cores each
	6 x 300 GB 15,000 RPM hard disk (RAID 5)[2] with 50 GB free space after installation of all prerequisite software and before installation of ADS software. Configure RAID 5 with disk write-caching turned on.
	RAID Controller–PERC H710 with 1 GB Cache
	DVD drive
	Note: ADX prerequisite software includes the Windows operating system, SQL Server software, Windows .NET Framework, and any other software or SPs required by your ADX configuration.
Recommended Memory	32 GB RAM
Supported Operating Systems [3] and Database Software	**Windows Server® 2012 R2 (64-bit) [4]**
	Supports Microsoft SQL Server 2014 with SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit)
	Note: Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597**.
	Windows Server 2012 (64-bit) [4]
	Supports Microsoft SQL Server 2014 with SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit)
	Note: Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597**.
	Windows Server 2008 R2 with SP1 (64-bit) [5]
	Supports Microsoft SQL Server 2014 with SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit)
	Note: Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597**.
Supported Operating Systems for Metasys Site Management Portal Client Computer	Windows 10 Pro or Windows 10 Enterprise
	Windows 8.1 Pro or Windows 8.1 Enterprise
	Windows 7 Professional, Enterprise, or Ultimate Edition with SP1 (32-bit or 64-bit)
	Apple® OS X® 10.11 El Capitan
	Apple OS X 10.10 Yosemite
	Apple OS X 10.9 Mavericks
	Apple OS X 10.8 Mountain Lion
	Note: ·
	· In OS X, you cannot view Graphics+ graphics in the Site Management Portal UI.
	· Apple operating systems are supported for Metasys client computers only.
Supported Web Browser Software for Metasys Site Management Portal Client Computers	Windows Internet Explorer® version 11
	Note: In Internet Explorer 11, select the Use Microsoft compatibility lists option, found under Tools > Compatibility View Settings, to ensure that websites appear and function correctly.
	Apple Safari® version 8.0 or later.
	Other browsers, such as Google® Chrome™ and Mozilla® Firefox®, may also be used but are not fully supported.
	Note: You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log in to the Site Management Portal (SMP) user interface.
Supported Virtual Environments	Microsoft Hyper-V™, VMware®
Supported User Interfaces	Site Management Portal (SMP)
	Metasys UI
	Ready Access Portal

...Continued...

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ADX - ADS

Technical specifications

Extended Application and Data Server System requirements (Unified ADX Systems, 50 or 100 users) – (Part 2/2)

Additional Software included with the ADX	CCT software	Microsoft SQL Server 2014 software with SP1 [6]
	Export Utility software	Microsoft .NET Framework Version 3.5 SP1
	Metasys Database Manager software	SCT software
	Launcher software	
	Note: The Metasys Advanced Reporting System requires an ADX. The SCT computer must be online and accessible to the ADX at all times.	
Optional hardware	Any network or local printer supported by the qualified Windows operating system.	
Optional software	Energy Essentials Graphic Generation Tool	

Note:

[1] Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information regarding computer/server recommendations.

[2] For best performance, use SAS hard drives (not SATA hard drives) that use RAID controllers with write caching enabled.

[3] Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for specific Microsoft Windows operating system settings that may be required for your Metasys system configuration.

[4] For SQL Server 2014 software or SQL Server 2012 software, you must purchase a SQL Server software license for each individual processor core (with a minimum of four core licenses). For example, if you have a single processor with dual cores, purchase four core licenses (the minimum) for SQL Server 2014 software or SQL Server 2012 software.

[5] For SQL Server 2008 R2 software, you must purchase a SQL Server software license for each individual processor you have. You do not need to purchase multiple licenses if you have a single processor divided into multiple cores. For example, if you have a single processor with dual cores, purchase one license for SQL Server software.

[6] SQL Server software is only included with the MS-ADX50SQL product.

Metasys®

ADX - ADS

Technical specifications

Extended Application and Data Server system requirements (Split ADX Systems, 10 or 25 users) - (Part 1/2)

Recommended Server Platform [1]	**Web/Application Server** 2.20 GHz E5 Series Intel Xeon® Quad Core single processor or better. 2 x 600 GB hard disk (RAID 1) [2] with 40 GB free space after installation of all prerequisite software [4] and before installation of ADS software. Configure RAID 1 (mirroring) with disk write-caching turned on. DVD drive **Note:** Metasys UI must reside on the ADX web/application server.
	Database Server 2.20 GHz E5 Series Intel Xeon® 6-Core single processor or better. 2 x 600 GB hard disk (RAID 1) with 40 GB free space after installation of all prerequisite software [4] and before installation of ADS software. Configure RAID 1 (mirroring) with disk write-caching turned on. DVD drive
	SCT Computer In a split configuration, you cannot install SCT or Ready Access Portal software on either the ADX web/application server computer or the ADX database server computer. *Refer to the System Configuration Tool Catalog Page (LIT-1900198) for current SCT computer requirements.*
Recommended Memory [3]	16 GB RAM (web/application server and database server for 10 or 25 user ADX)
Supported Operating Systems [5] , [6] with Supported Database Software	**Windows Server® 2012 R2 (64-bit)** [7] Supports Microsoft SQL Server 2014 with CU3 or SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit) **Note:** Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597**.
	Windows Server 2012 (64-bit) [7] Supports Microsoft SQL Server 2014 with CU3 or SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit) **Note:** Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597**.
	Windows Server 2008 R2 with SP1 (64-bit) [8] Supports Microsoft SQL Server 2014 with CU3 or SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit) **Note:** Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597**.
Supported Operating Systems for Metasys Site Management Portal Client Computer	Windows® 10 Pro or Windows 10 Enterprise Windows 8.1 Pro or Windows 8.1 Enterprise Windows 7 Professional, Enterprise, or Ultimate Edition with SP1 (32-bit or 64-bit) Apple® OS X® 10.11 El Capitan Apple OS X 10.10 Yosemite Apple OS X 10.9 Mavericks Apple OS X 10.8 Mountain Lion **Note:** · In OS X, you cannot view Graphics+ graphics in the Site Management Portal UI. · Apple operating systems are supported for Metasys client computers only.
Supported Web Browser Software for Metasys Site Management Portal Client Computers	Windows Internet Explorer® version 11 **Note:** In Internet Explorer 11, select the Use Microsoft compatibility lists option, found under Tools > Compatibility View Settings, to ensure that websites appear and function correctly. Apple Safari® version 8.0 or later. Other browsers, such as Google® Chrome™ and Mozilla® Firefox®, may also be used but are not fully supported. **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log in to the Site Management Portal (SMP) user interface.
Supported Virtual Environments	Microsoft Hyper-V™, VMware®
Supported User Interfaces	Site Management Portal (SMP) Metasys UI Ready Access Portal

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Metasys®

ADX - ADS

Technical specifications

Extended Application and Data Server system requirements (Split ADX Systems, 10 or 25 users) – (Part 2/2)

Additional Software Included with the ADX	CCT software	Microsoft SQL Server 2012 software with SP3 (64-bit)9
	Export Utility software	Microsoft .NET Framework Version 3.5 SP1
	Metasys Database Manager software	SCT software
	Launcher software	
	Note: The Metasys Advanced Reporting System requires an ADX. The SCT computer must be online and accessible to the ADX at all times.	
Optional hardware	Any network or local printer supported by the qualified Windows operating system.	
Optional software	Energy Essentials Graphic Generation Tool	

Note

[1] Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable.
   Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information regarding computer/server recommendations.
[2] For best performance, use SAS hard drives (not SATA hard drives) that use RAID controllers with write caching enabled.
[3] For best performance, use the maximum amount of memory. An ADX with 16 GB RAM has much greater performance than an ADX with only 4 GB RAM.
[4] ADX prerequisite software includes the Windows operating system and SQL Server software, Windows .NET Framework, and any other software or service packs required for your ADX configuration.
[5] The web/application and database servers must have the same operating system installed.
[6] *Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for specific Microsoft Windows operating system settings that may be required for your Metasys system configuration.*
[7] For SQL Server 2014 software or SQL Server 2012 software, you must purchase a SQL Server software license for each individual processor core (with a minimum of four core licenses). For example, if you have a single processor with dual cores, purchase four core licenses (the minimum) for SQL Server 2014 software or SQL Server 2012 software.
[8] For SQL Server 2008 R2 software, you must purchase a SQL Server software license for each individual processor you have. You do not need to purchase multiple licenses if you have a single processor divided into multiple cores. For example, if you have a single processor with dual cores, purchase one license for SQL Server software.
[9] SQL Server software is only included with the MS-ADX10SQL product.

130
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Metasys®

ADX - ADS

Technical specifications

Extended Application and Data Server system requirements (Split ADX system, 50 or 100 users) – (Part 1/2)

Recommended Server Platform [1]	**Web/Application Server** Two processors: 2.20 GHz Intel Xeon® Dual Processors with a minimum of 8 cores each 6 x 300 GB 15,000 RPM hard disk (RAID 5) [2] with 50 GB free space after installation of all prerequisite software [4] and before installation of ADS software. Configure RAID 5 with disk write-caching turned on. RAID Controller–PERC H710 with 1 GB Cache DVD drive **Note:** ARS and Energy Essentials can reside on the ADX web/application server. **Note:** Metasys UI must reside on the ADX web/application server.
	Database Server Two processors: 2.20 GHz Intel Xeon® Dual Processors with a minimum of 8 cores each 6 x 300 GB 15,000 RPM hard disk (RAID 5) with 50 GB free space after installation of all prerequisite software [4] and before installation of ADS software. Configure RAID 5 with disk write-caching turned on. RAID Controller–PERC H710 with 512 NV Cache DVD drive
	SCT Computer In a split configuration, you cannot install SCT or Ready Access Portal software on either the ADX web/application server computer or the ADX database server computer. *Refer to the System Configuration Tool Catalog Page (LIT-1900198) for current SCT computer requirements.*
Recommended Memory [3]	32 GB RAM
Supported Operating Systems and Database Software [5] , [6]	**Windows Server® 2012 R2 (64-bit)** [7] Supports Microsoft SQL Server 2014 with SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit) **Note:** Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597**.
	Windows Server 2012 (64-bit) [7] Supports Microsoft SQL Server 2014 with SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit) **Note:** Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597**.
	Windows Server 2008 R2 with SP1 (64-bit) [8] Supports Microsoft SQL Server 2014 with SP1 (64-bit), Microsoft SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 with SP3 (64-bit) **Note:** Microsoft SQL Server 2012 with SP3 is not an automatic Windows update. *For more information, refer to* **https://support.microsoft.com/en-us/kb/2979597**.
Supported Operating Systems for Metasys Site Management Portal Client Computer	Windows 10 Pro or Windows 10 Enterprise Windows 8.1 Pro or Windows 8.1 Enterprise Windows 7 Professional, Enterprise, or Ultimate Edition with SP1 (32-bit or 64-bit) Apple® OS X® 10.11 El Capitan Apple OS X 10.10 Yosemite Apple OS X 10.9 Mavericks Apple OS X 10.8 Mountain Lion **Note:** · In OS X, you cannot view Graphics+ graphics in the Site Management Portal UI. · Apple operating systems are supported for Metasys client computers only.
Supported Web Browser Software for Metasys Site Management Portal Client Computers	Windows Internet Explorer® version 11 **Note:** In Internet Explorer 11, select the Use Microsoft compatibility lists option, found under Tools > Compatibility View Settings, to ensure that websites appear and function correctly. Apple Safari® version 8.0 or later. Other browsers, such as Google® Chrome™ and Mozilla® Firefox®, may also be used but are not fully supported. **Note:** You use the web browser to download the Launcher application. After you install the Launcher application, you use the Launcher, not the web browser, to log in to the Site Management Portal (SMP) user interface.

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Metasys®

Technical specifications

Extended Application and Data Server system requirements (Split ADX system, 50 or 100 users) - (Part 2/2)

Supported Virtual Environments	Microsoft Hyper-V™, VMware®	
Supported User Interfaces	Site Management Portal (SMP) Metasys UI Ready Access Portal	
Additional Software Included with the ADX	CCT software	Microsoft SQL Server 2014 software with SP19
	Export Utility software	SCT software
	Metasys Database Manager software	Microsoft .NET Framework Version 3.5 SP1
	Launcher software	
	Note: The Metasys Advanced Reporting System requires an ADX. The SCT computer must be online and accessible to the ADX at all times.	
Optional Hardware	Any network or local printer supported by the qualified Windows operating system	
Optional Software	Energy Essentials Graphic Generation Tool	

Note

[1] Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable. Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information regarding computer/server recommendations.

[2] For best performance, use SAS hard drives (not SATA hard drives) that use RAID controllers with write caching enabled.

[3] For best performance, use the maximum amount of memory. An ADX with 32 GB RAM has much greater performance than an ADX with only 16 GB RAM.

[4] ADX prerequisite software includes the Windows operating system and SQL Server software, Windows .NET Framework, and any other software or service packs required for your ADX configuration.

[5] The web/application and database servers must have the same operating system installed.

[6] Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for specific Microsoft Windows operating system settings that may be required for your Metasys system configuration.

[7] For SQL Server 2014 software or SQL Server 2012 software, you must purchase a SQL Server software license for each individual processor core (with a minimum of four core licenses). For example, if you have a single processor with dual cores, purchase four core licenses (the minimum) for SQL Server 2014 software or SQL Server 2012 software.

[8] For SQL Server 2008 R2 software, you must purchase a SQL Server software license for each individual processor you have. You do not need to purchase multiple licenses if you have a single processor divided into multiple cores. For example, if you have a single processor with dual cores, purchase one license for SQL Server software.

[9] SQL Server software is only included with the MS-ADX50SQL product.

Johnson
Controls

Metasys®

GGT - Graphic Generator Tool

Graphics+ feature

Graphics+ is a data visualization software package designed for Metasys system customers who are looking for a quick way to create interactive building data representations, thus empowering them to visualize, analyze, and respond to problems faster. The Graphics+ software package comprises two components: the Graphic Generation Tool (GGT) and the Graphics+ Viewer.

The Graphic Generation Tool is a simple yet powerful diagramming tool that helps designers create compelling representations of their building equipment and floor plans and bind them to Metasys data objects. The tool includes an extensive library of pre-built symbols and templates, shortcut keys, and right-click functions, giving designers the ability to assemble graphics faster. The tool also provides flexibility to create customized graphics using a rich set of effects known as behaviors. Behaviors allow users to command, navigate, change color, apply flash, set visibility, and display a context menu for bound Metasys objects. You can save these graphics directly to a supported Metasys Host, such as a Site Director or a System Configuration Tool (SCT) archive database.

With the GGT, you can easily create a graphic of status summaries for each monitored system or space (for example, building, floor, or floor group). The graphic uses color to summarize the overall condition of monitored points. In one quick glance, you can view the number of warnings, alarms, or offline items across your entire facility or campus.

By clicking any one of these spaces or systems, you can see a detailed view of the monitored equipment. You can also open historical data for any trended point within the graphic using the Trend Module. The Trend Module can show trend data for up to four points at once for system diagnosis and comparison purposes. Additionally, using the predefined set of gauges, you can create an energy dashboard graphic that quickly conveys the current state of energy savings in your facility.

The Graphics+ Viewer is integrated with the Site Management Portal (SMP), SCT, and Ready Access Portal, allowing users to show, command, or update in real time all the data linked objects that were created in the GGT. The graphical display gives you a three-dimensional view of your facility, offering an intuitive way to manage the daily events of your buildings or campus.

Graphics built with GGT are easily configured for the new Metasys UI meeting the needs of Metasys operators who prefer graphical representations of their equipment and building layout to provide easy system navigation, to view status, and to take action—from any device.

Refer to the Graphics+ Feature Product Bulletin (LIT-12011698) for important product application information.

Features

▶ Thermographic display of temperature conditions of a floor
▶ Easy and consistent access to room information
▶ Summary Data of Multiple Buildings in a Single Graphical View with Navigational Aids
▶ Ability to Quickly and Easily Switch from Tabular to Graphical Views
▶ Stand-Alone Graphic Generation Tool
▶ Extensive Library of Prebuilt Dynamic Symbols and Templates
▶ Dynamic Symbol Capabilities, Including Commanding, Flashing, Changing Color, Showing and Hiding Elements, Navigation, and Context Menus, for Enhanced User Experience
▶ HVAC Library Elements Pre-Populated with Aliased Binding Strings
▶ Historical Trend Information Available Directly within a Graphic
▶ Computer Aided Drafting (CAD) File Import Capability
▶ Right-Click Functions, Short-Cut Keys, and User-Configurable Symbols Properties
▶ Comprehensive Representation of Facility Support Systems
▶ Multiple Language Support
▶ Optimal Graphics Display Performance

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Technical specifications

System requirements

Product	**MS-GGT-0** (new Graphic Generation Tool software)
	MS-GGT-6 (upgrade Graphic Generation Tool software)
Recommended computer platform [1]	Intel® Core™ 2 Duo E6700 or better (Intel Core 2 Duo E4300 minimum)
	100 MB recommended free hard disk space available
	DVD drive
Memory	4 GB RAM recommended (2 GB RAM minimum)

Graphic Generation Tool system requirements

Operating system	Windows® 8.1 and Windows 8.1 Enterprise Editions (64-bit)
	Windows 8 and Windows 8 Enterprise Editions (64-bit)
	Windows 7 Professional, Enterprise, or Ultimate Editions with SP1 (32-bit and 64-bit)
	Windows Server 2012 R2 (64-bit)
	Windows Server 2012 (64-bit)
	Windows Server 2008 R2 with SP1 (64-bit)
	Windows Server 2008 with SP2 (32-bit)
Other software	Microsoft .NET Framework 4.0 (required for creating Graphics+ graphics; included on the GGT product disk)
	Note: We recommend you install the full version of Microsoft .NET Framework 4.0.
Communication	Ethernet network interface card 10/100/1,000 Mbps (100 Mbps network recommended)
	Note: We recommend a wired connection. Wireless 802.11 connection.

Note
1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable.
Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information regarding computer/server recommendations.

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Metasys®

Technical specifications

Graphics+ Viewer system requirements

Product	Graphics+ Viewer built into Site Management Portal UI, SCT UI, and Ready Access Portal UI
Recommended computer platform [1,2]	Intel Core™ 2 Duo E6700 or better (Intel Core 2 Duo E4300 minimum)
Memory	4 GB RAM recommended (2 GB RAM minimum)
Operating system	Windows® 8.1 and Windows 8.1 Enterprise Editions (64-bit) Windows 8 and Windows 8 Enterprise Editions (64-bit) Windows 7 Professional, Enterprise, or Ultimate Editions with SP1 (32-bit and 64-bit) Windows Server 2012 R2 (64-bit) Windows Server 2012 (64-bit) Windows Server 2008 R2 with SP1 (64-bit) Windows Server 2008 with SP2 (32-bit) Apple® OS X® 10.8 Mountain Lion Apple OS X 10.9 Mavericks **Note:** Apple operating systems are supported for Metasys client computers only. **Note:** In OS X, you cannot view Graphics+ graphics in the Site Management Portal UI.
Other software	Windows Internet Explorer® Version 8, 9, 10, or 11 **Note:** In Internet Explorer 11, select the Use Microsoft compatibility lists option, found under Tools > Compatibility View Settings, to ensure that websites appear and function correctly. Microsoft Silverlight 5.0 or higher (available as a free download from Microsoft Corporation.) Apple® Safari version 6.0.5 and 7.0 (Other browsers, such as Google® Chrome and Mozilla Firefox, may also be used but are not fully supported.)
Communication	Ethernet network interface card 10/100/1,000 Mbps (100 Mbps network recommended) **Note:** We recommend a wired connection. Wireless 802.11 connection.

Note
1 For large graphics, rendering the image is CPU intensive. In general, a higher performing CPU with multiple cores is recommended.
2 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable.
   Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information regarding computer/server recommendations.

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Metasys®

MEU

Metasys Export Utility

The Metasys system Export Utility makes it easy for a facility manager to efficiently manage daily operations. The Export Utility extracts historical trend, alarm, and audit data from the system and presents the historical data in a variety of formats. Using these flexible formats, in programs such as Microsoft® Excel® and Access®, you can easily sort, compare, and archive data in spreadsheets and databases.

Export Utility is a valuable tool for effective historical data analysis. You can determine how to use the data to perform time studies and root cause analyses of system changes and mechanical equipment failure.

The scheduling capability of Export Utility allows you to extract the selected data immediately, or to schedule an extraction at a convenient time or interval.

When the base set of reports provided with Export Utility is insufficient, functionality is included that allows you to create a program to customize reports that fit your needs.

Refer to the Metasys Export Utility Product Bulletin (LIT-1201800) for important product application information.

Features
▶ Historical Data Retrieval
▶ Flexible Filtering of Historical Data
▶ Scheduled Collection of Historical Data
▶ Versatile Report Capabilities
▶ Custom Reporting
▶ Dynamic Link Library (DLL) Examples
▶ Historical Data Backup

Export Utility User Interface

Export Utility DLL example file

Ordering information

Export Utility selection charts

Codes [1]	Description
MS-EXPORT-0	Export Utility new project software. Software and license for one computer (not per site).
MS-EXPORT-6	Export Utility upgrade software to current release version. Software and license for one computer (not per site).

Note
1 Export Utility software is sold separately from Metasys software. However, some Metasys software packages include Export Utility software.
For more information on Metasys software packages, refer to the Metasys System Software Purchase Options Product Bulletin (LIT-12011703).

Metasys®

MEU

Technical specifications

Export utility system requirements

Product code	**MS-EXPORT-0, MS-EXPORT-6**
Recommended Computer/Server Platform [1]	Intel® Core™ 2 Duo E6700 or better (Intel Core 2 Duo E4300 minimum) 20 GB free hard disk space available (600 MB minimum) DVD drive When Export Utility is installed on an Application and Data Server/Extended Application and Data Server (ADS/ADX) or Open Data Server (ODS), follow the requirements for an ADS/ADX or ODS. *Refer to the Application and Data Server (ADS/ADX) Product Bulletin (LIT-1201525), the Application and Data Server (ADS) Lite Product Bulletin (LIT-12011690 or the Open Data Server Product Bulletin (LIT-12011943).*
Recommended memory [1]	Computer Platforms: 2 GB RAM (1 GB RAM minimum) Server Platforms: 4 GB RAM (2 GB RAM minimum)
Supported operating systems	Windows 10 Enterprise and Pro Editions (64-bit) Windows 8.1 Pro and Windows 8.1 Enterprise Editions (64-bit) Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (64-bit) Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (32-bit) Windows Server 2012 R2 Windows Server 2012 Windows Server 2008 R2 with SP1
Additional software Included on the product disks	Microsoft .NET Framework version 3.5 SP1 or version 4.0 For steps on installing .NET Framework version 3.5 SP1, refer to the ADS, ADX, and SCT Installation and Upgrade Instructions Wizard Content (LIT-12011331) or the ADS-Lite Installation and Upgrade Instructions Wizard Content (LIT-12011688). **Note:** The Windows 10, Windows 8.1, Windows 7, Windows Server 2012 R2, Windows Server 2012, and Windows Server 2008 R2 operating systems include Microsoft .NET Framework version 3.5/3.5.1. (Use the **Turn Windows features on or off** option in **Control Panel > Programs > Programs and Features** to add this component.) We recommend you also install Microsoft .NET Framework version 4.5 if you are using Windows 10, Windows 8.1, Windows Server 2012 R2, or Windows Server 2012.
Additional requirements (Order separately)	Microsoft Office Professional 2013, Microsoft Office Enterprise 365, Microsoft Office Professional 2010, or Microsoft Office Professional 2007 software to generate reports. **Note:** To extract data to Microsoft Excel or Microsoft Access software, you must have the respective software installed on the computer running Export Utility. **Note:** Export Utility can extract data to 32-bit and 64-bit versions of Microsoft Office. However, the DLL file and example files used to create custom reports are compatible only with 32-bit versions of Microsoft Office. Microsoft Office Professional 2013 and Microsoft Office 2010 do not support custom DLL files.

Note

1 Our computer platform and memory recommendations are not meant to imply that older or slower machines are not usable.
Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT-12011279) for more information regarding computer/server recommendations.

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Johnson Controls

Metasys®

SCT

System Configuration Tool

The System Configuration Tool (SCT) supports the engineering, installation, and commissioning of your building automation system.

The SCT application enables offline generation of the complete site and user interface creation of the system, including point naming; schedule trend log definition; integration of N1, N2, BACnet®, and LONWORKS® networks; integration of Modbus, M-Bus, and KNX third-party protocols; integration of local and remote Master-Slave/Token-Passing (MS/TP) devices; definition of tailored summaries and user views; and the creation of custom control logic using a graphical user interface.

SCT also manages the maintenance of the archive database for the Network Automation Engine (NAE), Network Control Engine (NCE), Network Integration Engine (NIE), Application and Data Server/Extended Application and Data Server (ADS/ADX) and Open Data Server (ODS).

To keep the archive database current, the user can set up the SCT to schedule regular uploads from the devices on the site.
When the system is operational, you can make online changes to the database at the engine, ADS/ADX, or ODS with the same user interface that was used for the offline data generation in SCT.

Lastly, SCT offers productivity features such as database import and export, supervisory device code download, field controller upload, and site discovery. For example, with site discovery, you can rebuild the entire archive database from the online system, a useful option if the original archive is missing or was never maintained. SCT also lets you fully manage a mixed release site for a Metasys system at Release 5.2 or later.

Refer to the SCT Technical Bulletin (LIT-1201534) for details.

Ordering information

SCT Selection Chart

Codes	Description
MS-SCTSWO-0	System Configuration Tool Software for local installations. Includes a copy of CCT. New project software for sites that do not have a previous version of SCT installed.
MS-SCTSWO-6	System Configuration Tool Software for local installations. Includes a copy of CCT. Upgrade software for previous SCT versions being upgraded to the latest release.

Features

▶ For existing sites, faster Metasys User Interface (UI) and navigation tree configuration with Auto-Discovery Serving Relationships through the Equipment Discovery window

▶ For new sites, simplified archive configuration and ability to quickly generate a populated archive from a Room Schedule using the Rapid Archive feature

▶ Efficient Metasys UI Graphics setup

▶ Ability to enable mass creation of spaces and equipment relationships with drag and drop functionality

▶ Improved user credential encryption and security modifications for Manage Archive processes

▶ Security database option for upload and download of supervisory devices and optional download of Metasys UI spaces and equipment in Manage Archive

▶ Ability to easily recreate the site's archive database with Site Discovery if the archive is missing, corrupt, or was never maintained

▶ Advanced system searching through User Definable Attribute IDs and Child Item Field Syntax for Summary Definitions

▶ Improvements to the Unbound Reference Report to make it easier to identify invalid references

▶ Ability to quickly view, mass copy, edit, or delete any extensions on points or devices through the Tailored Summary Definition Template

▶ Help System featuring context sensitive links from the user interface and easy to understand tables

▶ Ability to upload the controller application files (.caf) from field controllers into the archive database

Metasys®

<div style="background: gray;">**SCT**</div>

Technical specifications

The following table describes the recommended and minimum computer requirements for a computer on which you are installing a stand-alone SCT.

For applications where SCT is installed on an ADS/ADX, refer to the specifications in the Application and Data Server (ADS/ADX) Product Bulletin (LIT-1201525).

For applications where SCT is installed on an ODS, refer to the specifications in the Open Data Server (ODS) Product Bulletin (LIT-12011943).

SCT-Local system requirements (Part 1/2)

Products codes	**MS-SCTSWO-0:** New project software **MS-SCTSWO-6:** Upgrade software	
Recommended platform	Full server platform	Intel® Core™ 2 Duo E6700 or better (Intel Core 2 Duo E4300 minimum) 20 GB minimum free hard disk space available 4 GB RAM (2 GB RAM minimum) DVD drive
	Desktop computer platform	Intel Core 2 Duo E6700 or better (Intel Core 2 Duo E4300 minimum) 20 GB minimum free hard disk space available 2 GB RAM (1 GB RAM minimum) **Note:** A 32-bit operating system only supports a maximum of 4 GB memory. For best performance, use a 64-bit operating system. DVD drive
Supported operating systems and database software [1]	Full server platforms	**Windows Server 2012 R2** [2] Supports Microsoft SQL Server 2014 with SP1 (64-bit) [3], SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 Standard with SP3 (64-bit)
		Windows Server 2012 [2] Supports Microsoft SQL Server 2014 with SP1 (64-bit) [3], SQL Server 2012 with SP3 (64-bit), or Microsoft SQL Server 2008 R2 Standard with SP3 (64-bit)
		Windows Server 2008 R2 with SP1 Supports Microsoft SQL Server 2012 with SP3 (64-bit) or Microsoft SQL Server 2008 R2 Standard with SP3 (64-bit) **Note:** The operating system and software must both be 32-bit or 64-bit.
	Desktop computer platforms	**Windows® 10 Pro and Windows 10 Enterprise Editions (32-bit or 64-bit)** Supports Microsoft SQL Server 2014 Express with SP1 (32-bit or 64-bit) [3], Microsoft SQL Server 2012 Express with SP3 (32-bit or 64-bit), or Microsoft SQL Server 2008 R2 Express with SP3 (64-bit or 32-bit) **Note:** A 32-bit operating system only supports a maximum of 4 GB memory. For best performance, use a 64-bit operating system.
		Windows 8.1 Pro and Windows 8.1 Enterprise Editions Supports Microsoft SQL Server 2014 Express (64-bit) with SP1 [3], SQL Server 2012 Express with SP3 (64-bit), or Microsoft SQL Server 2008 R2 Express with SP3 (64-bit)
		Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (32-bit or 64-bit) Supports Microsoft SQL Server 2014 Express with SP1 (32-bit or 64-bit) [3], SQL Server 2012 Express with SP3 (64-bit), or Microsoft SQL Server 2008 R2 Express with SP3 (32-bit or 64-bit) **Note:** The OS and software must both be 32-bit or 64-bit.

...Continued...

Metasys®

SCT

Technical specifications

SCT–Local system requirements (Part 2/2)

Supported web browser software for Metasys Site Management Portal Client computers	Windows Internet Explorer® version 11
	Note: In Internet Explorer 11, select the **Use Microsoft compatibility lists** option, found under Tools > Compatibility View Settings, to ensure that websites appear and function correctly.
	Apple® Safari® version 8.0 or later
	Google® Chrome™ version 50 or later
	Other browsers, such as and Mozilla® Firefox®, may also be used but are not fully supported.
	Note: Use the web browsers to download the Launcher application. After you install the Launcher application, you can use the Launcher to log in to the Site Management Portal (SMP) user interface. You can also use the web browsers to access the Metasys UI and Metasys UI Offline sites. You can also add a bookmark to the Metasys UI and Metasys UI Offline sites.
Network communication for Metasys System Configuration Tool Client computers	Ethernet network interface card 10/100/1000 Mbps (100 Mbps network or better recommended)
	Note: The computer hosting the SCT application supports only one network interface card.
Optional Software Packaging	The ADS, ADX, ODS, and Ready Access Portal software include SCT software.

Note

[1] Refer to the Network and IT Guidance for the BAS Professional Technical Bulletin (LIT–1201279) for specific Microsoft Windows OS settings that may be required for your Metasys system configuration.

[2] For SQL Server 2012 software, you must purchase a SQL Server software license for each individual processor core (with a minimum of four core licenses).
For example, if you have a single processor with dual cores, purchase four core licenses (the minimum) for SQL Server 2012 software.

[3] To use SQL Server 2014 SP1 with Metasys products, you must install Microsoft cumulative update package 1 (KB3067389) for SQL Server 2014 SP1.
To download the update package, visit ***http://support.microsoft.com/kb/3067839/***

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Metasys®

VMD
Generator Express

VMD Generator Express (VGE) is software designed to support the creation of the Vendor Model Definition (VMD) files, used by the Modbus RTU and TCP integration on NIEx9 for third party integrations platform.

VMD Generator Express supplies a user friendly user's interface to create, modify and view VMD files.

VMD Generator Express incorporates a version tracking system, storing user, date/time and comment, every time a VMD is saved (created or modified).

VMD Generator Express allows creating generic models for standard integrations, like meters, chillers, AHU, to optimize the engineering time and follow standardization approach.

Features
▶ User friendly UI
▶ Version Tracking
▶ User Target Behaviour
▶ Excel string Import
▶ Model / Standardization
▶ Points List Export

Ordering information

Codes	Description
TL-NIE-DVD	VMD Generator Express software. It does not include the license

Note
The usage of the VMD Generator Express Tool requires a certification, which is achieved by attending a training course.
For more information please contact your local technical support team.

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Johnson
Controls

BAS system software
Supervisor software and tools

Metasys®

CCT

Controller Configuration Tool

The Controller Configuration Tool (CCT) is used to configure, simulate and commission the Field Equipment Controllers (FECs), Advanced Application Field Equipment Controllers (FACs), Network Control Engines (NCEs), Input/Output Modules (IOMs), and Variable Air Volume (VAV) Modular Assembly (VMA16s). You can also configure N2 VMAs using the System Section Wizard or using pre-built applications that cover the most common VMA configurations.

CCT operates in three modes that provide key functionality for your system: Configuration, Simulation, and Commissioning.

The Configuration mode allows you to select a wide variety of mechanical and control logic options through system selection trees for typical air handling, terminal unit, central plant and VAV box mechanical systems. When required you can customize the standard logic provided by the system selection process to meet your specialized control logic requirements. A comprehensive CCT Help (press F1) is provided to assist you as you make selections in the System Selection Tree and build and customise your applications. The Simulation mode allows you to review the application logic as if you were commissioning the system.
You can make adjustments to setpoints, inputs, or sensors during a simulation session to validate the logic before assigning the configuration to a specific controller.

The Commissioning mode manages the downloading of files to the FECs through three different network connection points. You can connect using a Wireless Commissioning Converter (MS-BTCVT-1) or BACnet® router (TL-BRTRP-0) between your laptop and the MS/TP bus, using a USB adapter with ZigBee™ driver for your laptop computer, or using the Ethernet Passthru mode. After downloading the controllers, you can use the Commissioning mode to validate the application and adjust setpoints and setup parameters.
For VAV applications, CCT includes an optional box flow test to automatically exercise all the VAV boxes to ensure correct mechanical installation and proper configuration of the key flow setup parameters.
In addition, the Commissioning mode has a Balancer tab for VAV applications that guides you through the typical steps of setting the flow constants. The ZFR Checkout Tool (ZCT) is available to validate the wireless connectivity and health of your wireless mesh network.
A Commissioning mode-only version of the CCT software is available for which is restricted to commissioning tasks only. The Configuration and Simulation modes are disabled in the CCT Commissioning mode only software.

Features

▶ Capability to customize standard control system logic that is created from simple system selection trees
▶ Consistent user interface across the Configuration, Simulation and Commissioning modes.
▶ Flexible connection capabilities for loading and commissioning controller
▶ Ability to download, upload, and upgrade multiple controllers at once
▶ Wireless commissioning via optional Bluetooth® adaptor
▶ Select required protocol for FEC/FAC and VMA controllers, BACnet mstp or N2 (CCT10.1 or later)

Metasys®

CCT

Ordering information

CCT

Codes	Description
MS-CCT-0	CCT Media for the full and commissioning only versions

Accessories

Codes	Description
BT-CVTVT-1	Bluetooth® commissioning adaptor
TL-BRTRP-0	Portable BACnet/IP to MSTP Router, includes a 1.8M USB cable and a 1.5M Ethernet cable
ZFR-USBHA-0	USB Dongle with ZigBee™ Driver provides a wireless connection through the CCT to allow wireless commissioning of the wirelessly enabled FEC and VMA16 field controllers. Also allows use of the ZCT in CCT.

Technical specifications

Product code	MS-CCT-0
Recommended platform	Intel® Core™ 2 Duo E6700 or better (Intel Core 2 Duo E4300 minimum) 20 GB free hard disk available (600 MB minimum) DVD drive
Recommended memory	Computer platforms: 2 GB RAM recommended (1 GB RAM minimum)
Supported Operating Systems Full Server Platforms and database software	**Windows® 8.1 Pro and Windows 8.1 Enterprise Editions (32-bit or 64-bit)** Supports Microsoft® SQL Server® 2014 Express (32-bit or 64-bit) [1] with SP1, Microsoft SQL Server 2012 Express with SP2 (32-bit or 64-bit), or Microsoft SQL Server 2008 R2 Express with SP3 (32-bit or 64-bit) **Note:** A 32-bit operating system only supports a maximum of 4 GB memory. For best performance, use a 64-bit operating system. **Note:** The OS and software must both be 32-bit or 64-bit. **Note:** cTool applications (for example, HVACPro or GX) cannot be installed on 64-bit platforms. **Note:** We recommend Windows 8 for users that need cTools. **Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (32-bit or 64-bit)** Supports Microsoft SQL Server 2014 Express (32-bit or 64-bit) [1], Microsoft SQL Server 2012 Express with SP2 (32-bit or 64-bit), or Microsoft SQL Server 2008 R2 Express with SP2 (32-bit or 64-bit) **Note:** A 32-bit operating system only supports a maximum of 4 GB memory. For best performance, use a 64-bit operating system. **Note:** The OS and software must both be 32-bit or 64-bit. **Note:** cTool applications (for example, HVACPro or GX) cannot be installed on 64-bit platforms.
Required Web Browser Software for Metasys Client Computers	**Windows Internet Explorer® version 8, 9, 10, and 11** **Note:** In Internet Explorer 11, select the Use Microsoft compatibility lists option, found under Tools > Compatibility View Settings, to ensure that websites appear and function correctly. **Note:** Web browser software is required if you want to view the Controller Tool Help (LIT-12011147) online. However, you can also access this help system as a PDF from the software.
Network Communication for Metasys CCT Client Computers	Ethernet network interface card 10/100/1000 Mbps (100 Mbps network or better recommended)
Software Optionally installed during CCT install	Microsoft .NET Framework version 3.5 with SP1 or 3.5.1 Microsoft SQL Server 2008 Express software with SP2
Optional hardware	Any network or local printer supported by the qualified Windows operating system

Note
1 To use SQL Server 2014 SP1 with Metasys products, you must install Microsoft cumulative update package 1 (KB3067389) for SQL Server 2014 SP1. To download the update package, visit **https://support.microsoft.com/en-us/kb/3067839/**.

Metasys®

CPO10

*Central Plant Optimization*TM

Johnson Controls has combined expertise from designing YORK® chillers and Metasys controls to bring the best world-class program to operate your chiller plant. The result is Johnson Controls Central Plant Optimization™ 10, which saves energy and improves reliability in your facility. A facility's central chiller plant uses a significant portion of the HVAC energy, typically 35%. Managing this load, while still maintaining occupant comfort is a primary strategy for overall energy management. CPO 10, which is powered by the Metasys system, provides such a strategy. The Metasys CPO 10 application uses field-proven, factory-tested and fully documented best practices to select the most efficient combination of chillers, pumps, heat exchangers and cooling towers needed to match the building load. The application then commands the selected devices to the appropriate state or speed, providing the necessary sequencing of pumps, isolation valves and main equipment, while observing all the timing delays for safe and stable operation of the central chiller plant.

Features

▶ Advanced Control Algorithms – Evaluate all possible combinations of devices considering capacities, efficiencies, runtimes, and number of starts resulting in the most efficient operating state rather than simply selecting the next available device as the building load increases.

▶ Total Automation of All Equipment – Provides proper sequencing of all devices in a safe and stable fashion.

▶ Simulation Mode Application Preview – Allows you to test a newly generated program prior to downloading the program to the field controllers.

▶ Optional Integration of Third-Party Equipment – Provides additional energy savings.

▶ Control Sequences Created by the System Selection Tool (SST) within Controller Configuration Tool (CCT) – Allow you to select from tens of thousands of possible equipment combinations, piping configurations, and control strategies, each resulting in the automatic creation of a software program using proven best practices.

▶ CCT Editor Allowing Customization of Individual Components of the Program Created Using SST – Addresses special situations that cannot be described in SST and easily customizes the program, without the need to build the entire program from scratch.

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Metasys®

CPO10

The CPO10 application supports:

- Up to eight chillers, centrifugal (mix of constant or variable speed), screw, reciprocating or scroll compressor of mixed sizes, piped in parallel

- Up to eight primary chilled water pumps of mixed sizes, all dedicated or headered and all constant or variable speed

- Up to eight secondary chilled water pumps that are mixed in size, are piped in parallel and are variable speed

- Up to eight condenser water pumps that are mixed in size, all dedicated or headered and all constant or variable speed

- Up to four heat exchangers of mixed sizes, piped in parallel

- Up to eight cooling towers piped in common to the chillers, are single speed (with optional vernier control), multispeed or variable speed with a variety of tower/sump valve arrangements

- A non-integrated waterside economizer able to control up to eight total devices (chillers and heat exchangers) piped in parallel

- Air-cooled chillers

The CPO10 application offers a variety of primary control strategies including measuring building chilled-water flow and differential temperature, the chillers' kW load and flow through a decoupler pipe in a primary/secondary system, or differential temperature only in a constant speed chilled water pump system. You can also select dozens of secondary strategies, such as open loop control of the cooling towers (as defined by the American Society of Heating, Refrigerating and Air-Conditioning Engineers [ASHRAE]) or closed loop control of condenser-water setpoint. The CPO10 application supports 24 sequences through any combination of the following chilled water systems and condenser water systems:

Chilled water systems

▶ Variable Primary Headered
▶ Variable Primary Dedicated
▶ Primary Secondary Headered
▶ Primary Secondary Dedicated
▶ Constant Headered

Condenser water systems

▶ Constant Dedicated
▶ Variable Headered
▶ Variable Dedicated
▶ Constant Headered

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Metasys®

NAE

Network Automation Engine

Network Automation Engines (NAEs) enable Internet Protocol (IP) connectivity and web-based access to Metasys Building Management Systems (BMSs).

NAEs leverage standard building management communication technologies, including BACnet® protocol, LonWorks® network, and N2 Bus protocol to monitor and supervise a wide variety of Heating, Ventilating and Air Conditioning (HVAC); lighting, security, fire and access control equipment.

NAEs provide comprehensive equipment monitoring and control, scheduling, alarm and event management, energy management, data exchange, data trending and data storage.

NAEs feature an embedded site management portal user interface, support multiple concurrent web browser sessions with password and permission access control and provide the protection of industry standard Information Technology (IT) security.

NAE55 models support a comprehensive set of supervisory features and functions for large facilities and technically advanced buildings and complexes.

The NAE35/NAE45 models enable cost-effective NAE connectivity and control in smaller facilities, and can extend NAE supervisory functions in larger facilities.

The NAE85 is a high-capacity NAE that allows integration of large BACnet IP systems and can take the place of multiple NAEs.

Features

▶ Communication using commonly accepted IT standards at the automation and enterprise level
▶ Web-based user interface
▶ Site director function
▶ Support for web services at the automation network level
▶ User interface and online system configuration software embedded in NAE
▶ Supervision of field controller networks including BACnet MS/TP, N2 Bus, LonWorks Network and BACnet IP Devices
▶ Multiple connection options for data access

NAE55 Network Automation Engine

NAE45 Network Automation Engine

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Metasys®

Ordering information

NAE35

Codes	Description
MS-NAE35xx-xxx (Base Features of Each NAE35)	NAE35 Network Automation Engines: Requires a 24 VAC power supply. Each model includes one RS-232-C serial port, one USB serial port, one Ethernet port, and an MS-BAT1020-0 data protection battery.
MS-NAE3510-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for optional external modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.
MS-NAE3511-2	Supports one N2 or BACnet MS/TP (RS-485) trunk (RS-485 port); includes an internal modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.
MS-NAE3514-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; features basic access support; includes an additional RS-232-C serial port for optional external modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.
MS-NAE3515-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; features basic access support; includes an internal modem; supports up to 50 devices on the N2 or BACnet MS/TP trunk.
MS-NAE3520-2	Supports one LonWorks trunk, includes an additional RS-232-C serial port for optional external modem. Supports up to 64 devices on the LonWorks port.
MS-NAE3521-2	Supports one LonWorks trunk, includes an internal modem. Supports up to 64 devices on the LonWorks port.
MS-NAE3524-2	Supports one LonWorks trunk, features Basic Access support, and includes an additional RS-232-C serial port for optional external modem. Supports up to 64 devices on the LonWorks trunks.
MS-NAE3525-2	Supports one LonWorks trunk, features Basic Access support, and includes an internal modem. Supports up to 64 devices on the LonWorks trunks.

NAE45

Codes	Description
MS-NAE45xx-xxx (Base Features of Each NAE45)	NAE45 Network Automation Engines: Requires a 24 VAC power supply. Each model includes one RS-232-C serial port, one USB serial port, one Ethernet port, and an MS-BAT1020-0 data protection battery.
MS-NAE4510-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an additional RS-232-C serial port for optional external modem; supports up to 100 devices on the N2 or BACnet MS/TP trunk.
MS-NAE4511-2	Supports one N2 or BACnet MS/TP (RS-485) trunk; includes an internal modem; supports up to 100 devices on the N2 or BACnet MS/TP trunk.
MS-NAE4520-2	Supports one LonWorks trunk, includes an additional RS-232-C serial port for optional external modem; supports up to 127 devices on the LonWorks port.
MS-NAE4521-2	Supports one LonWorks trunk, includes an internal modem; supports up to 127 devices on the LonWorks port.

Metasys®

NAE

Ordering information

NAE55

Codes	Description
MS-NAE55xx-x (Base Features of each NAE55)	NAE55 Network Automation Engines: Requires a 24 VAC power supply. Each model includes two RS-232-C serial ports, two USB serial ports, two RS-485 ports, one Ethernet port and one MS-BAT1010-0 Data Protection Battery. Supports up to 100 devices on each N2 or BACnet MS/TP trunk.
MS-NAE5510-3E	Supports two N2 or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk).
MS-NAE5511-3E	Supports two N2 or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk); includes an internal modem.
MS-NAE5520-3E	Supports a LonWorks trunk, and two N2 trunks or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk). Supports up to 255 devices on the LonWorks trunk.
MS-NAE5521-3E	Supports a LonWorks trunk, and two N2 trunks or two BACnet MS/TP (RS-485) trunks (or one N2 trunk and one BACnet MS/TP trunk); includes an internal modem. Supports up to 255 devices on the LonWorks trunk.

Note
Network engines with -3(E) ordering code suffix support Metasys Release 7.0.7 or later only

NAE85

Codes	Description
MS-NIE8500-0 *	NxE85 model with 1U chassis for mounting in a server rack. **Note:** The NAE85 models ship as MS-NIE8500-0 models. Use the ChangeModel utility in the NxE85 Metasys software to change an NIE85 to an NAE85.
MS-NxE85SW-0	NxE85 software for 10,000 objects (new projects only software).

Note
* Standard NxE85 models supports 10,000 objects; an upgrade is available to support an additional 15,000 objects.

Accessories

Codes	Description
MS-BAT1010-0	Replacement data protection battery for NAE55 and NIE55. Rechargeable gel cell battery: 12 V, 1.2 Ah, with a typical life of 3 to 5 years at 21 °C
MS-BAT1020-0	Replacement data protection battery for NAE35, NAE45, and NCE25. Rechargeable NiMH battery: 3.6 V 500 mAh, with a typical life of 10 years at 21 °C
MS-15KUPG-0	15,000 object upgrade for NxE85
MS-MULTENGSW-6	Network Engine Image Upgrade for all NAE/NIE/NCE Engines on a Site, Excluding NxE85
MS-EXPORT-0	Export Utility extracts historical trend, alarm, and audit data from the system and presents the historical data in a variety of formats. **Note:** This option is not necessary for sites that have an ADS/ADX that is the Site Director because Export Utility is provided with the ADS/ADX solution.
SC450RM1U (OEM Part No.)	Recommended Uninterruptable Power Supply (UPS) for NxE85 model: American Power Conversion (APC®) Smart-UPS SC 450VA, 280 W 120 VAC input/output with NEMA 5-15R output connections

Johnson Controls

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NAE

Technical specification

NAE35 and NAE45

Power requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), Safety Extra- Low Voltage (SELV) power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum)
Power consumption	25 VA maximum
Ambient operating conditions	0 to 50 °C; 10 to 90% RH, 30°C maximum dew point
Ambient storage conditions	–40 to 70 °C; 5 to 95% RH, 30°C maximum dew point
Data protection	Supports data protection on power failure. Rechargeable NiMH battery: 3.6 VDC 500 mAh, with a typical life of 5 to 7 years at 21 °C; Product Code Number: MS-BAT1020-0
Processor	192 MHz Renesas™ SH4 7760 RISC processor
Memory	128 MB Flash nonvolatile memory for operating system, configuration data, and operations data storage and backup 128 MB Synchronous Dynamic Random Access Memory (SDRAM) for operations data dynamic memory
Operating system	Microsoft® Windows® CE embedded
Network and serial interfaces	One Ethernet port; connects at 10 or 100 Mbps; 8-pin RJ-45 connector One optically isolated RS-485 port; 9.6k, 19.2k, 38.4k, or 76.8k baud (depending on protocol); with a pluggable and keyed 4-position terminal block (FC Bus available on NAE351x and NAE451x models only) One LONWORKS port; FTT10 78 Kbps; pluggable, keyed 3-position terminal block (LONWORKS port available on NAE352x-x and NAE452x models only) One RS-232-C serial port with standard 9-pin sub-D connector that supports standard baud rates. A second serial port, on models without an internal modem, that supports an optional, user-supplied external modem. One USB serial port with standard USB connector that supports an optional, user-supplied external modem. Option: One telephone port for internal modem; up to 56 Kbps; 6-pin modular connector (NAE models with an optional internal modem have one RS-232-C serial port only.)
Housing	
Plastic housing material	ABS + polycarbonate UL94-5VB
Protection	IP20 (IEC 60529)
Mounting	On flat surface with screws on three mounting clips or a single 35 mm DIN rail
Dimensions (H x W x D)	131 x 270 x 62 mm Minimum space for mounting NAE35 and NAE45: 210 x 350 x 110 mm
Shipping Weight	1.2 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

149
European product catalogue 2017
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Metasys®

NAE

Technical specification

NAE55xx-3E

Power requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), Safety Extra-Low Voltage (SELV) power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum)
Power consumption	50 VA maximum
Ambient operating conditions	0 to 50°C; 10 to 90% RH, 30°C maximum dew point
Ambient storage conditions	–40 to 70°C; 5 to 95% RH, 30°C maximum dew point
Data protection battery	Supports data protection on power failure. Rechargeable gel cell battery: 12 V, 1.2 Ah with a typical life of 3 to 5 years at 21°C; Product Code Number: MS-BAT1010-0
Clock battery	Maintains real-time clock through a power failure. Onboard cell; typical life 10 years at 21°C
Processor	1.46 GHz Intel Atom™ Bay Trail E3815 processor
Memory	16 GB flash nonvolatile memory for operating system, configuration data, and operations data storage and backup. 4GB DDR3 SDRAM for operations data dynamic memory
Operating system	Johnson Controls OEM Version of Microsoft Windows Embedded Standard 7 with SP1 (WES7)
Network and serial interfaces	One Ethernet port; 10/100/1,000 Mbps; 8-pin RJ-45 connector Two optically isolated RS-485 ports; 9,600, 19.2k, 38.4k, or 76.8k baud; pluggable and keyed 4 position terminal blocks (RS-485 terminal blocks available on NAE55 models only). Two RS-232-C serial ports, with standard 9-pin sub-D connectors, that support all standard baud rates. Two USB 2.0 serial ports; standard USB connectors support an optional, user-supplied external modem. Options: One telephone port for internal modem; up to 56 kbps; 6-pin RJ-12 connector. One LonWorks port; FTT10 78 Kbps; pluggable, keyed 3-position terminal block (LonWorks port available on NAE552x-x models only)
Housing	
Plastic housing	With internal metal shield
Plastic material	ABS + polycarbonate; Protection: IP20 (IEC 60529)
Mounting	On flat surface with screws on four mounting feet or on dual 35 mm DIN rail
Dimensions (H x W x D)	226 x 332 x 96.5 mm including mounting feet Minimum space for mounting: 303 x 408 x 148 mm
Shipping weight	2.9 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

Metasys®

Technical specification

NAE85 software system requirements for installation/upgrade

Product code	**MS-NxE85SW-0**: NxE85 software for 10,000 objects (new projects only software)
Recommended computer platform	Intel Xeon®E5506, 2.13 GHz, 4 MB Cache 2 x 160 GB 7.2K , 8.9 cm cabled 3 Gbps, RAID 1 configuration with add-in SAS6/iR (SATA/SAS controller)
Hard Disk	160 GB minimum
Recommended memory	2 GB RAM minimum
Supported Operating Systems (OS) and software	**Windows Server® 2012 R2 Editions** Microsoft .NET Framework Version 3.5 Service Pack (SP) [1] **Windows Server 2012 Editions** Microsoft .NET Framework Version 3.5 SP **Windows Server 2008 R2 Standard and Enterprise Editions with SP1** Microsoft .NET Framework Version 3.5 SP **Windows Server 2008 R2 Web Edition with SP1** Microsoft .NET Framework Version 3.5 SP **Windows Server 2008 Standard and Enterprise Editions with SP2 (32-bit)** **Note:** Microsoft .NET Framework Version 3.5 SP 1 is required for each operating system.
Internal optical drive	DVD ROM, SATA
Supported Operating Systems for Metasys client computers	Windows 8.1 Pro and Windows 8.1 Enterprise Editions (64-bit) Windows 8 Pro and Windows 8 Enterprise Editions (64-bit) Windows 7 Professional, Enterprise, and Ultimate Editions with SP1 (32-bit or 64-bit) Apple® OS X® 10.8 Mountain Lion Apple OS X 10.9 Mavericks **Note:** Apple operating systems are supported for Metasys client computers only. **Note:** In Apple OS X, you cannot view Graphics+ graphics in the Site Management Portal UI.
Recommended antivirus software	Symantec Endpoint Protection Version 12
Supported Virtual Environments	Microsoft Hyper-V™, VMWare®
Network communication	Network interface Single Ethernet network interface card 10/100/1000 Mbps (100 Mbps or better recommended)
Recommended data protection	Uninterruptible power supply (UPS) Smart-UPS SC 450VA, 280 W, 120 VAC input/output, NEMA 5-15R output connections, OEM Part No. SC450RM1U

151
European product catalogue 2017
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Metasys®

NIEx9

Network Integration Engine

Network Integration Engines (NIEx9s) for 3rd party integrations enable Internet Protocol (IP) connectivity and Web-based access to Metasys Building Management Systems (BMSs).

NIEx9s leverage standard building management communication technologies, including BACnet® protocol, LonWorks® network and N2 Bus protocol, Modbus, MBus, KNX and 3rd party proprietary protocols to monitor and supervise a wide variety of Heating, Ventilating and Air Conditioning (HVAC); lighting; security; fire; electrical and thermal measuring and access control equipment.

NIEx9s provide comprehensive equipment monitoring and control, scheduling, alarm and event management, energy management, data exchange, data trending and data storage.

NIEx9s feature an embedded Site Management Portal user interface, support multiple concurrent Web browser sessions with password and permission access control and provide the protection of industry standard Information Technology (IT) security.

NIE59 models support a comprehensive set of supervisory features and functions for large facilities and technically advanced buildings and complexes.

The NIE39/NIE49 models enable cost effective NAE connectivity and control in smaller facilities, and can extend NIEx9 supervisory functions in larger facilities.

The NIE29 models enable compact and combined solution including supervisory and control capacity. It can be used in smaller facilities where an "all-in-one" (supervisory, control and integration) platform is required.

Refer to the Network Integration Engine for 3rd Party Integrations Product Bulletin (LIT-12011923) for important product application information.

NIE29

NIE39/NIE49

NIE59

Features

▶ Communication using commonly accepted IT standards at the automation and enterprise level Web-based user interface
▶ Site Director function
▶ Support for Web services at the automation
▶ Network level
▶ User interface and online system
▶ Configuration software embedded in NAE supervision of field controller networks including N2 Bus, LonWorks network, BACnet Master- Slave/Token-Passing (MS/TP), BACnet IP devices, Modbus RTU, Modbus IP, M-Bus, KNX and other 3rd party protocols
▶ Multiple connection options for data access

NIE Integration

Integration type	NIE29	NIE39 and NIE49	NIE59
1 Modbus RTU + 1 Modbus IP	•	•	•
2 Modbus RTU	---	•	•
1 M-Bus SERIAL + 1 M-Bus IP	•	•	•
2 M-Bus SERIAL	---	•	•
1 M-Bus SERIAL + 1 Modbus IP	•	•	•
1 M-Bus SERIAL + 1 Modbus RTU	---	•	•
1 Modbus RTU + 1 M-Bus IP	•	•	•
1 Modbus IP + 1 M-Bus IP	•	•	•

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Ordering Information

NIE29

Codes	Description
MS-NIE29xx-x (Base Features of Each NIE29)	Requires a 24 VAC power supply and includes one RS-232-C serial port, one RS-485 optically isolated SA Bus port, one USB serial port, one Ethernet port and an MSBAT1020-0 Data Protection Battery. Each NIE29 Series model has 33 integral I/O points and supports up to 128 additional I/O points on the SA Bus. **Note:** Two ports can be defined for 3rd party integration. The number of devices and type of integrations depends on the protocol, consult technical documentation for details. The other ports have to be defined in order to use standard protocols (N2, BACnet or LON).
MS-NIE2910-0	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one N2 Bus. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the N2 Bus, up to 32 devices are supported.
MS-NIE2916-0	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one N2 Bus. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the N2 Bus, up to 32 devices are supported. Includes integral display screen.
MS-NIE2920-0	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one LonWorks Network trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the LonWorks network, up to 32 devices are supported.
MS-NIE2926-0	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one LonWorks Network trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the LonWorks network, up to 32 devices are supported. Includes integral display screen.
MS-NIE2960-0	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one BACnet MS/TP (RS-485) trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the BACnet MS/TP trunk, up to 32 devices are supported.
MS-NIE2966-0	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one BACnet MS/TP (RS-485) trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the BACnet MS/TP trunk, up to 32 devices are supported. Includes integral display screen.

NIE39

Codes	Description
MS-NIE39xx-x (Base Features of Each NIE39)	Requires a 24 VAC power supply. Each model includes two RS-232-C serial port, one USB serial port, one Ethernet port and an MS-BAT1020-0 Data Protection Battery. **Note:** Two ports can be defined for 3rd party integration. The number of devices and type of integrations depends on the protocol, consult technical documentation for details. The other ports have to be defined in order to use standard protocols (N2, BACnet or LON).
MS-NIE3910-2	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one N2 Bus or one BACnet MS/TP (RS-485) trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the N2 Bus or BACnet MS/TP trunk, up to 50 devices are supported.
MS-NIE3920-2	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one LonWorks trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the LonWorks network, up to 64 devices are supported.

NIE49

Codes	Description
MS-NIE49xx-x (Base features of each NIE49)	Requires a 24 VAC power supply. Each model includes two RS-232-C serial port, one USB serial port, one Ethernet port and an MS-BAT1020-0 Data Protection Battery. **Note:** Two ports can be defined for 3rd party integration. The number of devices and type of integrations depends on the protocol, consult technical documentation for details. The other ports have to be defined in order to use standard protocols (N2, BACnet or LON).
MS-NIE4910-2	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one N2 Bus or one BACnet MS/TP (RS-485) trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the N2 Bus or BACnet MS/TP trunk, up to 100 devices are supported.
MS-NIE4920-2	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one LonWorks trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the LonWorks network, up to 127 devices are supported.

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Ordering information

NIE59

Codes	Description
MS-NIE59xx-x (Base features of each NIE59)	Requires a 24 VAC power supply. Each model includes two RS-232-C serial ports, two USB serial ports, two RS-485 ports, one Ethernet port and one MS-BAT1010-0 Data Protection Battery. Supports up to 100 devices on each N2 or BACnet MS/TP trunk. **Note:** Two ports can be defined for 3rd party integration. The number of devices and type of integrations depends on the protocol, consult technical documentation for details. The other ports have to be defined in order to use standard protocols (N2, BACnet or LON).
MS-NIE5960-3	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one N2 Bus or one BACnet MS/TP (RS-485) trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the N2 or BACnet MS/TP (RS-485) trunk, up to 100 devices are supported.
MS-NIE5920-3	Supports two third-party trunks (Modbus RTU/Modbus IP & M-Bus) and one LONWORKS trunk. KNX is supported via IP in a single trunk configuration. The number of devices and type of integrations depends on the protocol. For the LONWORKS trunk, up to 255 devices are supported.

Note
Network engines with -3(E) ordering code suffix support Metasys Release 7.0.7 or later only

Accessories

Codes	Description
MS-BAT1010-0	Replacement data protection battery for NIE59. Rechargeable gel cell battery: 12 V, 1.2 Ah, with a typical life of 3 to 5 years at 21°C
MS-BAT1020-0	Replacement data protection battery for NIE29, NIE39, and NIE49. Rechargeable NiMH battery: 3.6 V 500 mAh, with a typical life of 10 years at 21°C

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Technical specification

NIE29

Power requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), Safety Extra Low Voltage (SELV) power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum)
Power consumption	25 VA maximum **Note:** The 25 VA rating does not include any power supplied by the NIE29 to devices connected at the NIE29 Binary Outputs (BOs). BO devices connected to and powered by an NIE29 can require an additional 125 VA (maximum).
Ambient operating conditions	0 to 50 °C; 10 to 90% RH, 30 °C maximum dew point
Ambient storage conditions	–40 to 70 °C; 5 to 95% RH, 30 °C maximum dew point
Data protection	Supports data protection on power failure. Rechargeable NiMH battery: 3.6 VDC 500 mAh, with a typical life of 5 to 7 years at 21 °C; Product Code Number: MS-BAT1020-0
Processor	192 MHz Renesas™ SH4 7760 RISC processor
Memory	128 MB Flash nonvolatile memory for operating system, configuration data, and operations data storage and backup 128 MB Synchronous Dynamic Random Access Memory (SDRAM) for operations data dynamic memory
Operating system	Microsoft® Windows® CE embedded
Network and serial interfaces	One Ethernet port; 10/100 MB; 8-pin RJ-45 connector One optically isolated RS-485 port SA Bus; with a pluggable and keyed 4-position terminal block (on all NIE29 models) One optically isolated RS-485 port; with a pluggable and keyed 4-position terminal block (available on NIE2910, NIE2916, NIE2960 and NIE2966 models only) One LONWORKS port; FTT10 78 Kbps; pluggable, keyed 3-position terminal block (available on NIE2920 and NIE2926 models only) One RS-232-C serial port with standard 9-pin sub-D connector that supports standard baud rates: 9600, 19.2k, 38.4k, or 76.8k baud. One USB serial port with standard USB connector
Housing	Plastic housing
Plastic material	ABS and polycarbonate
Protection	IP20 (IEC60529)
Mounting	On flat surface with screws on three mounting clips or a single 35 mm DIN rail
Dimensions (H x W x D)	155 x 270 x 64 mm Minimum mounting space required: 250 x 370 x 110 mm
Shipping weight	1.2 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

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Technical specifications

NIE39 – NIE49

Power requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), Safety Extra Low Voltage (SELV) power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum)
Power consumption	25 VA maximum
Ambient operating conditions	0 to 50 °C; 10 to 90% RH, 30°C maximum dew point
Ambient storage conditions	-40 to 70 °C; 5 to 95% RH, 30°C maximum dew point
Data protection	Supports data protection on power failure. Rechargeable NiMH battery: 3.6 VDC 500 mAh, with a typical life of 5 to 7 years at 21 °C; Product Code Number: MS-BAT1020-0
Processor	192 MHz Renesas™ SH4 7760 RISC processor
Memory	128 MB Flash nonvolatile memory for operating system, configuration data, and operations data storage and backup 128 MB Synchronous Dynamic Random Access Memory (DRAM) for operations data dynamic memory
Operating system	Microsoft® Windows® CE embedded
Network and serial interfaces	One Ethernet port; 10/100 Mbps; 8-pin RJ-45 connector (Metasys communications & integration bus) One optically isolated RS-485 port; 9600, 19.2k, 38.4k, or 76.8k baud (depending on protocol); with a pluggable and keyed 4-position terminal block (available on NIE3910 and NIE4910 models only) One LonWorks port; FTT10 78 Kbps; pluggable, keyed 3-position terminal block (available on NIIE3920 and NAE4920 models only) Two RS-232-C serial port with standard 9-pin sub-D connector that supports standard baud rates: 9600, 19.2k, 38.4k, or 76.8k baud. One USB serial port with standard USB connector that supports an optional, user-supplied external modem.
Housing	Plastic housing material: ABS + polycarbonate UL94-5VB
Protection	IP20 (IEC 60529)
Mounting	On flat surface with screws on three mounting clips or a single 35 mm DIN rail
Dimensions (H x W x D)	131 x 270 x 62 mm Minimum space for mounting: 210 x 350 x 110 mm
Shipping weight	1.2 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

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NIEx9

Technical specifications

NIE59xx-3

Power requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), Safety Extra-Low Voltage (SELV) power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum)
Power consumption	50 VA maximum
Ambient operating conditions	0 to 50°C; 10 to 90% RH, 30°C maximum dew point
Ambient storage conditions	-40 to 70°C; 5 to 95% RH, 30°C maximum dew point
Data protection	Supports data protection on power failure. Rechargeable gel cell battery: 12 V, 1.2 Ah, with a typical life of 3 to 5 years at 21°C; Product Code Number: MS-BAT1010-0
Clock battery	Maintains real-time clock through a power failure. Onboard cell; typical life 10 years at 21°C
Processor	1.46 GHz Intel Atom™ Bay Trail E3815 processor
Memory	16 GB flash nonvolatile memory for operating system, configuration data, and operations data storage and backup. 4GB DDR3 SDRAM for operations data dynamic memory
Operating system	Johnson Controls OEM Version of Microsoft Windows Embedded Standard 7 with SP1 (WES7)
Network and serial interfaces	One Ethernet port; 10/100/1,000 Mbps; 8-pin RJ-45 connector Two optically isolated RS-485 ports; 9,600, 19.2k, 38.4k, or 76.8k baud; pluggable and keyed 4 position terminal blocks (RS-485 terminal blocks available on NAE55 models only). Two RS-232-C serial ports, with standard 9-pin sub-D connectors, that support all standard baud rates. Two USB 2.0 serial ports; standard USB connectors support an optional, user-supplied external modem. Options: One telephone port for internal modem; up to 56 kbps; 6-pin RJ-12 connector. One LONWORKS port; FTT10 78 Kbps; pluggable, keyed 3-position terminal block (LONWORKS port available on NAE552x-x models only)
Housing	Plastic housing with internal metal shield
Plastic material	ABS + polycarbonate UL94-5VB Protection: IP20 (IEC 60529)
Mounting	On flat surface with screws on four mounting feet or on dual 35 mm DIN rail
Dimensions (H x W x D)	226 x 332 x 96.5 mm including mounting feet. Minimum space for mounting: 303 x 408 x 148 mm
Shipping weight	2.9 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

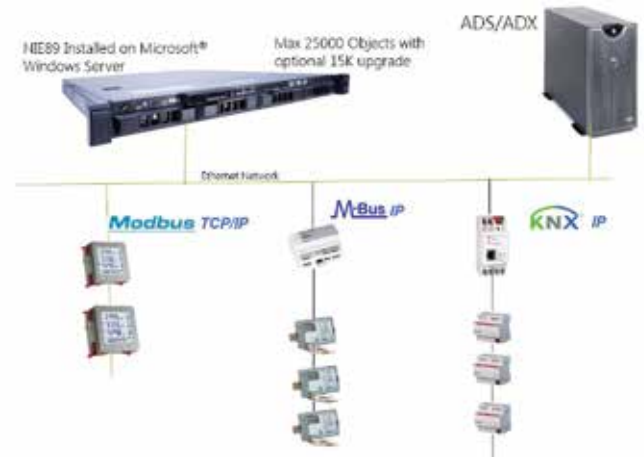# Metasys®

NIE89 software

Network Integration Engine software

The Metasys NIE89 is high-capacity server model for the integration of large third-party networks into the Metasys network.

The NIE89 software is supplied for installation on a Microsoft® Windows server computer. The NIE89 supports 10,000 objects with an optional upgrade available to increase the capacity to 25,000 objects.

The NIE89 supervisory engines can integrate power and energy meters, lighting, HVAC, security, access control, and many proprietary systems that communicate over various protocols. NIEx9s provide comprehensive equipment monitoring and control, scheduling, alarm and event management, energy management, data exchange, data trending, and data storage. These engines feature the same embedded Site Management Portal user interface, support multiple concurrent web browser sessions with password and permission access control, and provide the protection of industry-standard IT security.

Upto 8 third-party integration trunks are supported on an NIE89, for example four M-bus trunks and four Modbus trunks each using a specific TCP/IP port. One licensed driver per defined protocol will be required.

Features

- Support for up to four supervisory devices when configured as a Site Director
- A web-based user interface using HTTP
- Web services for access to data and services at the automation network level
- Routing of event and alarm notifications to an ADS or ADX (ADS-Lite does not support the NIE89)
- The capability to send event and alarm notifications to pager and email destinations directly
- Data collection, trend sampling, and audit trail logging
- Standard protocol clients:
- Simple Network Management Protocol (SNMP) for network device management
- Simple Network Time Protocol (SNTP) for time and date synchronization
- Dynamic Host Configuration Protocol (DHCP) for dynamic IP address assignment
- Simple Mail Transfer Protocol (SMTP) for sending email notification of alarms and events

158
European product catalogue 2017
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NIE89 software

Ordering information

Codes	Description
MS-NIE89SW-0	Network Integration Engine software for installation on a Microsoft® Windows server computer: supports up to 8 third-party trunks (Modbus RTU or TCP/IP, M-Bus, or KNX) and a total of 10,000 objects
MS-NIE89SW-6	Upgrade NIE89 software; for existing NIE89s
MS-MODBUSN89-0	Modbus driver for NIE89
MS-MBUSN89-0	M-Bus driver for NIE89
MS-KNXN89-0	KNX driver for NIE89
MS-15KUPG-0	15,000 object expansion upgrade for NIE89 (one expansion only per NIE89)

Accessories (M-BUS)

Codes	Description
SIS-MBUSNCLH-0E	M-Bus level converter for up to 100 units loads, 230 VAC (TCP connected)
SIS-MBUSNCLL-0E	M-Bus level converter for up to 100 units loads, 24 VAC/DC (TCP connected)
SIS-MBUSRPLH-0E	M-Bus repeater for up to 100 units loads, 230 VAC
SIS-MBUSRPLL-0E	M-Bus repeater for up to 100 units loads, 24 VAC/DC
SIS-MBUSSCLL-0E	M-Bus level converter for up to 100 units loads, 24 VAC/DC (RS232 connection)
SIS-MBUSSCSL-0E	M-Bus level converter for up to 6 units loads, 24 VAC/DC (RS232 connection)
INT-DX-KAB01	Optional connection cable SUB-D to RJ-12 for use with SIS-MBUSSCLL-0E

Accessories (KNX)

Codes	Description	Features

SIS-KNXNIXL-0E	KNX IP Tunneler Module	· Connects NIE to a single KNX line
		· Max No. of NIE per Interface: **5**
		· Max Group Addresses per NIE: **1000**
		Max KNX Networks
		    per NIE89, NIE59, NIE49: **5**
		    per NIE39, NIE29: **3**

SIS-KNXNRXL-0E	KNX IP Router Module	· KNX Router acts as Area / Line Coupler over Ethernet
		· NIE connects to a "KNX Network"
		· Max Group Addresses per NIE: **1000**
		Max KNX Networks
		    per NIE89, NIE59, NIE49: **5**
		    per NIE39, NIE29: **3**

Tools

Item	Description
VMD Generator Express Tool	The VMD Generator Express Tool is required to manage the creation of the 3rd party integrations on the NIE platform. The usage of the VMD Generator Express Tool requires a certification, which is achieved by attending a training course. For more information please contact your local technical support team.

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NxE to NIE Migration kit

Network Integration Engine

The NxE to NIE Migration kit provides the tools and licenses to convert an existing NAE or NCE into an NIE. This allows you to take a standard NCE or NAE device and add the integration capabilities.
The NIE migration can be applied to an NxE from release 4.1 or later.

All standard NIE's being shipped can only be used with Metasys release 7.0 or higher. It is not possible to downgrade a new NIE to an earlier version of Metasys. If you would like to install an NIE on an existing site that cannot be upgraded to the latest version of Metasys this solution can be used to create an NIE with Metasys release 4.1 or later.

Features

▶ Add an NIE at required Metasys release to existing site that cannot be upgraded to release 7.0 or later
▶ To add 3rd party integration capabilities to an existing NxE
▶ Avoid the need to upgrade from ADS-Lite to ADS when integrations are required. Integrations can be added to existing engine to remain within the limit for ADS-Lite

Benefits

▶ To be more competitive with our integration solutions
▶ Provide flexible integration solutions to the market
▶ Reduce installation costs, eliminates the need to replace the engine to add integration

Ordering information

Code	Description
SIS-NIEX9LIC-0E	NxE to NIE Migration kit. Includes NIE license and 'Engineered Connectivity' sticker to identify migrated device

Tools

Item	Description
VMD Generator Express Tool	The VMD Generator Express Tool is required to manage the creation of the 3rd party integrations on the NIE platform. The usage of the VMD Generator Express Tool requires a certification, which is achieved by attending a training course. For more information please contact your local technical support team.

NxE to NIE product code Migration

Standard NxE		Migration kit		NIE equivalent
MS-NCE2510-0				MS-NIE2910-0
MS-NCE2516-0				MS-NIE2916-0
MS-NCE2520-0				MS-NIE2920-0
MS-NCE2526-0				MS-NIE2926-0
MS-NCE2560-0				MS-NIE2960-0
MS-NCE2566-0				MS-NIE2966-0
MS-NAE3510-2	Apply	SIS-NIEX9-LIC-0E	Makes	MS-NIE3910-2
MS-NAE3520-2				MS-NIE3920-2
MS-NAE4510-2				MS-NIE4910-2
MS-NAE4520-2				MS-NIE4920-2
MS-NAE5510-3E				MS-NIE5960-3
MS-NAE5520-3E				MS-NIE5920-3

160
European product catalogue 2017
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EDE software

Extended Data Engine (EDE)

EDE is a powerful multiprotocol software application. It allows multiple connectivity with the most commonly used protocols with serial connections and over IP. EDE has been the connectivity Engine for the M3i/M5i supervisory software solution since 2007.

The EDE BACnet option now allows the EDE to be used with Metasys® to meet many complex integration requirements.

Features
▶ EDE manages the following protocols either as a Client or Server:
▶ OPC (Client and Server)
▶ MODBUS RTU (Master and Slave)
▶ MODBUS IP (Client and Server)
▶ MBUS (Client)
▶ MBUS IP (Client)
▶ SNMP (Polling using GET and Trap receiver)
▶ BACnet IP (Client and Server)
▶ SOAP Webservices (Server)
▶ N2 (System 91, N2 Open and N2B)
▶ REST Webservices (Server)

In addition to the above EDE provides the following other features:
▶ Data Bridge between all the connectivity's above
▶ Applying Math Calculations to the values
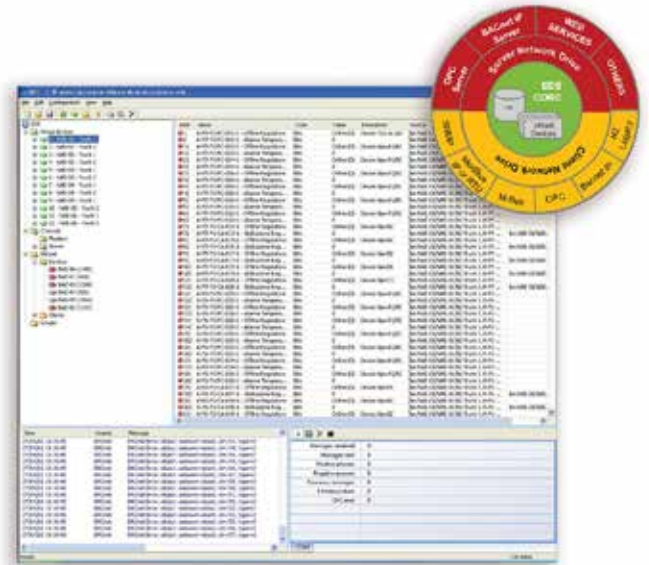▶ Trend Feature

IMPORTANT

EDE must be installed on a suitable hardware platform, *please consult the EDE Installation and Commissioning Application Note for details.*

On request EDE can be supplied pre-installed on an industrial PC, *please contact SIS Europe for details and pricing.*

Microsoft Windows 7.0 is the latest OS version validated for EDE.
To use EDE with later versions of Windows, *please contact SIS Europe for advice.*
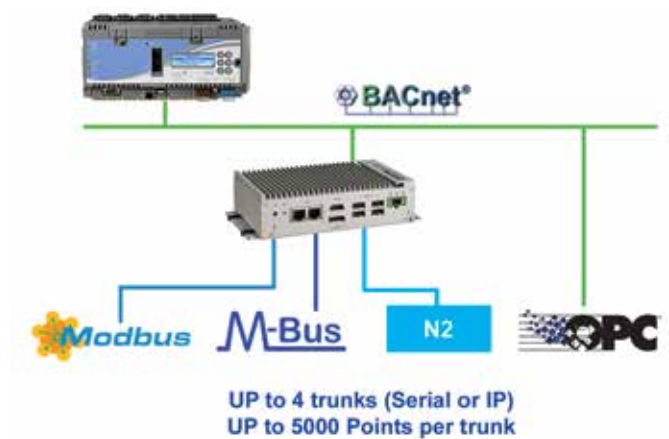
161
European product catalogue 2017
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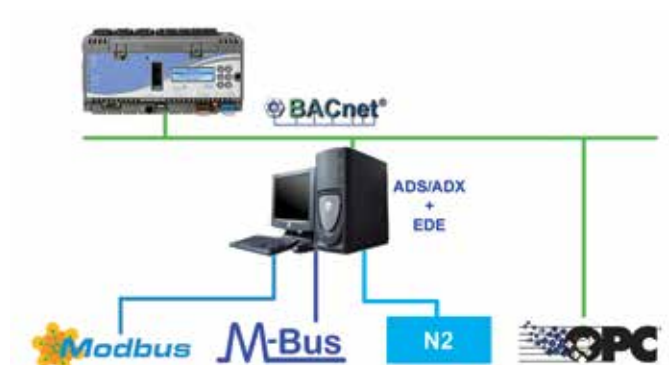
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EDE supported architecture

The EDE software with BACnet supports several different architectures and can be installed on various hardware platforms.
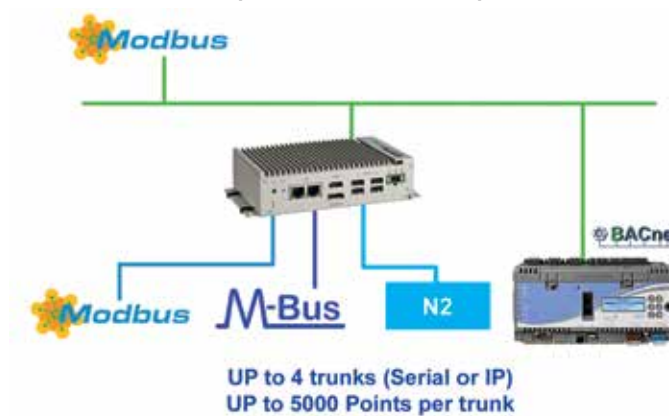
BACnet option – Standalone solution

UP to 4 trunks (Serial or IP)
UP to 5000 Points per trunk

Installed with ADS/ADX server

BACnet option with additional IP protocol

UP to 4 trunks (Serial or IP)
UP to 5000 Points per trunk

162
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Ordering information

When ordering and applying the EDE it is necessary to order the Extended Data Engine software plus the protocol drivers required.
For example to use EDE to manage a Modbus integration into Metasys you would need to order the product codes as follows:
MW-EDE-0E and SIS-EDE-BAC-0E and MW-EDE-04-xx-0E.

EDE Base software		EDE BACnet (Reqd for Metasys)		Integration Protocol drivers (Up to 4 Trunks, 5000 objects per trunk)	
Code		**Code**		**Codes**	**Description**
				MW-EDE-02-05-0E	EDE N2 Protocol 500 N2 Objects
				MW-EDE-02-15-0E	EDE N2 Protocol 1500 N2 Objects
				MW-EDE-02-50-0E	EDE N2 Protocol 5000 N2 Objects
				MW-EDE-04-05-0E	EDE MODBUS Serial 500 Objects
				MW-EDE-04-15-0E	EDE MODBUS Serial 1500 Objects
				MW-EDE-04-50-0E	EDE MODBUS Serial 5000 Objects
MW-EDE-0E	+	SIS-EDE-BAC-0E	+	MW-EDE-05-05-0E	EDE MODBUS IP 500 Objects
				MW-EDE-05-15-0E	EDE MODBUS IP 1500 Objects
				MW-EDE-05-50-0E	EDE MODBUS IP 5000 Objects
				MW-EDE-06-05-0E	EDE M-BUS IP 500 Objects
				MW-EDE-06-15-0E	EDE M-BUS IP 1500 Objects
				MW-EDE-06-50-0E	EDE M-BUS IP 5000 Objects

Codes	Description
SIS-EDE-BAC-0E	EDE Software only, BACnet IP Client/Server, 20,000 Objects
MW-EDE-0E	Standalone EDE Extended Data Engine Software with OPC server
MW-EDE-02-05-0E	EDE N2 protocol connectivity for System 9100 or N2Open devices for max. 500 N2 objects
MW-EDE-02-15-0E	EDE N2 protocol connectivity for System 9100 or N2Open devices for max. 1500 N2 objects
MW-EDE-02-50-0E	EDE N2 protocol connectivity for System 9100 or N2Open devices for max. 5000 N2 objects
MW-EDE-04-05-0E	EDE MODBUS Serial Protocol RTU or ASCII connectivity for max. 500 points
MW-EDE-04-15-0E	EDE MODBUS Serial Protocol RTU or ASCII connectivity for max. 1500 points
MW-EDE-04-50-0E	EDE MODBUS Serial Protocol RTU or ASCII connectivity for max. 5000 points
MW-EDE-05-05-0E	EDE MODBUS IP Protocol connectivity for max. 500 points
MW-EDE-05-15-0E	EDE MODBUS IP Protocol connectivity for max. 1500 points
MW-EDE-05-50-0E	EDE MODBUS IP Protocol connectivity for max. 5000 points
MW-EDE-06-05-0E	EDE M-BUS Serial Protocol connectivity for max. 500 points
MW-EDE-06-15-0E	EDE M-BUS Serial Protocol connectivity for max. 1500 points
MW-EDE-06-50-0E	EDE M-BUS Serial Protocol connectivity for max. 5000 points

Johnson Controls

Metasys®

NCE
Network Control Engine

NCE25 Network Control Engine

The Metasys Network Control Engine (NCE) series controllers combine the network supervisor capabilities and Internet Protocol (IP) network connectivity of a Network Automation Engine (NAE) with the Input/Output (I/O) point connectivity and direct digital control capabilities of a Field Equipment Controller (FEC).

NCEs provide a cost-effective solution designed for integrating central plants and large built-up air handlers into your Metasys networks.

All NCE models provide IP Ethernet network connectivity, the Metasys site management portal User Interface (UI) and the network supervisory capabilities featured on NAE35/NAE45 series network automation engines.

All NCE models provide connectivity to and supervisory control of a specified field bus trunk with up to 32 field controllers. Depending on the model, an NCE25 supports either a BACnet® Master-Slave/Token-Passing (MS/TP) trunk, an N2 Bus trunk, or a LonWorks® network trunk.

All NCE models feature 33 integral I/O points and a Sensor Actuator (SA) Bus, which allow you to increase the NCE's I/O field point capacity and also integrate NS series Network Sensors and Variable Frequency Drives (VFDs) into your NCE application.

Some NCE models feature an integral field controller display screen with a navigation keypad. In addition, some NCE models feature an internal modem that supports standard dial-up capabilities.

Features
▶ Communication using commonly accepted IT standards at the automation and enterprise level Web-based user interface
▶ Web-based User Interface
▶ Supervision of either an N2 Bus, LonWorks Network or BACnet MS/TP Bus field controller trunk
▶ Multiple connection options for data access
▶ Integral field controller with 33 I/O points
▶ Expandable I/O point capacity, NS sensor connectivity and VFD control on field controller SA Bus

Metasys®

Ordering information

Codes	Description
MS-NCE25xx-x (Base Features on Each NCE25)	Each NCE25 series model requires a 24 VAC power supply and includes one RS-232-C serial port, one RS-485 optically isolated SA Bus port, one USB serial port, one Ethernet port, and an MS-BAT1020-0 data protection battery. Each NCE25 series model has 33 integral I/O points and supports up to 128 additional I/O points on the SA Bus.
MS-NCE2500-0	Base features with no physical field controller trunk connection.
MS-NCE2506-0	Base features with no physical field controller trunk connection. Includes integral display screen.
MS-NCE2510-0	Supports one N2 Bus trunk with up to 32 N2 devices.
MS-NCE2511-0	Supports one N2 Bus trunk with up to 32 N2 devices. Includes internal modem.
MS-NCE2516-0	Supports one N2 Bus trunk with up to 32 N2 devices. Includes integral display screen.
MS-NCE2517-0	Supports one N2 Bus trunk with up to 32 N2 devices. Includes integral display screen and internal modem.
MS-NCE2520-0	Supports one LonWorks network trunk with up to 32 LonWorks devices.
MS-NCE2521-0	Supports one LonWorks network trunk with up to 32 LonWorks devices. Includes internal modem.
MS-NCE2526-0	Supports one LonWorks network trunk with up to 32 LonWorks devices. Includes integral display screen.
MS-NCE2527-0	Supports one LonWorks network trunk with up to 32 LonWorks devices. Includes integral display screen and internal modem.
MS-NCE2560-0	Supports one FC Bus trunk with up to 32 MS/TP devices.
MS-NCE2561-0	Supports one FC Bus trunk with up to 32 MS/TP devices. Includes internal modem.
MS-NCE2566-0	Supports one FC Bus trunk with up to 32 MS/TP devices. Includes integral display screen.
MS-NCE2567-0	Supports one FC Bus trunk with up to 32 MS/TP devices. Includes integral display screen and internal modem.

Accessories

Codes	Description
MS-BAT1020-0	Replacement data protection battery for NAE35, NAE45, and NCE25. Rechargeable NiMH battery: 3.6 V 500 mAh, with a typical life of 10 years at 21 °C
MS-BTCVT-1	Wireless commissioning converter, with Bluetooth® technology, for configuring and commissioning the NCE field controller and the devices on the NCE SA Bus
MS-DIS1710-0	Local controller display connects to NCE on SA Bus and provides menu display and navigation keypad for monitoring status and controlling parameters on the NCE's integral field controller. **Note:** A DIS1710 display does not operate on NCE models that have an integral controller display.
MS-EXPORT-0	Metasys export utility, which extracts historical trend, alarm, and audit data from the system and presents the historical data in a variety of formats. **Note:** This option is not necessary for sites that have an ADS/ADX as the site director because it is provided with the ADS/ADX solution.

European product catalogue 2017

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Metasys®

Technical specification

Power requirement	Dedicated nominal 24 VAC, Class 2 power supply (North America), Safety Extra Low Voltage (SELV) power supply (Europe), at 50/60 Hz (20 VAC minimum to 30 VAC maximum)
Power consumption	25 VA maximum **Note:** The 25 VA rating does not include any power supplied by the NCE29 to devices connected at the NCE29 Binary Outputs (BOs). BO devices connected to and powered by an NCE29 can require an additional 125 VA (maximum).
Ambient operating conditions	0 to 50°C; 10 to 90% RH, 30°C maximum dew point
Ambient storage conditions	–40 to 70°C; 5 to 95% RH, 30°C maximum dew point
Data protection	Supports data protection on power failure. Rechargeable NiMH battery: 3.6 VDC 500 mAh, with a typical life of 5 to 7 years at 21°C; Product Code Number: MS-BAT1020-0
Processor	192 MHz Renesas™ SH4 7760 RISC processor
Memory	128 MB Flash nonvolatile memory for operating system, configuration data, and operations data storage and backup 128 MB Synchronous Dynamic Random Access Memory (SDRAM) for operations data dynamic memory
Operating system	Microsoft® Windows® CE embedded
Network and serial interfaces	One Ethernet port; 10/100 MB; 8-pin RJ-45 connector One optically isolated RS-485 port SA Bus; with a pluggable and keyed 4-position terminal block (on all NCE29 models) One optically isolated RS-485 port; with a pluggable and keyed 4-position terminal block (available on NCE2910, NCE2916, NCE2960 and NCE2966 models only) One LonWorks port; FTT10 78 Kbps; pluggable, keyed 3-position terminal block (available on NCE2920 and NCE2926 models only) One RS-232-C serial port with standard 9-pin sub-D connector that supports standard baud rates: 9600, 19.2k, 38.4k, or 76.8k baud. One USB serial port with standard USB connector
Housing	Plastic housing
Plastic material	ABS and polycarbonate
Protection	IP20 (IEC60529)
Mounting	On flat surface with screws on three mounting clips or a single 35 mm DIN rail
Dimensions (H x W x D)	155 x 270 x 64 mm Minimum mounting space required: 250 x 370 x 110 mm
Shipping weight	1.2 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

Gateways

MAP

Mobile Access Portal Gateway

The Mobile Access Portal (MAP) Gateway is a pocket-sized web server that provides a wireless mobile user interface to Johnson Controls branded system controllers.

The MAP Gateway can be used to see trunk devices on Metasys® systems. It supports Johnson Controls branded Field Controllers, including PEAK®, FEC, FAC, and VMA.

Offering many-to-one, multi-client connectivity, the MAP Gateway gives you access to any supported device that is on a connected BACnet® Master-Slave/Token-Passing (MS/TP) field bus.
The MAP Gateway solution is conveniently sized and has a built-in wireless access point. The MAP Gateway provides an intuitive, browser-based user interface to access advanced features like alarms and point configuration.

Features

▶ Multi-Client Connectivity – Provides access to all identifiable supported devices connected to the BACnet® MS/TP trunk

▶ Browser-based Interface – Offers a local display replacement solution that allows you to access device information through any supported web browser

▶ Wi-Fi Connectivity – Lets you commission, configure, and access building automation equipment using Wi-Fi-enabled smart devices or laptops

▶ Advanced Features – Allows you to view alarms, events, and trends. Also to modify schedules and commission devices

▶ Browser-based Remote Building Management – Allows remote management of building systems

▶ Portable Size and Mobility – Allows for options to permanently mount or carry the unit from site to site

▶ Configurable Home Pages for Devices – Allows you to customize your work processes using the Display Object in the Controller Tool

▶ Easy-to-use Intuitive User Interface – Uses color coded bars on point listings to enable you to quickly get the most important statuses from a long list of points

Gateways

MAP

Ordering information

Code	Description
TL-MAP1810-0PE	Portable MAP Gateway – includes MAP Gateway, RJ-12 cable, protective shell and lanyard

Accessories

Codes	Description
TL-PWRKIT-0D	Universal AC Power Supply Adapter – Used for connecting to Ethernet
MP-STAKIT-0	Stationary Mounting Kit – includes stationary mounting cradle and field bus adapter
MP-STAFBA-0	Field Bus Adapter – RJ-12 to 4-position Terminal Block Adapter. Used for connecting directly to MS/TP Field Bus

Portable MAP Gateway

Stationary Mounting Cradle

168
European product catalogue 2017
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Gateways

MAP

Technical specifications

Product code	**TL-MAP1810-0PE:** Portable MAP Gateway - includes MAP Gateway, RJ-12 cable, bumper guard, and lanyard.
Power consumption	From SA/FC bus: 15 VDC at 2.7 VA maximum
Ambient temperature conditions	
Operating	0 to 50 °C
Operating survival	-30 to 60 °C
Storage	-40 to 70 °C
Ambient humidity conditions	
Storage	-40 to 70 °C; 5 to 95% RH 30 °C maximum dew point conditions
Operating	0 to 50 °C; 5 to 95% RH, 30 °C maximum dew point conditions
Transmission power (Typical)	
Wireless Local Area Network (WLAN) Transmission Power	+14.5 dBm, 54 Mbps +12.5 dBm, 65 Mbps
WLAN Receiver Sensitivity (Typical)	-76 dBm, 10% packet error rate (PER), 54 Mbps -73 dBm, 10% PER, 65 Mbps
Transmission speeds	
Wireless communication	2.4 GHz ISM bands, 802.11 b/g/n, 11/22/54 Mbps
Serial communication (SA/FC Bus)	9600, 19.2k, 38.4k, or 115.2k bps
Ethernet communication	10, 100 Mbps
Transmission range (Typical)	
Wireless communication	30 m line-of-sight indoors 90 m line-of-sight outdoors
WLAN range performance	0 – 15 m = Excellent 15 – 30 m = Good 30 – 90 m = Weakest, approaching out of range
Wireless security	WPA2-PSK TKIP (Wi-Fi Protected Access Pre-Shared Key mode Temporal Key Integrity Protocol)
Network and serial interfaces	One SA/FC port (6-pin port; connects with 1.5 m RJ-12 field bus cable) One USB port (Micro-B port; 2.0; supports Open Host Controller Interface [Open HCI] specification)
Dimensions (H x W x D)	
Unit alone	120 x 70 x 24.5 mm (when used vertically)
Unit in shell	128 x 75 x 29.5 mm (when used vertically)
Housing	White Acrylonitrile butadiene styrene (ABS) bracket Black silicone shell
Weight	
Unit alone	0.10 kg
Unit in shell	0.15 kg
	Note: Weights do not include any peripheral components such as cables, lanyard, or an external power supply.
Web browser requirements for computers and handheld devices	
Computer	Windows® Internet Explorer® 10 and Windows Internet Explorer 11, Apple® Safari® 6.1 and later, or Google® Chrome™
Handheld device	The handheld device must be running either Internet Explorer Mobile for Windows Mobile version 5 or version 6 operating system (OS); Apple® iPhone® and iPod touch® iOS version 7.0 or greater; or Android™ 4.0.3, 4.0.4, and 4.1+, or Google Chrome. Other web browsers may display the UI, but the functionality is not guaranteed.
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

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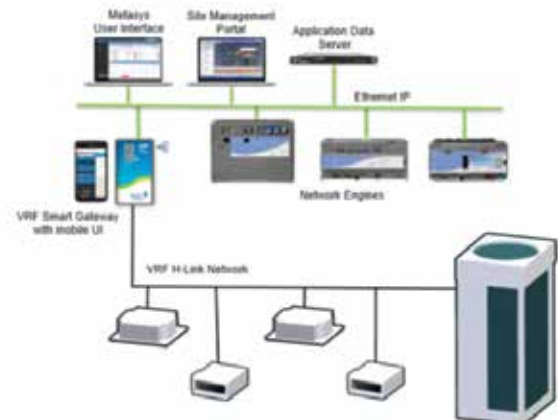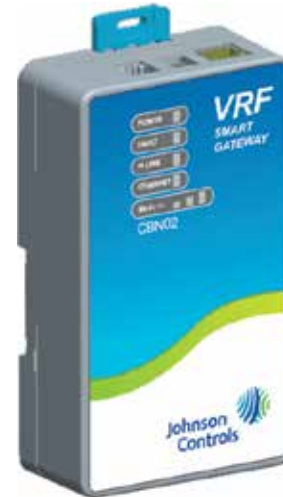**CLICK HERE**

Gateways

VRF Smart Gateway

Hitachi VRF Integration to Metasys

The Johnson Controls® VRF Smart Gateway enables the integration of the Hitachi VRF system with a building automation system (BAS), such as the Metasys system. The VRF Smart Gateway performs this function by communicating between the native H-Link communications network of the Hitachi VRF system and the open building standard BACnet®/IP network. The VRF Smart Gateway intelligently provides the VRF device and point data over the BACnet/IP network in a way that the BAS can easily discover. The VRF Smart Gateway therefore requires little or no post-integration configuration within the BAS. The VRF Smart Gateway includes a simple web server that provides a wireless mobile user interface for configuring communication parameters and performing VRF system discovery and device naming.

The wireless connection on the VRF Smart Gateway allows users of a supported mobile device to be up to 30m (line of sight) away. Power must be supplied using the provided external power supply.

Features

▶ Web interface for simple configuration over Ethernet and Wi-Fi
▶ Virtualized individual VRF Indoor units and Outdoor units automatically organizes device and point mapping to the BAS
▶ Exposes more point data per Indoor and Outdoor Unit for greater system and diagnostic visibility

Connecting VRF Equipment to the Metasys System

Ordering information

Codes	Description
SI-VRFCBN02-OSx	VRF Smart Gateway (Includes VRF Smart Gateway and 100 to 240 VAC power supply.) Last digit (x) represents non-US country code.

Manufacturer reserves the right to change specifications without prior notice

Gateways

VRF Smart Gateway

Technical specification

Power consumption	12 to 15 VDC at 5.2 W maximum
Ambient temperature conditions	
Operating	0 to 50 °C
Operating survival	−30 to 60 °C
Non-operating	−40 to 70°C
Ambient humidity conditions	
Storage and operating	5 to 95% RH 30 °C maximum dew point conditions
Transmission power (typical)	Wireless Local Area Network (WLAN) transmission power: CE Compliant levels +14.5 dBm, 54 Mbps +12.5 dBm, 65 Mbps
WLAN receiver sensitivity (typical)	−76 dBm, 10% packet error rate (PER), 54 Mbps −73 dBm, 10% PER, 65 Mbps
Transmission speeds	
Wireless communication	2.4 GHz ISM bands, 802.11 b/g/n, 11/22/54 Mbps
Serial communication (H-Link Bus)	9600 bps
Ethernet communication	10, 100 Mbps
Transmission range (typical)	
Ethernet communication	100 m cable length
H-Link Bus communication	1,000 m cable length
Wireless communication	30 m line-of-sight indoors 91 m line-of-sight outdoors
WLAN range performance	0 to 15 m = Excellent 15 to 30 m = Good 30 to 90 m = Weakest, approaching out of range
Wireless security	WPA2-PSK TKIP (Wi-Fi Protected Access Pre-Shared Key mode Temporal Key Integrity Protocol) WPA2-EAP-PEAP WPA2-EAP-TLS
Network and serial interfaces	One H-Link port (4-pin port)
Dimensions (H x W x D)	145.4 x 85.4 x 40.1 mm (when used vertically)
Weight	0.21 kg **Note:** Weights do not include an external power supply.
Web Browser requirements	
Computer	Windows® Internet Explorer® 10 and Windows Internet Explorer 11, Apple® Safari® 6.1 and later, and Google® Chrome™
Handheld Device	The handheld device must be running either Internet Explorer Mobile for Windows Mobile version 5 or version 6 operating system (OS); Apple® iPhone® and iPod touch® iOS version 7.0 or greater; Android™ 4.0.3, 4.0.4, and 4.1+, or Google Chrome. Other web browsers may display the UI, but the functionality is not guaranteed.
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

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Network displays

FAD
Field Advanced Display

The Field Advanced Display (FAD) is a user friendly operator interface featuring BACnet® communication and a colorful, graphic display with touch-screen interface.

The solution is specifically designed to enable user interaction with a BACnet MS/TP-based Building Automation Control System through a convenient, comprehensive and intuitive user interface.
The FAD is delivered with a factory programmed application for ease of use and to reduce and simplify its set-up.

Its flexible, attractive and intuitive graphical interface allows any user type to navigate the Building Automation Control System to view useful information such as temperatures, adjust parameters as set-points, program schedules and calendars and monitor dynamic information such as alarms and events. The access authority to information is managed though a series of optional user passwords.
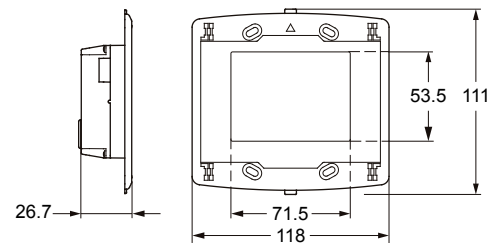
The FAD offers various options to configure. It can be configured directly without the need of a PC or software tool, using its own user interface or it can be conveniently prepared off-line using a PC.
The device configuration can be easily archived, exported or imported with a widely supported file format (CSV) through the embedded USB port.
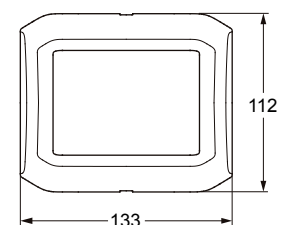
Its compact dimensions, IP protection ratings and multiple mounting options, together with its modern and discrete design, allow the FAD to properly adapt its style to any type of room and user's preference.

Features
▶ Factory Programmed Application
▶ BACnet® MS/TP Communication
▶ Portable configurations and easily upgradeable
▶ Compact and neutral design

Wall mount box (WMB0351-0)

Plastic frame (WPF0351-0 and BPF0351-0)

Dimensions in mm

172

Network displays

FAD

Ordering information

Codes	Description
FAD0351-0	3.5" Field Advanced Display
WMB0351-0	Wall mounting box
FMB0351-0	Flush mounting box
IPG0351-0	IP65 gasket
WPF0351-0	White plastic frame
BPF0351-0	Black plastic frame
USB0351-0	USB cable, 0.5 m
USB0351-1	USB cable, 2 m

Controllers with display packaged solutions

A series of bundle packages are available to facilitate and optimize ordering and logistics operations.

These bundles are including the selected field controller and a Field Advanced Display to offer a convenient solution.

Codes	Description
FED2611-0	Field Equipment controller, 24 VAC, 17-points with FAD display
FCD2612-1	Field Advanced controller, 24 VAC, 18-points with FAD display
FCD2612-2	Field Advanced controller, 230 VAC, 18-points with FAD display
FCD2611-0	Field Advanced controller, 24 VAC, 17-points with FAD display
FCD3611-0	Field Advanced controller, 24 VAC, 26-point with FAD display

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Metasys® controllers

FEC - FAC
Field Equipment Controllers

The Metasys Field Equipment Controllers (FEC) are a complete family of BACnet® compatible field controllers and accessories designed with the flexibility to meet a wide range of your HVAC control applications. Built on the ASHRAE standard for building automation system control and communication, these controllers support Johnson Controls commitment to open communication standards and greater control options for you.

The FEC family includes the 10-point FEC16, 16-point FEC25 and the 17-point FEC26 field controllers, as well as I/O expandability. All seamlessly integrate with the Metasys building management system. FEC controllers are available with optional LCD display.

FAC Series controllers feature an integral real-time clock and support time-based tasks, which enables these field controllers to monitor and control schedules, calendars, alarms and trends.

All FEC and FAC controllers feature selectable N2 or BACnet® MS/TP communication protocol, this allows them to be used as functional replacements for legacy N2 controllers.

Features
▶ Supports peer-to-peer communications
▶ Continuous tuning adaptive control provides more efficient control and reduces level of manual intervention
▶ Advanced diagnostics for failure detection, resolution and prevention

▶ Standard packaging and terminations simplify installation
▶ Field Equipment Controllers have been tested by the BACnet Testing Labs (BTL) and are certified as BACnet application specific controllers
▶ FAC models feature a integral real time clock with on-board time schedules, calendars, trends and alarms and are BTL certified as BACnet Advanced Application Controllers (B-AAC)

Point Type Counts per Model

Point Types	Signals accepted	FEC16	FEC25	FEC2611 and FAC2611	FAC2612	FAC3611
Universal Input (UI)	Analog input, voltage mode, 0–10 VDC Analog input, current mode, 4–20 mA Analog input, resistive mode, 0–2k ohm, RTD (1k NI [Johnson Controls], 1k PT, A99B SI), NTC (10k type L, 2.252k type 2) Binary input, dry contact maintained mode	2	4 **1**	6	5	8
Binary Input (BI)	Dry contact maintained mode Pulse counter/accumulator mode (high speed) 100 Hz (50 Hz – FEC25, FAC36)	1	6	2	4	6
Analog Output (AO)	Analog output, voltage mode, 0–10 VDC Analog output, current mode, 4–20 mA	0	2 **2**	2	0	6
Binary Output (BO)	24 VAC triac	3	2	3	0	6
Configurable Output (CO)	Analog output, voltage mode, 0–10 VDC Binary output mode, 24 VAC triac	4	2	4	4	0
Relay Outputs (RO)	240 VAC maximum voltage 1/3 hp 125 VAC, 1/2 hp 250 VAC 400 VA Pilot Duty at 240 VAC 200 VA Pilot Duty at 120 VAC 3 A Noninductive 24-240 VAC	0	0	0	5 (2 x SPDT) (3 x SPST)	0

Note
1 Does not support 4-20 mA input
2 Does not support 4-20 mA output

Metasys® controllers

FEC - FAC

Ordering information

Codes	Description
MS-FEC1611-1	10-point Field Equipment Controller with 2 UI, 1 BI, 3 BO and 4 CO; 24 VAC; SA Bus
MS-FEC1611-1ET	10-point Field Equipment Controller with 2 UI, 1 BI, 3 BO and 4 CO; 24 VAC; SA Bus, extended operating temperature
MS-FEC1621-1	10-point Field Equipment Controller with 2 UI, 1 BI, 3 BO and 4 CO; 24 VAC; SA Bus; Integral display
MS-FEC2511-0	16-point Field Equipment Controller with 4 UI, 6 BI, 2 BO, 2 AO and 2 CO; 24 VAC; SA Bus
MS-FEC2611-0	17-point Field Equipment Controller with 6 UI, 2 BI, 3 BO, 2 AO and 4 CO; 24 VAC; SA Bus
MS-FEC2611-0ET	17-point Field Equipment Controller with 6 UI, 2 BI, 3 BO, 2 AO and 4 CO; 24 VAC; SA Bus, extended operating temperature
MS-FEC2621-0	17-point Field Controller with 6 UI, 2 BI, 3 BO, 2 AO and 4 CO; 24 VAC; SA Bus; Integral display
MS-FAC2611-0	17-point advanced application Field Equipment Controller with 6 UI, 2 BI, 2 AO, 3 BO and 4 CO; 24 VAC; SA Bus
MS-FAC2612-1	18-point advanced application Field Equipment Controller with 5 UI, 4 BI, 4 CO and 5 RO; 24 VAC; SA Bus; pluggable terminals
MS-FAC2612-2	18-point advanced application Field Equipment Controller with 5 UI, 4 BI, 4 CO and 5 RO; 100-250 VAC; SA Bus; pluggable terminals
MS-FAC3611-0	26-point advanced application Field Controller with 8 UI, 6 BI, 6 AO and 6 BO; 24 VAC; SA Bus

Accessories

Codes	Description
MS-DIS1710-0	Local controller display for FEC and FAC models
MS-BTCVT-1	BlueTooth wireless commissioning adaptor
MS-BTCVTCBL-700	Cable replacement set for the MS-BTCVT-1 includes retractable 5 m cable
TL-BRTRP-0	Portable BACnet/IP to MS/TP Router. Includes 1.8 m cable and 1.5 m Ethernet cable
AP-TBK4SA-0	Replacement MS/TP SA Bus Terminal, 4-position connector, brown, bulk pack
AP-TBK4FC-0	Replacement MS/TP FC Bus Terminal, 4-position connector, blue, bulk pack
AP-TBK3PW-0	Replacement Power Terminal, 3-position Connector, grey, bulk pack
MS-TBKLV03-0	FAC2612, 3 position line voltage Terminal Block. Includes 3 pieces (grey)
MS-TBKRO02-0	FAC2612, 2 position Relay Output Terminal Block. Includes 9 pieces, 3 of each position (red)
MS-TBKRO03-0	FAC2612, 3 position Relay Output Terminal Block. Includes 6 pieces, 3 of each position (red)
MS-TBKCO04-0	FAC2612, 4 position configurable Output Terminal Block. Includes 6 pieces, 3 of each position (black)
MS-TBKUI04-0	FAC2612, 4 position Universal Input Terminal Block. Includes 9 pieces, 3 of each position (white)
MS-TBKUI05-0	FAC2612, 5 position Universal Input Terminal Block. Includes 3 pieces (white)
MS-ZFR1810-1	Wireless Field Bus Coordinator, 10 mW Transmission Power. Functions with NAE35xx, NAE45xx, NAE55xx and NCE25xx models.
MS-ZFR1811-1	Wireless Field Bus Router, 10 mW Transmission Power. Functions with Metasys BACnet FECs, VMA1600s and WRZ-TTx Series Wireless Mesh Room Temperature Sensors.
ZFR-USBHA-0	USB Dongle with ZigBee™ Driver provides a wireless connection through CCT to allow wireless commissioning of the wireless enabled FEC, FAC, IOM, and VMA16 field controllers. Also allows use of the ZFR Checkout Tool (ZCT) in CCT

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Metasys® controllers

FEC - FAC

Technical specifications

FEC

Supply voltage	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, Safety Extra-Low Voltage (SELV) (Europe)
Power consumption	14 VA maximum for FEC models with no integral display 20 VA maximum for FEC models with integral display **Note:** VA ratings do not include any power supplied to the peripheral devices connected to Binary outputs (BOs) or Configurable Outputs (COs), which can consume up to 12 VA for each BO or CO, for a possible total consumption of an additional 84 VA (maximum).
Ambient conditions	
Operating	0 to 50°C; 10 to 90% RH noncondensing (-xET models -40 to 70°C; 10 to 90% RH noncondensing)
Storage temperature	-40 to 80°C; 5 to 95% RH noncondensing
Controller addressing	DIP switch set; valid field controller device addresses 4-127 (Device addresses 0-3 and 128-255 are reserved and not valid field controller addresses.)
Communications bus	Selectable N2 or BACnet® MS/TP RS-485: 3-wire FC Bus between the supervisory controller and field controllers 4-wire SA Bus between field controller, network sensors, and other sensor/actuator devices, includes a lead to source 15 VDC supply power (from field controller) to bus devices.
Processor	H8SX/166xR Renesas® microcontroller
Memory	1 MB flash memory and 512 KB Random Access Memory (RAM)
Input and output capabilities	
FEC16 model	2 - Universal inputs: Defined as 0-10 VDC, 4-20 mA, 0-600k ohm or binary dry contact 1 - Binary inputs: Defined as dry contact maintained or pulse counter/accumulator mode 3 - Binary outputs: Defined as 24 VAC triac (selectable internal or external source power) 4 - Configurable outputs: Defined as 0-10 VDC or 24 VAC triac BO
FEC25 model	4 - Universal inputs: Defined as 0-10 VDC, 0-600k ohm or binary dry contact 6 - Binary inputs: Defined as dry contact maintained or pulse counter/accumulator mode 2 - Binary outputs: Defined as 24 VAC triac (external source power only) 2 - Configurable outputs: Defined as 0-10 VDC or 24 VAC triac BO 2 - Analog outputs: Defined as 0-10 VDC only
FEC26 model	6 - Universal inputs: Defined as 0-10 VDC, 4-20 mA, 0-600k ohm or binary dry contact 2 - Binary inputs: Defined as dry contact maintained or pulse counter/accumulator mode 3 - Binary outputs: Defined as 24 VAC triac (selectable internal or external source power) 4 - Configurable outputs: Defined as 0-10 VDC or 24 VAC triac BO 2 - Analog outputs: Defined as 0-10 VDC or 4-20 mA
Analog input/analog output resolution and accuracy	Analog input: 16-bit resolution Analog output: 16-bit resolution and ±200 mV in 0-10 VDC applications
Terminations	Input/output: Fixed screw terminal blocks FC Bus, SA Bus and power supply: 3-wire and 4-wire pluggable screw terminal blocks FC Bus and SA Bus: RJ-12 6-pin modular jacks
Mounting	Horizontal on single 35 mm DIN rail mount (preferred) or screw mount on flat surface with three integral mounting clips on controller
Housing	Enclosure material: ABS and polycarbonate UL94 5VB; Self-extinguishing, plenum-rated protection class: IP20 (IEC529)
Dimensions (H x W x D)	
FEC16/25 model	150 x 164 x 53 mm including terminals and mounting clips
FEC2611 model	150 x 190 x 53 mm including terminals and mounting clips
	Note: Mounting space for FAC models requires an additional 50 mm space on top, bottom, and front face of controller for easy cover removal, ventilation, and wire terminations.
Weight	
FEC16/25 model	0.4 kg
FEC2611 model	0.5 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

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Metasys® controllers

FEC - FAC

Technical specifications

FAC (Part 1/2)

Supply voltage	
FAC2611-0/FAC3611-0 and FAC2612-1	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, Safety Extra-Low Voltage (SELV) (Europe)
MS-FAC2612-2	100 to 250 VAC, 50/60 Hz
Power consumption	14 VA maximum for FxC models with no integral display
	Note: VA ratings do not include any power supplied to the peripheral devices connected to Binary outputs (BOs) or Configurable Outputs (COs), which can consume up to 12 VA for each BO or CO, for a possible total consumption of an additional 84 VA (maximum).
Ambient conditions	
Operating	0 to 50°C; 10 to 90% RH noncondensing
Storage	−40 to 80°C; 5 to 95% RH noncondensing
Controller addressing	DIP switch set; valid field controller device addresses 4–127 (Device addresses 0–3 and 128–255 are reserved and not valid field controller addresses)
Communications bus	Selectable N2 or BACnet® MS/TP RS-485: 3-wire FC Bus between the supervisory controller and field controllers. 4-wire SA Bus between field controller, network sensors, and other sensor/actuator devices, includes a lead to source 15 VDC supply power (from field controller) to bus devices.
Processor	
FAC26 models	H8SX/166xR Renesas® 32-bit microcontroller
FAC36 model	RS630 32-Bit Renesas® microcontroller
Memory	4 MB Flash Memory and 1 MB Random Access Memory (RAM)
Input and output capabilities	
FAC2611 model	6 - Universal inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohm or binary dry contact 2 - Binary inputs: Defined as dry contact maintained or pulse counter/accumulator mode 3 - Binary outputs: Defined as 24 VAC triac (selectable internal or external source power) 4 - Configurable outputs: Defined as 0–10 VDC or 24 VAC triac BO 2 - Analog outputs: Defined as 0–10 VDC or 4–20 mA
FAC2612 models	5 - Universal inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohm or binary dry contact 4 - Binary inputs: Defined as dry contact maintained or pulse counter/accumulator mode 5 - Relay outputs: Defined as maximum 3A noninductive at 24-240VAC, 2 x SPDT and 3 x SPST 4 - Configurable outputs: Defined as 0–10 VDC or 24 VAC triac BO
FAC3611 model	8 - Universal inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohm or binary dry contact 6 - Binary inputs: Defined as dry contact maintained or pulse counter/accumulator mode 6 - Binary outputs: Defined as 24 VAC triac (selectable internal or external source power) 6 - Analog outputs: Defined as 0–10 VDC or 4–20 mA
Analog input/analog output Resolution and Accuracy	Analog input: 16-bit resolution Analog output: 16-bit resolution and ±200 mV in 0–10 VDC applications
Terminations	Input/output: Fixed Screw Terminal Blocks (FAC2611 & FAC3611) Pluggable Terminal Blocks (FAC2612) FC Bus, SA Bus, and Supply Power: 3-Wire and 4-Wire Pluggable Screw Terminal Blocks FC Bus and SA Bus: RJ-12 6-Pin Modular Jacks

...Continued...

Metasys® controllers

FEC – FAC

Technical specifications

FAC (Part 2/2)

Mounting	Horizontal on single 35 mm DIN rail mount (preferred), or screw mount on flat surface with three integral mounting clips on controller
Housing	Enclosure material: ABS and polycarbonate UL94 5VB; Self-extinguishing, Plenum Rated. Protection Class: IP20 (IEC529)
Dimensions (H x W x D)	
FAC2611-0	150 x 190 x 53 mm including terminals and mounting clips
FAC2612-x	150 x 164 x 53 mm including terminals and mounting clips
FAC3611-0	150 x 220 x 57.5 mm including terminals and mounting clips
	Note: Mounting space for FAC models requires an additional 50 mm space on top, bottom and front face of controller for easy cover removal, ventilation, and wire terminations.
Weight	0.5 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

European product catalogue 2017

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Metasys® controllers

VMA16/VMA18

Variable air volume modular assembly

VMAs are programmable digital controllers tailored for VAV applications that communicate via the BACnet Master-Slave/Token- Passing (MS/TP) protocol (VMA16) or via the N2 protocol (VMA18), which can be integrated to any supervisory controller capable of managing N2 Open networks and devices, such as the Network Communication Module (NCM) and Network Automation Engine (NAE).

The VMA controllers feature an integral digital pressure sensor, an integral damper actuator, and a 32-bit microprocessor. The controllers' small package size facilitates quick field installation and efficient use of space, while not compromising high-tech control performance. The VMA controllers connect easily to the NS-Series Network Sensors for zone and discharge air temperature sensing.

Our wide variety of network sensor models provides options for measuring and displaying zone temperature, occupancy detection, duct temperature, zone humidity, carbon dioxide (CO_2) level, setpoint adjustments, and discharge air temperatures.

The VMA18 series controllers embedded capabilities, in addition to its modular accessories, make it well-suited as a replacement for legacy VMA14xx Series Controllers.

These features make the VMA the product of choice for VAV systems.

Features

▶ 32-bit microprocessor ensures optimum performance and meets industry specifications.
▶ Universal inputs, configurable outputs and Point Expansion modules. Allow multiple signal options to provide input/output flexibility.
▶ Standard hardware and software platform. Uses a common hardware design throughout the family line to support standardized wiring practices and installation workflows. Also uses a common software design to support use of a single tool for control applications, commissioning, and troubleshooting to minimize technical training.
▶ Auto Tuned Control Loops. Patented proportional adaptive control (P-Adaptive) and Pattern Recognition Adaptive Control (PRAC) technologies provide continuous loop tuning. Reduce commissioning time, eliminate change-of-season re-commissioning, and reduce wear and tear on mechanical devices.
▶ A state-of-the-art digital non-flow pressure sensor to provide 14-bit resolution with bidirectional flow operation that supports automatic correction for polarity on high- and low-pressure DP tube connections; this pressure sensor eliminates high- and low-pressure connection mistakes
▶ A fast response actuator that drives the damper from full open to full closed (90°) in 60 seconds to reduce commissioning time

VMA16

▶ Standard BACnet Protocol - BACnet Testing Laboratories™ (BTL) listing provides interoperability with other Building Automation System (BAS)

VMA18

▶ Use for VMA14xx retrofits. Includes cable adapters for use when replacing VMA14xx Series controllers.
▶ N2 Open Communications Protocol - N2 Protocol can be converted to BACnet Master-Slave/Token-Passing MS/TP protocol with a software download. This functionality provides a differentiated and cost-effective platform upgrade path for existing VMA customers who are looking for a gradual upgrade strategy

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Metasys® controllers

Ordering information

Codes	Communication Protocol	Description	Hardware
MS-VMA1615-0	BACnet	VAV controller with integrate actuator and integrate differential pressure transducer	3 Universal Inputs (UI), 2 Binary Outputs (BO)
MS-VMA1630-0		VAV controller with integrate actuator and integrate differential pressure transducer	3 Universal Inputs (UI), 3 Binary Outputs (BO), 2 Configurable Outputs (CO)
MS-VMA1626-0		VAV controller with integrate actuator	3 Universal Inputs (UI), 3 Binary Outputs (BO), 2 Configurable Outputs (CO)
MS-VMA1628-0		VAV controller with integrate differential pressure transducer	3 Universal Inputs (UI), 3 Binary Outputs (BO), 2 Configurable Outputs (CO)
MS-VMA1826-0	N2 Open *	VAV controller with integrate actuator	3 Universal Inputs (UI), 3 Binary Outputs (BO), 2 Configurable Outputs (CO)
MS-VMA1832-0		VAV controller with integrate actuator and integrate differential pressure transducer	3 Universal Inputs (UI), 3 Binary Outputs (BO), 2 Configurable Outputs (CO)

Note
* Can be converted to BACnet protocol with a software download

The **VMA1615 and VMA1630** controllers feature an integral digital differential pressure transducer (DPT), an integral damper actuator and a 32-bit microprocessor. These controllers easily adapt NS Series Network Sensors for zone and discharge air temperature sensing.

The **VMA1626** controller is shipped with an actuator but without a differential pressure transducer (DPT), making it well suited for commercial zoning applications or for pressure-dependent VAV box applications where no DPT is required.

The **VMA1628** includes a DPT but does not have an actuator. Without an actuator, this controller is well suited for controlling large VAV boxes that require more than 4 Nm of torque.

The **VMA18** models are designed to be functional replacements for the VMA14xx Series Variable Air Volume Modular Assembly controllers. They contain a sensor bus port and accessories well suited for replacing VMA14xx controllers.

180
European product catalogue 2017
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Metasys® controllers

VMA16/VMA18

Ordering information - Accessories

VMA16

Codes	Description
MS-DIS1710-0	Local controller display
MS-BTCVT-1	Wireless Commissioning Converter with Bluetooth® Technology
MS-BTCVTCBL-700	Cable replacement set for the MS-BTCVT-1 or the NS-ATV7003-0; Includes one 1.5 m retractable cable
TL-BRTRP-0	Portable BACnet IP to MS/TP Router
AP-TBK1002-0	2-position screw terminal that plugs onto VMA output point spade lugs
AP-TBK1003-0	3-position screw terminal that plugs onto VMA output point spade lugs
AP-TBK4SA-0	Replacement MS/TP SA Bus Terminal, 4-position connector, brown, bulk pack
AP-TBK4FC-0	Replacement MS/TP FC Bus Terminal, 4-position connector, blue, bulk pack
AP-TBK3PW-0	Replacement Power Terminal, 3-position connector, grey, bulk pack
MS-ZFR1810-1	Wireless Field Bus Coordinator, 10 mW Transmission Power. Functions with NAE35xx, NAE45xx, NAE55xx, and NCE25xx models
MS-ZFR1811-1	Wireless Field Bus Router, 10 mW Transmission Power. Functions with Metasys BACnet FECs, VMA16s, and WRZ-TTx Series Wireless Mesh Room Temperature Sensors
WRZ-7860-0	Many-to-One ZigBee Wireless Receiver for wireless sensor only applications
ZFR-USBHA-0	USB dongle with ZigBee driver to provide a wireless connection through CCT to allow wireless commissioning of the wirelessly enabled FEC, FAC, IOM, and VMA16 controllers. The dongle is used with the ZFR Checkout Tool to troubleshoot and validate ZFR wireless meshes using a laptop computer.
NS series sensors	NS series Network Sensors: *Refer to the "NS Network room command module" in this catalog*
WRZ series sensors	WRZ series Wireless Room Sensors: *Refer to the "WRZ ZigBee wireless protocol" in this catalog*

VMA18

Codes	Description
MS-BTCVT-1	Wireless Commissioning Converter with Bluetooth® Technology
AP-TBK4FC-0	Replacement MS/TP FC Bus terminal, 4-position connector, blue, bulk pack
NS series sensors	NS series Network Sensors: *Refer to the "NS Network room command module" in this catalog*
AS-CBLVMA-1	Cable adapter, 8-pin female socket to 6-pin male jack (bulk pack of 10)
AS-CBLVMA-2	Cable adapter, 8-pin female socket to 8-pin male jack with 6-pin female socket for wireless commissioning converter (bulk pack of 10)

European product catalogue 2017

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Metasys® controllers

VMA16/VMA18

Technical specifications

Product code numbers	**MS-VMA1615-0:** Integrated VAV controller/actuator/DPT, 3 UI and 2 BO	
	MS-VMA1626-0: Integrated VAV controller and actuator, 3 UI, 3 BO and 2 CO (No DPT)	**MS-VMA1826-0:** Integrated VAV controller and actuator, 3 UI, 3 BO and 2 CO; 24 VAC; (No DPT)
	MS-VMA1628-0: Integrated VAV controller and DPT, 3 UI, 3 BO and 2 CO (No actuator)	**MS-VMA1832-0:** Integrated VAV controller/actuator/DPT, 3 UI, 3 BO and 2 CO; 24 VAC;
	MS-VMA1630-0: Integrated VAV controller/actuator/DPT, 3 UI, 3 BO and 2 CO	

Power requirement		
Voltage	24 VAC (nominal, 20 VAC minimum / 30 VAC maximum), 50/60 Hz, Safety Extra-Low Voltage (SELV) (Europe)	
Consumption	10 VA typical, 14 VA maximum	
	Note: VA rating does not include any power supplied to the peripheral devices connected to Binary Outputs (BOs) or Configurable Outputs (COs), which can consume up to 12 VA for each BO or CO for a possible total consumption of an additional 60 VA (maximum).	

Ambient conditions	
Operating	0 to 50 °C
Storage temperature	−40 to 70 °C

Terminations	**VMA16**	**VMA18**
	· Inputs/Outputs: 6.3 mm spade lugs	· Inputs/Outputs, SA bus and Supply Power: 6.3 mm spade lugs
	· FC Bus, SA Bus and supply power: 4-wire and 2-wire pluggable screw terminal blocks	· N2/FC Bus pluggable: screw terminal block
	· FC and SA Bus modular ports: RJ-12 6-pin modular jacks	· TSTAT Modular Port: RJ-45 8-pin modular jack (supports analog non-communicating sensor

Controller addressing	
BACnet MS/TP Protocol	DIP switch set; valid field controller device addresses 4−127 (Device addresses 0−3 and 128−255 are reserved and not valid field controller addresses)
N2 Open Protocol	DIP switch set; valid field controller device addresses 1−253

Communications Bus	Selectable N2 or BACnet® MS/TP RS-485: 3-wire FC Bus between the supervisory controller and field controllers
	4-wire SA Bus from the VMA controller, network sensors, and other sensor/actuator devices, includes a terminal to source 15 VDC supply power from VMA to SA Bus devices.

Processor	RX630 32-bit Renesas® microcontroller
Memory	1 MB Flash Memory and 512 KB Random Access Memory (RAM)

Input and output capabilities	
Universal input	Defined as 0−10 VDC, 4−20 mA, 0−600k ohm, or Binary Dry Contact
Binary outputs	Defined as 24 VAC Triac (internal power source)
Configurable outputs	Defined as 0−10 VDC or 24 VAC Triac BO

Analog input/Analog output Accuracy	
Analog input	15-bit resolution on UIs
Analog output	0−10 VDC ± 200 mV

Air pressure differential sensor	Range: −1.5 inches to 1.5 inches H20 (−374pa to 374pa)
Performance characteristics	Total Error Band: ±1.3% Full Span Maximum Accuracy: ±0.25% Full Scale Best Fit

Mounting	Mounts to damper shaft using single set screw and to duct with single mounting screw
Actuator rating	4 Nm minimum shaft length = 44 mm

Dimensions (H x W x D)	165 x 125 x 73 mm Center of Output Hub to Center of Captive Spacer: 135 mm
Weight	0.65 kg

CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

Metasys® controllers

IOM

Input/output modules

A range of Input/Output modules compatible with Metasys.
IOMs can serve in one of two capacities depending on where they are installed on the Metasys system. When installed on the Sensor Actuator (SA) Bus of an Field Equipment Controller (FEC), the IOMs expand the point count of these controllers. When installed on the Field Controller (FC) Bus as point multiplexers, IOMs allow a Network Automation Engine (NAE) or Network Controller Engine (NCE) to monitor and control supervisory points directly.
A full range of FEC/FAC models combined with the IOM models can be applied to a wide variety of building applications ranging from simple fan coil or heat pump control, to advanced central plant management.

Features

▶ Expands controllers for larger applications
▶ Flexible configurations: 4, 6, 10, 12, 16 and 17-point expandability
▶ Integrates at both field and supervisory levels
▶ Models with 16 inputs for monitoring applications

Point type counts per model

Point types	Signals accepted	IOM17	IOM27	IOM37	IOM47	IOM2721	IOM3721	IOM3731
Universal Input (UI)	Analog Input, Voltage Mode, 0 - 10 VDC Analog Input, Current Mode, 4 - 20 mA Analog Input, Resistive Mode, 0 - 2k ohm, RTD (1k NI [Johnson Controls], 1k PT, A99B SI), NTC (10k Type L, 2.252k Type 2) Binary Input, Dry Contact Maintained Mode	0	2	4	6	8	0	0
Binary Input (BI)	Dry Contact Maintained Mode Pulse Counter Mode (High Speed), 100 Hz	4	0	0	2	0	16	8
Analog Output (AO)	Analog Output, Voltage Mode, 0 - 10 VDC Analog Output, Current Mode, 4 - 20 mA	0	0	0	2	2	0	0
Binary Output (BO)	24 VAC Triac	0	0	0	3	0	0	8
Universal Output (UO)	Analog Output, Voltage Mode, 0 - 10 VDC Binary Output Mode, 24 V AC/DC FET Analog Output, Current Mode, 4 - 20 mA	0	2	4	0	0	0	0
Configurable Output (CO)	Analog Output, Voltage Mode, 0–10 VDC Binary Output Mode, 24 VAC Triac	0	0	0	4	0	0	0
Relay Output	Maximum voltage 24 VAC (240 VAC; -2 models only)	0	2	4	0	0	0	0

European product catalogue 2017

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Metasys® controllers

IOM

Ordering information

Codes	Description
MS-IOM1711-0	Input Module, 4 Binary Inputs
MS-IOM2711-2	Input/Output Module, 2 Universal Inputs, 2 Relay Outputs (Max 240 VAC), 2 Universal Outputs
MS-IOM3711-2	Input/Output Module, 4 Universal Inputs, 4 Relay Outputs (Max 240 VAC), 4 Universal Outputs
MS-IOM4711-0	Input/Output Module, 6 Universal Inputs, 2 Binary Inputs, 3 Binary Outputs, 4 Configurable Outputs, 2 Analog Outputs
MS-IOM2721-0	Input Output Module with 8 Universal Inputs and 2 Analog Outputs, 24 VAC
MS-IOM3721-0	Input Output Module with 16 Binary Inputs, 24 VAC
MS-IOM3731-0	Input Output Module with 8 Binary Inputs and 8 Binary Outputs, 24 VAC

Accessories

Codes	Description
AP-TBK4SA-0	Replacement MS/TP SA Bus Terminal, 4-position connector, brown, bulk pack
AP-TBK4FC-0	Replacement MS/TP FC Bus Terminal, 4-position connector, blue, bulk pack
AP-TBK3PW-0	Replacement Power Terminal, 3-position connector, grey, bulk pack
MS-DIS1710-0	Local controller display for FEC and FAC models
MS-BTCVT-1	Wireless commissioning converter, with Bluetooth® technology
MS-BTCVTCBL-700	Cable replacement set for the MS-BTCVT-1 or the NS-ATV7003-0; includes one 5-foot retractable cable

Metasys® controllers

IOM

Technical specifications (Part 1/2)

Supply voltage	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, Safety Extra-Low Voltage (SELV) Europe
Power consumption	14 VA maximum **Note:** VA rating does not include any power supplied to the peripheral devices connected to Binary Outputs (BOs) or Configurable Outputs (COs), which can consume up to 12 VA for each BO or CO; for a possible total consumption of an additional 84 VA (maximum).
Ambient conditions	
Operating	0 to 50 °C; 10 to 90% RH noncondensing
Storage temperature	−40 to 80 °C; 5 to 95% RH noncondensing
Controller addressing	DIP switch set; valid field controller device addresses 4−127 (Device addresses 0−3 and 128−255 are reserved and not valid IOM addresses.)
Communications Bus	BACnet® MS/TP, RS-485: 3-wire FC Bus between the supervisory controller and field devices 4-wire SA Bus between field controller, network sensors, and other sensor/actuator devices, includes a lead to source 15 VDC supply power (from field controller) to bus devices *****.
Processor	H8SX/166xR Renesas® 32-bit microcontroller
Memory	1 MB Flash Memory and 512 KB Random Access Memory (RAM)
IOM17, IOM27 and IOM37 models	640 KB Flash Memory and 128 KB Random Access Memory (RAM)
IOM47 models	1 MB Flash Memory and 512 KB RAM
Input and Output capabilities	Analog Input: 16-bit resolution Analog Output: 16-bit resolution and ±200 mV in 0−10 VDC applications
IOM1711	4 − Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator mode

IOM2711	2 − Universal Inputs: Defined as 0−10 VDC, 4−20 mA, 0−600k ohm, or Binary Dry Contact
	2 − Universal Outputs: Analog Output mode - 0-10 VDC, Binary Output Mode - 24 VAC/VDC Field-effect Transistor
	2 − Relay Outputs (Single-pole, double-throw) Rate as:
	    24 VAC Maximum Voltage
	    3A Non-inductive 24 VAC
	    6(4)A 240 VAC Maximum Voltage; MS-IOM2711-2 model only

IOM2721	8 − Universal Inputs: Defined as 0−10 VDC, 4−20 mA, 0−600k ohm, or Binary Dry Contact 2 − Analog Outputs: Defined as 0−10 VDC or 4−20 mA

IOM3711	4 − Universal Inputs: Defined as 0−10 VDC, 4−20 mA, 0−600k ohm, or Binary Dry Contact
	4 − Universal Outputs: Analog Output mode - 0-10 VDC, Binary Output Mode - 24 VAC/VDC Field-effect Transistor
	4 − Relay Outputs (Single-Pole, Double-Throw) Rate as:
	    24 VAC Maximum Voltage
	    3A Non-inductive 24 VAC
	    6(4)A 240 VAC Maximum Voltage; MS-IOM3711-2 Model only

IOM3721	16 - Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator mode
IOM3731	8 - Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator mode 8 - Binary Outputs: Defined as 24 VAC Triac **Note:** Binary Outputs (BOs) on MS-IOM3731 controllers do not supply power for the outputs; the BOs require external low-voltage (< 30 VAC) power sources.
IOM4711	6 − Universal Inputs: Defined as 0−VDC, 4−20 mA, 0−600k ohm, or Binary Dry contact 2 − Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator mode 3 − Binary Outputs: Defined as 24 VAC Triac (selectable internal or external source power) 4 − Configurable Outputs: Defined as 0−10 VDC or 24 VAC Triac BO 2 − Analog Outputs: Defined as 0−10 VDC or 4−20 mA

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Metasys® controllers

IOM

Technical specifications (Part 2/2)

Analog Input/Analog Output resolution and accuracy	
Analog Input	16-bit resolution
Analog Output	16-bit resolution and ±200 mV in 0–10 VDC applications
Terminations	Input/Output: Fixed Screw terminal blocks SA/FC Bus and Supply Power: 4-wire and 3-wire pluggable screw terminal blocks SA/FC Bus Port: RJ-12 6-Pin Modular Jacks
Mounting	Horizontal on single 35 mm DIN rail mount (preferred), or screw mount on flat surface with three integral mounting clips on controller
Housing	Enclosure material: ABS and polycarbonate UL94 5VB; Self-extinguishing, Plenum-rated Protection Class: IP20 (IEC529)
Dimensions (H x W x D)	
IOM17xx and IOM271x models	150 x 120 x 53 mm including terminals and mounting clips
IOM272x, IOM372x and IOM373x models	150 x 164 x 53 mm including terminals and mounting clips
IOM37 and IOM47 models	150 x 190 x 53 mm including terminals and mounting clips
	Note: For all models, mounting space requires an additional 50 mm space on top, bottom, and front face of controller for easy removal, ventilation, and wire terminations.
Weight	0.5 Kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

Metasys® controllers

Romutec

Input/Output modules

Romutec Input/Output Modules are designed to integrate seamlessly into the Metasys system. They are installed on the BACnet MS/TP Sensor Actuator (SA) Bus of a Network Control Engine (NCE) or on the SA Bus of a Field Equipment Controller (FEC/FAC) and expand the point count of these controllers. A full range of FEC/FACs, NCEs and Romutec IO Modules allow various combinations, which will meet the requirements from simple to advanced building applications.

Romutec Input/Output modules can be used when manual overrides are required or when control panel space is limited and a small footprint is needed.

Six models of IO modules are offered with different combinations of BI's, BO's, AI's and AO's. In addition to the standard models optional manual override modules are available. Manual override modules come in two versions, one which can be used inside a control cabinet (DIN rail mounting) and the other for fixing on the cabinet door (front panel mounting). The manual override modules are connected with a USB type cable directly to their corresponding host IO Module.
They are preconfigured so setting up requires nothing more than selecting the appropriate DIP switch settings.

Six additional models are also available to meet the requirement for DIN rail mounted IO modules with integral overrides and point status LED's.

Features

▶ Small footprint, compared with the Metasys® Input/Output module (IOM) series.

▶ Manual overrides available as an option. Integral manual overrides for AO and BO on selected models.

▶ Models available for indicating the status of binary inputs with LED's.

▶ Supports BI, BO, AI and AO objects.

▶ Easy engineering as supported by CCT (Controller Configuration Tool).

▶ Quick engineering for manual overrides as all modules are preconfigured.

▶ Connected to the SA Bus of the FEC/FAC or NCE controller as an MSTP slave device.

▶ Equipped with fault and status LED's for troubleshooting.

▶ Pluggable terminals with spring clamp for quick and simple wire termination without special tools.

**Input/Output Module +
Control Panel**

**Input/Output module with
Integral control panel**

Metasys® controllers

Romutec

Romutec point types, functions and ratings

Point types	Function	Signal/Rating
Analog IN	Analog Input, Voltage mode	Accepts a 0–10VDC input signal, internal 75kΩ pull–down
	Analog Input, Current mode	Accepts a 0–20 mA input signal, internal 100Ω load impedance
	Analog Input, Resistive mode	Accepts a 0–600 kΩ input signal, internal 12V, 15kΩ pull–up RTD:1k Nickel [L & G], 1k Nickel [DIN], 1k Platinum, A99B Silicon Temperature sensor
Binary IN	Binary Input, Dry contact maintained mode	0.01s minimum pulse width (50Hz at 50% duty cycle) Internal 35V, 2.7kΩ pull–up
Analog OUT	Analog Output, Voltage mode, sources 0–10 VDC output voltage	External 1kΩ minimum load required 10 VDC maximum output voltage, 10 mA maximum output current
Binary OUT	Binary Output, up to 250VAC Relay contact Connects NO to common when activated	Characteristics (Resistive Load): Initial contact resistance 100mΩ (at 1A / 24VDC) Rated load 5A at 250VAC, 5A at 30VDC, 10A at 125VAC Max. switching voltage 277VAC, 30VDC Max. switching capacity 1250VA (AC), 150W (DC) Endurance 1x105 ops (Rated Load), 1x107 ops (no Load)
	Binary Output, up to 250VAC Relay contact Disconnects NC from Common when activated	Characteristics (Resistive Load): Initial contact resistance 100mΩ (at 1A / 24 VDC) Rated load 3A at 250VAC, 5A at 30VDC, 10A at 125VAC Max. switching voltage 277VAC, 30VDC Max. switching capacity 1250VA (AC), 150W (DC) Endurance 1x105 ops (Rated Load), 1x107 ops (no Load)

Selection table

Input/Output module with optional control panels

Item	BI	BO	AI	AO	Control panel
JDB1610	16				JBD1620 (for status LED)
JDB8010	8				JBD8020 or JDB8040 (for status LED)
JDB8410	8	4			JBD8420 or JDB8440 (for outputs manual override)
JAB0410				4	JAB0420 or JAB0440 (for manual override)
JAB6610	2	2	4	4	No control panel available

Input/Output mpodules with integrated control panels

Item	BI	BO	AI	AO	Control panel
JDB1651	16				Integral status LED
JDB8051	8				Integral status LED
JDB8451	8	4			Integral BO manual override and BI status LED
JDB6451	6	4			Integral BO manual override and BO status LED
JAB0451				4	Integral manual override and status LED
JAB6651	2	2	4	4	No control panel available

188
European product catalogue 2017
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Metasys® controllers

Romutec

Ordering information

Codes	Description
JAB0410	4-point Romutec IOM with 4 AO and SA Bus support
JAB0420	Optional manual overrides for JAB0410, front panel mounting
JAB0430	Bundle of JDB8010 (Base module), JAB0420 (Override module, panel) and 3.0 m USB-cable
JAB0440	Optional manual overrides for JAB0410, DIN Rail mounting
JAB0450	Bundle of JAB0410 (Base module), JAB0440 (Override module, DIN rail) and 0.1 m USB-cable
JAB0451	4-point Romutec IOM with 4 AO and SA Bus support with integral overrides and status LED's, DIN rail mounting
JAB6610	12-point Romutec IOM with 2 BI, 2 BO, 4 AI, 4 AO and SA Bus support (Points only, no overrides or input status LED's), DIN rail mounting
JAB6651	12-point Romutec IOM with 2 BI, 2 BO, 4 AI, 4 AO and SA Bus Support (Points only, no overrides or input status LED's), DIN rail mounting, part of integral family
JDB1610	16 Binary input point Romutec IOM
JDB1620	Optional point status LED module for JDB1610, front panel mounting
JDB1630	Bundle of JDB1610 (Base module), JDB1620 (Status LED module, panel) and 3.0 m USB-cable
JDB1651	16-point Romutec IOM with 16 BI and SA Bus Support with point status LED's, DIN rail mounting
JDB6451	10-point Romutec IOM with 6 BI, 4 BO (two 2-state drives) and SA Bus support with integral overrides and status LED's, DIN rail mounting
JDB8010	8-point Romutec IOM with 8 BI and SA Bus support
JDB8020	Optional LED's for indicating the BI status of JDB8010, front panel mounting
JDB8030	Bundle of JDB8010 (Base module), JDB8020 (LED module, panel) and 3.0 m USB-cable
JDB8040	Optional LED module for indicating the BI status of JDB8010, DIN Rail mounting
JDB8050	Bundle of JDB8010 (Base module), JDB8040 (LED module, DIN rail) and 0.1 m USB-cable
JDB8051	8-point Romutec IOM with 8 BI and SA Bus Support with integral status LED's, DIN rail mounting
JDB8410	12-point Romutec IOM with 8 BI, 4 BO and SA Bus support (four 1-state drives)
JDB8420	Optional manual override module for JDB8410, front panel mounting
JDB8430	Bundle of JDB8410 (Base module), JDB8420 (Override module, panel) and 3.0 m USB-cable
JDB8440	Optional manual overrides for JDB8410, DIN Rail mounting
JDB8450	Bundle of JDB8410 (Base module), JDB8440 (Override module, DIN rail) and 0.1 m USB-cable
JDB8451	12-point Romutec IOM with 8 BI, 4 BO (four 1-state drives) and SA Bus Support with Integral overrides and status LED's, DIN rail mounting

Accessories

Codes	Description
USB-A-B-0.1	USB-cable A-B type, 0.1 m
USB-A-B-3.0	USB-cable A-B type, 3.0 m
USB-A-B-5.0	USB-cable A-B type, 5.0 m
JD-RTR4084	19"-rack 4HE/84TE, plastic (GRP), for mounting of 10 front panels
JD-RTR4084S	Same as JD-RTR4084, but with transparent lockable cover and IP54 protection class
JD-RTR7050	19"-rack 7HE/50TE, plastic (GRP), for mounting of 12 front panels
JD-RTR7050S	Same as JD-RTR7050, but with transparent lockable cover and IP54 protection class
JDL8000	Cover 3HE/8TE , colour blue, for unused slots
JD-JUMPER	Three-pole jumper, needed for coding the colour of a LED to orange

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Metasys® controllers

Romutec

Technical specifications

Product code numbers	JAB0410 JDB1610 JDB6410 JAB6610 JDB8010 JDB8410	JAB0420 JDB1620 JDB6420 JDB8020 JDB8420	JAB0440 JDB6440 JDB8040 JDB8440	JAB0451 JDB1651 JDB6451 JAB6651 JDB8051 JDB8451
Supply voltage	24 VAC ± 10% at 50 or 60 Hz	5 VDC ± 5%, provided by the I/O-Module via USB		24 VAC ± 10% at 50 or 60 Hz
Power consumption	12 VA maximum incl. Front panel Load	1 VA maximum, provided by I/O-Module		12 VA maximum
Ambient conditions				
Operating	0 to 50 °C; 10 to 90% RH non-condensing			
Storage	0 to 70 °C; 10 to 90% RH non-condensing			
Terminations	Spring-type terminals for I/O's, power supply and MS/TP Bus	USB type B for the connection to the I/O Module		Spring-type terminals for I/O's, power supply and MS/TP Bus
Device addressing	DIP switch set (128-254). Addresses 0-127, 255 are reserved	Not Required		DIP switch set (128-254). Addresses 0-127, 255 are reserved
Communications Bus	BACnet® MS/TP; 4-wire SA Bus (3 wires used)	USB connection to host module		BACnet® MS/TP; 4-wire SA Bus (3 wires used)
Mounting	35 mm DIN rail	Panel front 19″ Rack	35 mm DIN rail	
Dimensions	116 x 32 x 166 mm	129 x 40.5 x 43 mm	116 x 32 x 166 mm	92 x 72 x 70 mm
Housing				
Plastic housing, Plastic material	PA6.6 25%GF	ABS + Polycarbonate UL94 5VB	PA6.6 25%GF	PC-GF10
Protection	IP20 (IEC529)			
Weight	**JAB0410:** 0.180 kg **JDB1610:** 0.180 kg **JDB6410:** 0.232 kg **JAB6610:** 0.222 kg **JDB8010:** 0.180 kg **JDB8410:** 0.240 kg	**JAB0420:** 0.102 kg **JDB1620:** 0.075 kg **JDB6420:** 0.089 kg **JDB8020:** 0.075 kg **JDB8420:** 0.105 kg	**JAB0440:** 0.143 kg **JDB6440:** 0.133 kg **JDB8040:** 0.132 kg **JDB8440:** 0.135 kg	**JAB0451:** 0.240 kg **JDB1651:** 0.160 kg **JDB6451:** 0.200 kg **JAB6651:** 0.190 kg **JDB8051:** 0.150 kg **JDB8451:** 0.210 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.			

Terminal Unit Controllers

TUC03

Configurable Terminal Unit Controller

The TUC03 configurable Terminal Unit Controller is designed specifically to provide direct digital control of terminal unit applications with heating and/or cooling coils, an electric heater and a three-speed or variable speed fan.

These applications include close control units, fan coil units, unit ventilators and chilling or heating ceiling beam installations.

The device can be configured by the installer, without the need of a PC and software tool, using a set of on-board dip-switches.

The controller is designed for field installation in a panel or enclosure or for mounting by original equipment manufacturers (OEMs) on DIN-rail or directly on a surface.
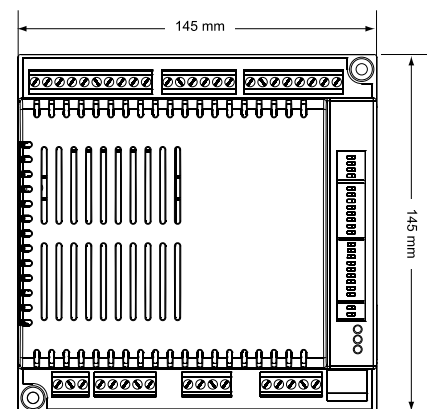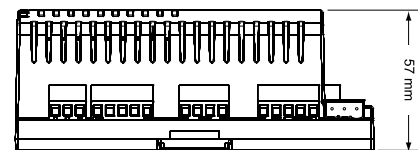
The space comfort set point, occupancy mode and fan speed may be adjusted from a wide range of room sensor modules with options for a digital display.

Communication options are available to enable the controller to be integrated into an N2 Open or BACnet® network of a building automation system. The BACnet interface of the controller complies with the ANSI/ASHRAE Standard 135-2004 for sharing data other devices on the network.

Features
▶ Field Selectable application type, communication protocol and room module, via dip-switches on controller
▶ 230 VAC power supply
▶ 5 VDC / 15 VDC / 24 VAC power supply for field devices, directly provided by the controller
▶ Modular range of room sensor modules
▶ Network communications options - N2 Open and BACnet MS/TP
▶ BACnet MS/TP with peer to peer communication
▶ Configurable using standard tools

Dimensions in mm

Ordering information

Codes	Description
TUC0301-2	230 VAC N2 / BACnet Terminal Unit Controller, no cover
TUC0311-2	230 VAC N2 / BACnet Terminal Unit Controller

191
European product catalogue 2017
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Terminal Unit Controllers

TUC03

Ordering information

Room Sensor Modules

Codes	Description
With LCD display and Integrated IR Receiver	
LP-RSM003-000C	Room Sensor Module, wall mount
LP-RSM003-001C	Room Sensor Module, horizontal flush mount
LP-RSM003-003C	IR receiver w/ integrated temperature sensor
LP-RSM003-004C	IR hand held remote control unit
Without display - 80 mm x 80 mm	
TM-2140-0000	Room sensor module, temperature sensor only
TM-2150-0000	Room sensor module, occupancy button and LED
TM-2160-0000	Room sensor module, 12–28 °C setpoint dial, occupancy button and LED
TM-2160-0002	Room sensor module, 12–28 °C setpoint dial, occupancy button and LED, fan speed override
TM-2160-0005	Room sensor module, +/- setpoint dial, occupancy button and LED
TM-2160-0007	Room sensor module, +/- setpoint dial, occupancy button and LED, fan speed override
TM-2190-0000	Room sensor module, 12–28 °C setpoint dial
TM-2190-0005	Room sensor module, +/- setpoint dial
With backlit LCD display - 80 mm x 80 mm	
RS-1180-0000	Room Sensor module, 12–28 °C setpoint dial
RS-1180-0005	Room Sensor module, +/- setpoint dial
RS-1180-0002	Room Sensor module, 12–28 °C setpoint dial, fan speed override
RS-1180-0007	Room Sensor module, +/- setpoint dial, fan speed override

Accessories

Codes	Description
LP-KIT003-010C	Remote temperature sensor, NTC 50k Ω, bulb, 80 cm leads
LP-KIT003-011C	Remote temperature sensor, NTC 50k Ω, wall mount, decorative box
LP-KIT003-012C	Remote temperature sensor, NTC 50k Ω, duct mount
LP-KIT003-013C	Remote temperature sensor, NTC 50k Ω, wall mount, decorative box
HX-9100-8001	Condensation (dew point) sensor
TS-6340K-F00	Remote temperature sensor, NTC 10k Ω, bulb, 200 cm leads
TS-6340C-E10	Remote temperature sensor, NTC 10k Ω, ceiling

LP-RSM003-000C

LP-RSM003-001C

RS Series

TM Series

LP-RSM003-003C and LP-RSM003-004C

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Terminal Unit Controllers

TUC03 Plus

Configurable Terminal Unit controller

The TUC03 Plus configurable Terminal Unit Controller is specifically designed to provide an improved BACnet® integration compared to the standard TUC03 model.

It allows the direct digital control of terminal unit applications with heating and/or cooling coils, an electric heater and a three-speed or variable speed fan.

These applications include close control units, fan coil units, unit ventilators and chilling or heating ceiling beam installations.

The device can be configured by the installer, without the need of a PC and software tool, using a set of on-board dip-switches.

The controller is designed for field installation in a panel or enclosure or for mounting by original equipment manufacturers (OEMs) on DIN-rail or directly on a surface.

The space comfort set point, occupancy mode and fan speed may be adjusted from a wide range of room sensor modules with options for a digital display.

The MS/TP field bus is available to enable the controller to be integrated into a BACnet network of a building automation system.

The BACnet interface of the controller complies with the widely accepted market standard for sharing data with other devices on the network and improves the performances of the standard TUC03 version with advanced features.

Features
▶ BACnet only – No N2 support
▶ Improved Performances – TUC03 Plus BACnet Change-of-Value and Segmentation features improve the overall system communication performances allowing to reduce the number of components required to manage the whole network and therefore saving on the total installed costs.
▶ Enhanced User Experience – TUC03 Plus BACnet State Text features enable a quicker, simpler but enhanced user experience lowering engineers effort during integrations then reducing the engineering costs.

Dimensions in mm

Ordering information

Codes	Description
TUC0312-0	TUC03 Plus – 230 VAC BACnet Terminal Unit Controller

Configurable Room Control

IRC 3rd Edition

Integrated Room Controller

IRC Controllers are microprocessor–based programmable controllers designed to control terminal units such as fan coils, heatpumps and chilled beams.

Controllers can be used as standalone or integrated to a LonWorks® or BACnet® network.

Controllers can also be extended with light and sunblind modules and work with a wide range of room sensors that could include CO_2 sensing and motion detection to allow the system to adjust to actual operating conditions and to increase energy savings. They also include wireless capability to connect remotely room sensors.

Features

▶ Single point of control for environmental comfort in the room for the occupants – temperature, air quality, lighting and sunblinds

▶ Standard Protocols (Lon and BACnet) to guarantee interoperability with other manufacturers

▶ Expandable with lighting and sunblind modules to build an integrated room control solution, for up to 45% energy savings

▶ Universal power supply and optional 24 VAC power outputs, for a direct connection of the controller to the main power supply and outputs such dampers and valve actuators, eliminating the need for transformer

▶ Multiple sensors management, for a full room management including ambient (temperature–humidity), air quality (CO2) and presence detection (motion sensor)

▶ Large choice of user interfaces: remote controls devices, room devices

▶ Network or wireless room sensors, to reduce wiring cost and create wire–free installations

Dimensions in mm

Point type counts per model

Point types	Signals accepted	IRCx205-3	IRCx225-3
Universal Input (UI)	Analog input voltage mode 0 – 10 VDC, Binary input dry contact, Binary input pulse counter 1Hz max	2	2
Sensor Input (SI)	Temperature NTC (10k type II, III)	1	1
Binary Input (BI)	Dry contact, Pulse counter 20Hz max	3	3
Analog Output (AO)	Analog output voltage mode 0 – 10 VDC	4	2
Powered Relay Outputs	100-240 VAC, same as device power supply voltage, 3 A max (inductive or resistive load) for the total sum of the 3 outputs	3	3
Relay Outputs	255 VAC maximum voltage, 9 A max non inductive 100 - 255 VAC, 2kW at 230 VAC	1	1
Powered Triac Outputs	100 – 240 VAC, same as device power supply voltage 0,5A continuous, 1A at 15 duty cycle for a 10-minute period	2	0
24 VAC Triac Outputs (DO)	See Note *	0	2

Note:

* 24 VAC power supply outputs used to power both triac outputs and analogue output, 24 VAC ± 10%, 50 Hz, 500 mA max with a resistive load (12 VA at 24 VAC), peak current 0.8A max, short-circuit and overload protected.

Configurable room control

IRC 3rd Edition

Ordering information

IRC

Integrated room controllers

Codes	Description
IRC3205-3	16-point BACnet Terminal Unit Controller, 110 – 240 VAC with 2 UI, 1 SI, 3 DI, 4 AO, 2 Triacs, 4 relays, Subnet Bus, Wireless Port
IRC3225-3	14-point BACnet Terminal Unit Controller, 110 – 240 VAC with 2 UI, 1 SI, 3 DI, 2 AO, 2 Triacs, 4 relays, 24 VAC outputs, Subnet bus, Wireless Port
IRC4205-3	16-point LONWORKS Terminal Unit Controller, 110 – 240 VAC with 2 UI, 1 SI, 3 DI, 4 AO, 2 Triacs, 4 relays, Subnet Bus, Wireless Port
IRC4225-3	14-point LONWORKS Terminal Unit Controller, 110 – 240 VAC with 2 UI, 1 SI, 3 DI, 2 AO, 2 Triacs, 4 relays, 24 VAC outputs, Subnet bus, Wireless Port
Accessory	
IRK1000-3	Strain relief and terminal cover for IRC controllers

Light and sunblind modules

IRS/IRL/IRD

Codes	Description
IRS1045-3	Sunblind module, 4 outputs, 4 digital inputs, 100 – 240 VAC power supply and sunblind outputs (8 A max, total for the 4 outputs), quick connectors (wieland type)
IRL1045-3	Lighting on-off module, 4 outputs, 4 digital inputs, 0 – 240 VAC power supply and light outputs (6 A max, total for all outputs), quick connectors (wieland type)
IRL2045-3	Lighting dimming module, 4 outputs, 4 digital inputs, 0 – 240 VAC power supply and light outputs (6 A max, total for all outputs), 1 - 10 V dimming command,quick connectors (wieland type)
IRD1045-3	Lighting DALI module, 4 outputs, 4 digital inputs, 100 – 240 VAC power supply and light outputs (6 A max, total for all outputs), quick connectors (wieland type)

Multi-sensor

IMS

Codes	Description
IMS1005-3	Infrared multi sensor, motion sensor
IMS2005-3	Infrared multi sensor, motion sensor and Lux level measure
IMS3005-3	Infrared multi sensor, motion sensor, temperature and Lux level measure
IMK1000-3	Subnetwork adaptor (optional, not requested if IMS is the last device on the subnet)

Remote controls

RCL

Codes	Description
RCL1015-3	Infrared remote control
RCL1025-3	Infrared remote control, wall-mounted support, irremovable
RCK1025-3	Wall-mounted support, irremovable remote control
RCK1015-3	Wall-mounted support, removable remote control

Accessories

Codes	Descriptions
IRJ4100-3	RJ45 cable for subnet bus, 10 m
IRJ4150-3	RJ45 cable for subnet bus, 15 m
IRJ4010-3	RJ45 cable for subnet bus, 1 m
IRJ4005-3	RJ45 cable for subnet bus, 50 cm
IRJ4050-3	RJ45 cable for subnet bus, 5 m

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Configurable room control

IRC 3nd Edition

Ordering information

Room modules

Network room display

Codes	Description
IRM1005-3	Room temperature sensor (NTC 10k) with backlit display and graphical menus
IRM2005-3	Room temperature (NTC 10k) and motion sensors with backlit display and graphical menus
IRM3005-3	Room temperature (NTC 10k) and humidity sensors with backlit display and graphical menus
IRM4005-3	Room temperature (NTC 10k), motion and humidity sensors with backlit display and graphical
IRM5005-3	Room temperature (NTC 10k) and CO_2 sensors with backlit display and graphical menus
IRM6005-3	Room temperature (NTC 10k), CO_2 and motion sensors with backlit display and graphical menus
IRM7005-3	Room temperature (NTC 10k), CO_2 and humidity sensors with backlit display and graphical menus
IRM8005-3	Room temperature (NTC 10k), CO_2 motion and humidity sensors with backlit display and graphical menus

IRM

Network room command

Codes	Description
IRU1015-3	Room temperature sensor (NTC 10k) with setpoint knob
IRU1025-3	Room temperature sensor (NTC 10k) with setpoint knob and fan speed selection knob
IRU1035-3	Room temperature sensor (NTC 10k) with setpoint knob and occupancy button
IRU1045-3	Room temperature sensor (NTC 10k) with setpoint knob, occupancy button and fan speed selection knob
Accessories	
ILK1000-3	Lighting add-on commands for IRU room module
ISK1000-3	Sunblind add-on control for IRU room module

IRU

Network room sensor

Codes	Descriptions
INS1005-3	Room temperature sensor (NTC 10k)
INS2005-3	Room temperature (NTC 10k) and humidity sensors
INS3005-3	Room temperature (NTC 10k) and CO_2 sensors
INS4005-3	Room temperature (NTC 10k), CO_2 and humidity sensors

INS

European product catalogue 2017

SMART Equipment controllers

PEAK™

HVAC/R controllers

The PEAK 18 and PEAK 32 Controllers are configurable controllers that can be switched between MS/TP, Modbus RTU, and N2 Communication protocols real-time through the onboard local display or through the Mobile Access Portal (MAP) Gateway. When the controllers are used as MS/TP devices, they are BACnet® Advanced Application Controllers (B-AACs) with integral RS-485 Master-Slave/Token-Passing (MS/TP) communications.

PEAK Series Controllers feature an integral real-time clock and support time-based tasks, which enables these field controllers to monitor and control schedules, calendars, alarms, and trends.

The PEAK 18 controller features line-voltage relay outputs, making this controller well-suited for use in terminal units. PEAK 18 model uses a line-voltage power supply, eliminating the need for a 24 VAC transformer in line-voltage applications. PEAK 18 comes both in 24 VAC and 120 to 240 VAC power models, with or without display.

The PEAK 32 with larger inputs and outputs counts also features linevoltage relay outputs for many suitable applications.
PEAK 32 comes in 24 VAC model, with or without display.

A full range of PEAK 18 and 32 models combined with the Input/Output Module (IOM) models can be applied to a wide variety of HVAC/R applications ranging from simple fan coil or heat pump control to advanced AHU or chiller applications.

Features

▸ Standard BACnet Protocol – Provides interoperability with other Building Automation Systems (BAS) products that use the widely accepted BACnet standard.

▸ Standard Software and Application Development – Uses a common hardware design throughout the family line to support standardized wiring practices and installation workflows. Also uses a common software design to support use of a single tool for control applications, commissioning, and troubleshooting to minimize technical training.

▸ Configurable Controller – Eliminates the need for software or programming in the field. Factory commission and programmed. Only configuration of parameters in the field through local display or MAP.

▸ Real-time Switchable communication protocols from BACnet MS/TP to Modbus or N2 – Is available through the onboard display or MAP Gateway one configuration parameter can be set to switch the protocol in real time.

▸ Dedicated Modbus Integration bus – Provides interoperability with other Modbus devices through the dedicated Modbus master port.

▸ Predefined alarms and trends – Based on HVAC/R application all alarms and trends will be predefined within the controller.

▸ Onboard display with real time clock to support local scheduling and trends – Provides an onboard display for configuration and commissioning of the equipment, validation of controls, validation of alarms, faults and control.

▸ Auto-Tuned Control Loops – Reduce commissioning time, eliminate change-of-season re-commissioning, and reduce wear and tear on mechanical devices.

▸ Universal Inputs, Configurable Outputs, and Point Expansion Modules – Allow multiple signal options to provide input/output flexibility.

▸ Optional Local User Interface Display – Allows convenient monitoring and adjusting capabilities at the local device.

▸ Optional Mobile Interface – Allow monitoring, servicing, and commissioning of the equipment through the MAP gateway, utilizing any smart mobile devices.

▸ USB Port – Onboard USB port for firmware upgrades and backup/restore of configuration of the controller.

▸ BACnet Testing Laboratories (BTL) Listing – Ensures interoperability with other BTL rev 12- listed devices. BTL is a third-party agency, which validates that BAS vendor products meet the BACnet industry-standard protocol.

▸ Future Verasys Connectivity – Support of Equipment Model technology for plug and play of equipment to the system level.

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SMART Equipment controllers

PEAK™

Ordering information

PEAK controllers

Codes	Description
PK-OEM1810-0	PEAK 18, 24 Volts no Display – 5 UI, 4 BI, 2 BO, 4 RO and 3 CO
PK-OEM1820-0	PEAK 18, 24 Volts with Display– 5 UI, 4 BI, 2 BO, 4 RO and 3 CO
PK-OEM1811-0	PEAK 18, 240 Volts no Display– 5 UI, 4 BI, 2 BO, 4 RO and 3 CO
PK-OEM1821-0	PEAK 18, 240 Volts with Display– 5 UI, 4 BI, 2 BO, 4 RO and 3 CO
PK-OEM3210-0	PEAK 32, 24 Volts no Display - 6 UI, 12 BI, 4 BO, 5 RO, 4 CO and 1 PWM
PK-OEM3220-0	PEAK 32, 24 Volts with Display- 6 UI, 12 BI, 4 BO, 5 RO, 4 CO and 1 PWM
PK-KIT1810-0	PEAK 18, 24 Volts removable terminal block kit for all spade connections
PK-KIT1811-0	PEAK 18, 240 Volts removable terminal block kit for all spade connections
PK-KIT3210-0	PEAK 32, 24 Volts removable terminal block kit for all spade connections

PEAK IOM series

Codes	Description	UL and cUL (Canada)	CE Marked
PK-IOM1711-0	4-Point IOM with 4 BI, FC Bus and SA Bus Support	•	•
PK-IOM2711-2	6-Point IOM with 2 UI, 2 UO, 2 BO, FC Bus, and SA Bus Support. Relays are rated for 240 VAC.	---	•
PK-IOM2721-0	10-Point IOM with 8 UI, 2 AO, FC Bus, and SA Bus Support	•	•
PK-IOM3711-2	12-Point IOM with 4 UI, 4 UO, 4 BO, FC Bus, and SA Bus Support. Relays are rated for 240 VAC.	---	•
PK-IOM3721-0	16-Point IOM with 16 BI, FC Bus, and SA Bus Support	•	•
PK-IOM3731-0	16-Point IOM with 8 BI, 8 BO, FC Bus, and SA Bus Support	•	•
PK-IOM4711-0	17-Point IOM with 6 UI, 2 BI, 3 BO, 2 AO, 4 CO, FC and SA Bus Support	•	•

Accessories (Order separately)

Codes	Description
MS-DIS1710-0	Local Controller Display: *Refer to Local Controller Display Product Bulletin (LIT-12011273) for more information.*
MS-BACEOL-0	Terminator module providing EOL termination on FC Bus and N2 segments
MS-BTCVT-1	Wireless Commissioning Converter with Bluetooth Technology
MS-BTCVTCBL-700	Cable Replacement Set for the MS-BTCVT-1 or the NS-ATV7003-0; Includes One 5 ft (1.5 m) Retractable Cable
NS Series Sensors	NS Series Network Sensors: *Refer to the NS Series Network Sensors Product Bulletin (LIT-12011574) for specific sensor model descriptions.*
TL-MAP1810-0PE	Portable MAP Gateway includes MAP Gateway, RJ-12 cable, protective shell, and lanyard.
TL-BRTRP-0	Portable BACnet IP to MS/TP Router

198
European product catalogue 2017
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SMART Equipment controllers

PEAK™

Technical specification

PEAK controllers (Part 1/2)

Product code numbers	**PK-OEM1810-0:** PEAK 18, 24 Volts no display – 5 UI, 4 BI, 2 BO, 4 RO and 3 CO **PK-OEM1820-0:** PEAK 18, 24 Volts with display – 5 UI, 4 BI, 2 BO, 4 RO and 3 CO **PK-OEM1811-0:** PEAK 18, 240 Volts no display – 5 UI, 4 BI, 2 BO, 4 RO and 3 CO **PK-OEM1821-0:** PEAK 18, 240 Volts with display – 5 UI, 4 BI, 2 BO, 4 RO and 3 CO **PK-OEM3210-0:** PEAK 32, 24 Volts no display - 6 UI, 12 BI, 4 BO, 5 RO, 4 CO and 1 PWM **PK-OEM3220-0:** PEAK 32, 24 Volts with display - 6 UI, 12 BI, 4 BO, 5 RO, 4 CO and 1 PWM
Supply voltage	
PEAK 18/24 Volts and PEAK 32/24 Volts	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, power supply Class 2 (North America), Safety Extra-Low Voltage (SELV) (Europe)
PEAK 18/240 Volts	90 to 240 VAC, 50/60 Hz, power supply Class 1 (North America), Safety Extra-Low Voltage (SELV) (Europe)
Power consumption	20 VA Maximum VA rating does not include any power supplied to the peripheral devices connected to Binary Outputs (BOs) or Configurable Outputs (COs), which can consume up to 12 VA for each BO or CO; for a possible total consumption of an additional 60 VA (maximum).
Ambient conditions	
Operating	–20 to 70 °C; 10 to 95% RH noncondensing; Pollution Degree 2
Storage	–40 to 85 °C; 5 to 95% RH noncondensing
Controller addressing	
BACnet® MS/TP	60 VA; valid field controller device addresses 4–127 (Device addresses 0–3 and 128–255 are reserved and not valid field controller addresses.)
N2	Valid field controller device addresses 1 to 255
Communications Bus	BACnet® MS/TP, MODBUS (Master/Slave) and N2 via RS-485: · 3-wire FC Bus between the supervisory controller and field controller addresses). · 3-wire SA Bus between controller, network sensors, and other sensor/actuator devices, includes a lead-to source 15 VDC supply power (from controller) to bus devices. · 3-wire one Modbus communication half-duplex (Master RTU port)
Processor	RX631 Renesas® 32-bit microcontroller
Memory	2 MB flash memory and 8 MB RAM
Input and output capabilities PEAK 18	
Five universal inputs	User-configurable, 3 available modes: · Voltage input: 0 to 10 VDC · Current sense input: 4 to 20 mA · Resistive inputs/dry contact Inputs
Four binary inputs	Defined as dry contact maintained or pulse counter/accumulator mode (high speed), 100 HZ
Three configurable outputs	User-configurable, 2 available modes: · Analog output: 0 to 10 VDC, 10 mA · Triac output: 24 VAC, 0.5 A (Externally source powered)
Four binary outputs (relays)	Single-pole, Single-throw. Dry Contacts rated 240 VAC. · UL: 5A Resistive, 1.9 FLA/11.1LRA, D300 Pilot Duty, 70 °C (30,000 cycles) · IEC: 3A Resistive, 3A Inductive, Cos(phi)=0.6, -20 to 70 °C (100,000 cycles)
Two binary outputs (Triacs)	Output: 24 VAC or 240VAC, 0.5A (Externally Powered). **Note:** Reference all triac commons to the same pole of the supply circuit.
Utility output power port	Ability to deliver 24 VAC

...Continued...

SMART Equipment controllers

PEAK™

Technical specification

PEAK controllers (Part 2/2)

Input and output capabilities PEAK 32	
Six universal inputs	User-configurable, 3 available modes: · Voltage input: 0 to 10 VDC · Current sense input: 4 to 20mA · Resistive inputs/dry contact inputs
Twelve binary inputs	Defined as dry contact maintained or pulse counter/accumulator mode (high speed), 100 HZ
Four configurable outputs	User-configurable, 2 available modes: · Analog output: 0 to 10 VDC, 10 mA · Triac output: 24 VAC, 0.5 A (Externally sourced powered)
Five binary outputs (relays)	2 single-pole, single-throw. Dry contacts rated 240 VAC, 1 SPDT 240 VAC, 2 double insulated SPST, 240 VAC · UL: 5 A Resistive, 1.9 FLA/11.1LRA, D300 Pilot Duty, 70 °C (30,000 cycles) · IEC: 3 A Resistive, 3 A Inductive, Cos(phi)=0.6, -20 to 70 °C (100,000 cycles)
Four binary outputs (Triacs)	Output: 24 VAC or 240 VAC, 0.5A (Externally powered)
One pulse width modulation	PWM 0 to 15 VDC at 10 ma max 100 HZ **Note:** Reference all triac commons to the same pole of the supply circuit.
Analog input/analog output resolution and accuracy	Analog input: 15-bit resolution Analog output: 15-bit resolution, +/- 200 mV accuracy in 0 to 10 VDC applications
Terminations PEAK 18 and PEAK 32	Input/output: Fixed spade terminals SA/FC/Modbus: 4-wire and 3-wire pluggable screw terminal blocks SA Bus tool Port: RJ-12 6-Pin modular jacks
Terminations PEAK 18 and PEAK 32 field install option	Input/output: Fixed solder terminals SA/FC/Modbus: 4-wire and 3-wire pluggable screw terminal blocks SA Bus tool Port: RJ-12 6-Pin modular jacks
Mounting	Horizontal on single 35 mm DIN rail mount (preferred), or screw mount on flat surface with three integral mounting clips on controller
Housing	Enclosure material: ABS and polycarbonate UL94 5VB; Self-extinguishing, Plenum Rated Protection Class: IP20 (IEC 60529)
Dimensions (Height x Width x Depth)	
PEAK 18, 24 Volts	150 x 164 x 53 mm including terminals and mounting clips
PEAK 18, 240 Volts	150 x 190 x 53 mm including terminals and mounting clips
PEAK 32, 24 Volts	150 x 220 x 53 mm including terminals and mounting clips
Weight	0.5 kg
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

SMART Equipment controllers

PEAK™

Technical specification

PEAK IOM series (Part 1/2)

Product code numbers	**PK-IOM1711-0:** 4-point IOM with 4 BI, FC Bus and SA Bus Support **PK-IOM2711-2:** 6-point IOM with 2 UI, 2 UO, 2 BO, FC Bus, and SA Bus Support. Relays are rated for 240 VAC. **PK-IOM2721-0:** 10-point IOM with 8 UI, 2 AO, FC Bus, and SA Bus Support **PK-IOM3711-2:** 12-point IOM with 4 UI, 4 UO, 4 BO, FC Bus, and SA Bus Support. Relays are rated for 240 VAC **PK-IOM3721-0:** 16-point IOM with 16 BI, FC Bus, and SA Bus Support **PK-IOM3731-0:** 16-point IOM with 8 BI, 8 BO, FC Bus, and SA Bus Support **PK-IOM4711-0:** 17-point IOM with 6 UI, 2 BI, 3 BO, 2 AO, 4 CO, FC and SA Bus Support
Supply voltage	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, Power Supply Class 2 (North America), Safety Extra-Low Voltage (SELV) Europe
Power consumption	14 VA maximum **Note:** VA ratings do not include any power supplied to the peripheral devices connected to Binary Outputs (BOs) or Configurable Outputs (COs), which can consume up to 12 VA for each BO or CO, for a possible total consumption of an additional 84 VA (maximum), depending on the IOM model.
Ambient conditions	
Operating	0 to 50 °C; 10 to 90% RH noncondensing
Storage	−40 to 80 °C; 5 to 95% RH noncondensing
Addressing	DIP switch set; valid field controller device addresses 4–127 (Device addresses 0–3 and 128–255 are reserved and not valid IOM addresses).
Communications Bus	BACnet MS/TP, RS-485 wire FC Bus between the supervisory controller and field devices 4-wire SA Bus between field controller, network sensors, and other sensor/actuator devices. Includes a lead source 15 VDC supply power (from field controller) to bus devices.
Processor	H8SX/166xR Renesas® 32-bit microcontroller
Memory	512 KB Flash Memory and 128 KB RAM
Input and output capabilities	
PK-IOM1711	4 – Binary inputs: Defined as Dry Contact Maintained or Pulse Counter/ Accumulator Mode
PK-IOM2711	2 – Universal inputs: Defined as 0 to 10 VDC, 4 to 20 mA, 0 to 600k ohm, or Binary Dry Contact 2 – Universal outputs: Analog output: Voltage mode, 0-10 VDC; Binary iutput mode: 24 VAC/DC FET; Analog output: Current mode, 4 to 20 mA 2 – Relay Outputs: (Single-pole, Double-throw); UL 916 (-0 model only) 1/4 hp 120 VAC, 1/2 hp 240 VAC; 360 VA Pilot Duty at 120/240 VAC (B300); 3 A Non-inductive 24 to 240 VAC; EN 60730 (-2 model only) 6 (4) A N.O. or N.C. only, 240 VAC
PK-IOM2721	8 – Universal Inputs: Defined as 0 to 10 VDC, 4 to 20 mA, 0 to 600k ohm, or Binary Dry Contact 2 – Analog Outputs: Defined as 0 to 10 VDC or 4 to 20 mA
PK-IOM3711	4 – Universal Inputs: Defined as 0 to 10 VDC, 4 to 20 mA, 0 to 600k ohm, or Binary Dry Contact 4 – Universal Outputs: Analog Output: Voltage Mode, 0-10 VDC; Binary Output Mode: 24 VAC/DC FET; Analog Output: Current Mode, 4 to 20 mA 4 – Relay Outputs: (Single-Pole, Double-Throw); UL 916 (-0 model only): 1/4 hp 120 VAC, 1/2 hp 240 VAC; 360 VA Pilot Duty at 120/240 VAC (B300); 3 A Non-inductive 24-240 VAC; EN 60730 (-2 model only): 6 (4) A N.O. or N.C. only, 240 VAC
PK-IOM3721	16 – Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator Mode
PK-IOM3731	8 – Binary Inputs: Defined as Dry Contact Maintained or Pulse Counter/Accumulator Mode 8 – Binary Outputs: Defined as 24 VAC Triac (Require external low-voltage power source) **Note:** Binary Outputs (BOs) on MS-IOM3731-0A controllers do not supply power for the outputs; the BOs require external low-voltage (< 30 VAC) power sources.
PK-IOM4711	6 – Universal Inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohm, or Binary Dry Contact 2 – Binary Inputs: Defined as Dry Contact Maintained or Pulse/Counter Accumulator Mode 3 – Binary Outputs: Defined as 24 VAC Triac (selectable internal or external source power) 4 – Configurable Outputs: Defined as 0–10 VDC or 24 VAC Triac BO 2 – Analog Outputs: Defined as 0–10 VDC or 4–20 mA

201
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SMART Equipment controllers

PEAK[TM]

Technical specification

PEAK IOM series (Part 2/2)

Analog input/Analog output resolution and accuracy	
Analog input	16-bit resolution
Analog output	16-bit resolution and ±200 mV in 0–10 VDC applications
Terminations	
Input/output	Fixed screw terminal blocks
SA/FC Bus and supply power	4-wire and 3-wire pluggable screw terminal blocks SA/FC Bus Port: RJ-12 6-Pin modular jacks
Mounting	Horizontal on single 35 mm DIN rail mount (preferred), or screw mount on flat surface with three integral mounting clips on controller
Housing	
Enclosure material	ABS and polycarbonate UL94 5VB; self-extinguishing, Plenum-rated protection class IP20 (IEC529)
Dimensions (Height x Width x Depth)	
PK-IOM17 and PK-IOM27 family models	150 x 120 x 53 mm including terminals and mounting clips
PK-IOM2721, PK-IOM3721, and PK-IOM3731 models	150 x 164 x 53 mm including terminals and mounting clips
PK-IOM37 and PK-IOM47 family models	150 x 190 x 53 mm including terminals and mounting clips
	Note: Mounting space for all field controllers requires an additional 50 mm space on top, bottom, and front face of controller for easy cover removal, ventilation, and wire terminations.
Weight	0.5 kg maximum
CE Compliance	Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

Mechanical thermostats

270XT

Freeze protection, IP30

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 Penn switch
▶ 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.

Dimensions in mm

Ordering information

Codes	Range (°C)	Diff. (K) fixed	Style	Cap. length (m)	Bulb size (mm)	Switch 8A	Additional features
270XT-95008	-10 to +12	3	9	---	3.2 x 6000	SPDT open low	Automatic recycle
270XT-95078					3.2 x 3000		
270XT-95068	-24 to +18	4	1b	2	9.5 x 80		
270XTAN-95008	-10 to +12	---	9	---	3.2 x 6000		Manual reset
270XTAN-95088					3.2 x 3000		
270XTAN-95048	-24 to +18		1b	2	9.5 x 80		

Style 1b　　　　**Style 9**

203
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Johnson Controls

Mechanical thermostats

A19

Capillary and space thermostats, IP30

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.
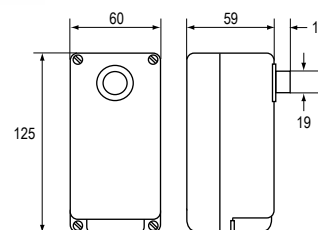
All are equiped with IP50 enclosure.

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.

Dimensions in mm

Style 2   Style 4H   Style 1a   Style 1b   Style 3

Ordering information

A19A capillary thermostats

Codes	Range (°C)	Diff. (K) fixed	Style	Cap. length (m)	Bulb size (mm)	Switch 8A auto recycle	Additional features
A19AAC-9005	-5 to +28	2			135	SPDT open low	
A19AAC-9009	40 to 120	3.5	1b		100		---
A19AAC-9102	-35 to +10	2.5		2	110	SPDT open high	
A19AAC-9107	35 to 150	4			265		Ø 5 mm bulb
A19AAC-9108	90 to 290	5.5	1a		155		---
A19AAC-9123	0 to 10	2.5			80		Bulb Ø 9.3 mm
A19AAC-9124	-5 to +28	2		5	135	SPDT open low	---
A19AAC-9127	1 to 60	1.5	1b	3	115		Maximum bulb temperature 85 °C
A19AAC-9130	-10 to +14	2.5			110		Case compensation, low limit stop at 2 °C
A19AAF-9101	0 to 10	1.5	1a	2	80	SPDT open low	Ø 9.3 mm bulb
A19AAF-9102							Ø 9.3 mm bulb, case compensation
A19AAF-9103	5 to 32	0.8	1b		155	SPDT open high	---

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Mechanical thermostats

A19

Ordering information
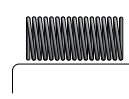

Dimensions in mm

Codes	Range (°C)	Diff. (K) fixed	Style	Cap. length (m)	Bulb size (mm)	Switch 8A auto recycle	Additional features
				A19A capillary thermostats			
A19ABC-9011	40 to 120	3 to 13	2	---	---	SPDT open high	½–14NPT connector
A19ABC-9012			4H	2	---		
A19ABC-9036	−35 to +40	2.8 to 8	1b	6.5	110	5 A switch, SPDT open low	Universal replacement
A19ABC-9037	−35 to +40			3.5		---	
A19ABC-9103	−35 to +10	2.8 to 11		2		SPDT open low	---
A19ABC-9104	−5 to +28	2 to 8		2	135		
A19ABC-9106	10 to 95	3.5 to 14	1a	3.5	75	SPDT open high	Diam. 7.4 mm bulb
A19ABC-9116	1 to 60	2 to 8.5	1b	3	115	SPDT open low	Max. bulb temp. 85 °C
A19ABC-9117				5			
A19AGF-9101*	0 to 13	1.5 fixed	1a	2	80		3 A switch (see bull. 3545), no enclosure, cal. pointer with dial, screwdriver slot, case compensation, bulb Ø 9.3 mm, bulk pack
				A19ACC capillary thermostat, lock-out low with manual reset			
A19ACC-9100	−35 to 10	6	1b	2	110	SPDT open low	---
A19ACC-9101	−5 to 28	4			135		
A19ACC-9103				5			
A19ACC-9105	−35 to 10	6		3.5	110		Low limit stop set at 2 °C
A19ACC-9107	−5 to 28	4		3	135		---
A19ACC-9111	−35 to 10	6		5	110		Low limit stop set at 2 °C
A19ACC-9116				6.5			Low limit stop set at 3 °C, universal replacement
				A19ADC capillary thermostat, lock-out high with manual reset			
A19ADC-9200	40 to 120	7	2	---	---	SPDT open high	1/2-14 NPT connector
				A19B space thermostats			
A19BAC-9001	0 to 43	2	3	---	---	SPDT open high	Vinyl coated element
A19BAC-9250	−35 to 10	2.5					
A19BAC-9251	−5 to 28	2				SPDT open low	
A19BBC-9275	−35 to 40	2.8 to 8				SPDT open low, 5A	
				A19D strap-on thermostats			
A19DAC-9001	40 to 120	4.5	20	---	---	SPDT open high	8 A switch, NEMA 1 enclosure, universal adjustment, including mounting strap
A19DAF-9001	92 to 116	2	20				3 A switch, universal adjustment, including mounting strap

Note: * Quantity orders only

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Johnson
Controls

Refrigeration components
Temperature controls

Mechanical thermostats

A19

Capillary and space thermostat, IP65

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.

Dimensions in mm

Ordering information

A19A Capillary Thermostats

Codes	Range (°C)	Diff. (K) adjust.	Style	Cap. length (m)	Bulb size (mm)	Switch 8A auto recycle	Additional features
A19ARC-9100	−35 to +10	2.8 to 11	1b	2	110		---
A19ARC-9101	−5 to +28	2 to 8	1b	2	135		
A19ARC-9104	−20 to +65	3.5 to 13	1a	3.5	75		Ø 7.4 mm bulb
A19ARC-9105	5 to 50	2.5 to 11	1b	2	110	SPDT open low	Concealed scale, screwdriver adjustment, bulb and cap. rubber coated
A19ARC-9107	40 to 120	3.5 to 13.5	1a	2	100		---
A19ARC-9109	1 to 60	2 to 8.5	1a	3	115		Maximum bulb temperature 85 °C
A19ARC-9110	−10 to +50	2.5 to 11	1b	2	110		Concealed scale, screwdriver adjustment
A19ARC-9113	−35 to +40	2.8 to 11	1b	2	110		---

Style 1a   **Style 1b**   **Style 3**

206
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Mechanical thermostats

Ordering information

Codes	Range (°C)	Diff. (K) Adjust.	Style	Cap. length (m)	Bulb size (mm)	Switch 8A auto recycle	Additional features
				A19A capillary thermostats			
A19AQC-9101	–5 to 5	2 fixed	1a	2	80		5 A switch, Ice bank control, bulb Ø 9.3 mm, case compensation, concealed scale, screwdriver adjustment, scale calibrated at increasing temperature
A19AQC-9102	–5 to 28	2 fixed	1b	2	135		8 A switch, calibrated and set at 2 °C, case compensation, pointer adjust, PG16 connect., ½ - 14 NPT WELL connector
A19AQC-9104	–35 to 10	2 fixed	1b	2	110	SPDT open low	Case compensation, knob adjustment
A19AQC-9200	–5 to 55	2.5 fixed	2	---	---		---
A19AQF-9100	0 to 13	1.5 fixed	1a	2	80		3 A switch, bulb Ø 9.3 mm, case compensation, concealed scale, screwdriver adjustment
A19AQF-9102	0 to 13	1.5 fixed	1a	3	80		3 A switch, cap. thermostat, bulb Ø 9.3 mm, case compensation, concealed scale, screwdriver adjustment
				A19B space thermostats			
A19BRC-9250	–5 to +28	2 to 8	3				
A19BRC-9251	0 to 43	2 to 8	3				
A19BRC-9252	–35 to +10	2.8 to 11	3	---	---	SPDT open low	Vinyl coated element
A19BRC-9253	–35 to +40	2.8 to 11	3				
A19BQC-9252	–5 to +25	2 fixed	3				Concealed scale, screwdriver adjustment

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Mechanical thermostats

A28

2-stage capillary and space thermostat, IP30 / IP65

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 panel mounting
▶ 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

IP30

IP65

Dimensions in mm

Style 1b   Style 3

Mechanical thermostats

A28

Ordering information

Codes	Range (°C)	Diff. (K)		Style	Cap. length (m)	Bulb size (mm)	Switch 5A auto recycle	Additional features NEMA 1 Enclosure
		Stage	Betw					
IP30								
A28AA-9006	−35 to +10	2	1 to 4	1b	2	110	SPDT Open Low	General purpose
A28AA-9007	−5 to +28	1.5				135		
A28AA-9106					5			
A28AA-9113	0 to 43			3	---	---	SPDT Open High	Bulb stainless steel, general purpose
A28AA-9118	1 to 60	2		1b	3	115		Max. bulb temp. 85 °C, general purpose
IP65								
A28QA-9101	5 to 50	2	4	1b	2	110	SPDT Open Low	Concealed scale, screwdriver adjustment
A28QA-9110	−35 to +10		1 to 4		2	110		---
A28QA-9111	−5 to +28	1.5			2	135		---
A28QA-9114	−35 to +40	2			3.5	110		---
A28QA-9113	0 to 43	1.5		3	---	---	SPDT Open High	Bulb stainless steel
A28QA-9115	1 to 60	2		1b	3	115		---
A28QA-9117	20 to 40	1.5		3	---	---		Bulb stainless steel
A28QJ-9100	10 to 95		1 to 5	1b	3	100	SPDT Open Low	3 A Switch

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Mechanical thermostats

A36
3- or 4-stage thermostat

Models are available in 'open' construction for panel mounting. 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

173
69
62

Dimensions in mm

Ordering information

Codes	Range (°C)	Adjustment code	Cap. length (m)	Bulb size (mm)	Switch auto recycle	Additional features
3-stage thermostats						
A36AGA-9101	-18 to 20	B1	5	125	5 A	Armored PVC capillary
A36AGA-9102						
A36AGA-9103	15 to 35	C1	3.5	140		
A36AGB-9103	-18 to 20	B2		125	3 A	
4-stage thermostats						
A36AHA-9105	-18 to 20	B1	3.5	125	5 A	Armored PVC capillary
A36AHA-9107	-16 to 20		5			
A36AHA-9108	15 to 35	C1	3.5	140		
A36AHB-9103	10 to 95	D2	3	100	3 A	Max. bulb temp.115 °C
A36AHB-9104	-18 to 20	B2	3.5	125		Armored PVC capillary
A36AHB-9105			5			Braided copper capillary
A36AHB-9109	-15 to 30		5	110		Max. bulb temp. 75 °C

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Mechanical thermostats

T22 - T25

Stage room thermostat, line voltage, IP20

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
▶ 2-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:

▶ 2-stages heating
▶ 2-stages cooling
▶ Heating/cooling with dead band and automatic change over

Dimensions in mm

Ordering information

Codes	Range (°C)	Diff. (K) Fixed	Adjustment	Thermometer	Switch 3A	Additional features
T22, 1-stage room thermostat						
T22SRX-9100	5 to 32	1	Knob	●	SPDT open high	Automatic recycle
T22SRX-9101				---		
T22SRX-9104			Concealed	---		
T25, 2-stage room thermostat						
T25B-9101	1	1 to 3	Knob	---	SPDT open high	---
T25B-9102			---	---		Concealed scale, screwdriver adjustment

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Mechanical thermostats

A25
Limit control manual reset, IP30

A rod and tube type sensing element actuate 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.

Dimensions in mm

Ordering information

Codes	Range (°C)	Switch 8A manual reset	Additional features
A25CN-9001	0 to 100	SPDT open high	Visible scale, Knob adjustment, NEMA 1 enclosure,with flange for duct mounting

212
European product catalogue 2017
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Accessories

Ordering information

Codes	Description	Primary usage	Inner Ø x tube length bulb well (mm)	Inside and outside connector (NPT)	Material connector pocket
FTG13A-600R	Closed tank connector Style 1b elements, Max. 10 bar, 120 °C, Min. –40 °C	A19/28/36	---	---	---
KIT012N600	Capillary brackets (6 pieces)	270XT			
WEL003N602R	Bulb well, Max. pressure 70 bar, Temp. 370 °C	---	9.8 x 125	1/2 - 14	Stainless steel
WEL11A601R	Bulb well, Max. pressure 20 bar, Temp. 120 °C, USA item	A19	7.3 x 60	1/2 - 14	Brass/Copper
WEL14A-600R	Bulb well, Max. pressure 69 bar, Temp. 370 °C, USA item	A19/28/36	11.2 x 120	1/2 - 14	Monel/Monel
WEL14A602R	Bulb well, Max. pressure 20 bar, Temp. 120 °C, USA item	A19/28/36	9.8 x 125	1/2 - 14	Brass/Copper
WEL14A603R	Bulb well, Max. pressure 20 bar, Temp. 120 °C, USA item	A19/28/36	9.8 x 147	1/2 - 14	Brass/Copper
WEL16A-601R	Bulb well, Max. pressure 20 bar, Temp. 120 °C, USA item	A19/28/36	9.5 x 71	1/2 - 14	Brass/Copper

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Mechanical liquid flow switch

F61

Flow switch for liquid

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 IP67 enclosure
▶ Stainless steel pipe-insert type
▶ Large wiring space
▶ Range screw easy accessible.

Dimensions in mm

Ordering information

IP43

Codes	Range	Connection		Switch action	Additional features
F61SB-9100	0,15 dm³/s – 46 dm³/s	R1" DIN2999	(ISO R7)	SPDT contacts, 15(8) Amp 230 V~	4 paddles 1", 2", 3", 6" St.St. AISI 301
F61SD-9150	0,04 dm³/s – 0,07 dm³/s	½ –14 NPTF	T-body		---
F61SD-9175		¾ –14 NPTF			

IP67

Codes	Range	Connection		Switch action	Additional features
F61TB-9100				SPDT contacts, 15(8) amp 220 V~	4 paddles, 1", 2", 3" and 6" St.St. AISI 301
F61TB-9104	0,15 dm³/s – 46 dm³/s	R1" DIN2999	(ISO R7)	SPDT contacts, 0,4 Amp 15 V~	Lowenergy gold flashcontacts 4 paddles, 1", 2", 3" and 6" St.St. AISI 301
F61TB-9200				SPDT contacts, 15(8) Amp 220 V~	Stainless steel body assembly 3 paddles 1",2",3" St.St. AISI 316L
F61TD-9150	0,04 dm³/s – 0,07 dm³/s	½ –14 NPTF	T-body		---

Accessories for flow switches

Codes	Description
PLT69-11R	F61 – 6" stainless steel AISI 301 paddle
KIT21A-602	F61 – 4 paddles 1", 2", 3" and 6" St.St. AISI 301

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Mechanical liquid flow switch

F261

Flow switch for liquid

The F261 series flow switches respond to fluid flow in lines carrying water, ethylene glycol, or other nonhazardous fluids.
These models also work in applications with swimming pool water and lubricating oils.

F261 series standard flow switches use a variety of paddle sizes to respond to fluid flow rates in applications with 1 inch trade size (or greater) pipe.

Features

▶ Type 3R (NEMA) or type 4 (NEMA) polycarbonate enclosure
▶ Viton® diaphragm
▶ Gold-plated contacts on selected models
▶ Maximum fluid pressure of 290 psig (20 bar)

F261 standard flow switch - Dimensions in mm

Ordering information

Standard model flow switches

Codes	Description
F261KAH-V01C	Standard model flow switch with type 3R (NEMA) enclosure; 1 in., 2 in., 3 in., and 6 in. stainless steel paddles, lock-tooth washer, and stainless steel paddle screw supplied uninstalled
F261MAH-V01C	Standard model flow switch with type 4 (NEMA) enclosure; 1 in., 2 in., 3 in., and 6 in. stainless steel paddles, lock-tooth washer, and stainless steel paddle screw supplied uninstalled

Replacement paddle parts

Codes	Description
KIT21A-600	Stainless steel 3-piece paddle (3 in., 2 in., and 1 in. segments)
KIT21A-601	Stainless steel 6 in. paddle
PLT52A-600R	Stainless steel 3-piece paddle (3 in., 2 in., and 1 in. segments) and stainless steel 6 in. paddle

Manufacturer reserves the right to change specifications without prior notice

Mechanical liquid flow switch

F261

Technical specifications

F261xxH ceries ctandard controls electrical ratings

Volts, 50/60 Hz	UL60730/UL1059				EN60730	
	24	**120**	**208**	**240**	**24**	**230**
Horsepower	---	1	1	1	---	---
Full load Amperes	---	16	10	10	---	8
Locked rotor Amperes	---	96	60	60	---	48
Resistive Amperes	16	16	10	10	16	16
Pilot duty VA	125	720	720	720	77	720

UL conformity declaration information

Purpose of control	**F261 fluid flow switch**
Construction of control	Electronic independently mounted control
Number of cycles	100,000 cycles
Method of mounting control	Mounting to sensed media vessel/orientation
Type 1 or type 2 action	Type 1.C (Microinterruption)
External pollution situation	Pollution degree 4
Internal pollution situation	Pollution degree 2
Rated impulse voltage	4,000 VAC
Ball pressure temperature *Enclosure*	130 °C
Switch component	122 °C
Control adjustment instruction	---
Field wiring rating	**Wire/cord temperature ratings:** 60 °C only permitted when ambient air and media are less than 45 °C 75 °C only permitted when ambient air and media are less than 60 °C 90 °C only permitted when ambient air is less than 60 °C and media is less than 75 °C 150 °C permitted when ambient air is less than 60 °C and media is less than 121 °C
Vessel pressure	F261 fluid flow switch: 290 psi (20 Bar)

F261 series fluid flow switches

Switch		SPDT
Enclosure		
	UL	Type 3R or Type 4
	CE	IP43 (IP23 with drain hole plug removed) or IP67
Wiring connections		Three color-coded screw terminals and one ground terminal
Conduit connection		One 22 mm hole for 1/2 in. trade size (or PG16) conduit
Pipe connector		Standard: 1 in. 11-1/2 NPT Threads
Maximum fluid pressure		290 psi (20 bar)
Minimum fluid temperature [1]		−29 °C
Maximum fluid temperature [2]		121 °C
Ambient conditions		−40 to 60 °C
CE Compliance		Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

Note

[1] Ensure that the low liquid temperature combined with the low ambient temperature does not lead to the freezing the liquid inside the body (or bellows, where appropriate). Please observe the liquid freezing point.

[2] At higher ambient temperatures, the maximum allowed liquid temperature becomes lower. The temperature of the electrical switch inside should not exceed 70 °C.

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Johnson
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Refrigeration components
Float and flow controls

Mechanical air flow switch

F62

Air flow switch

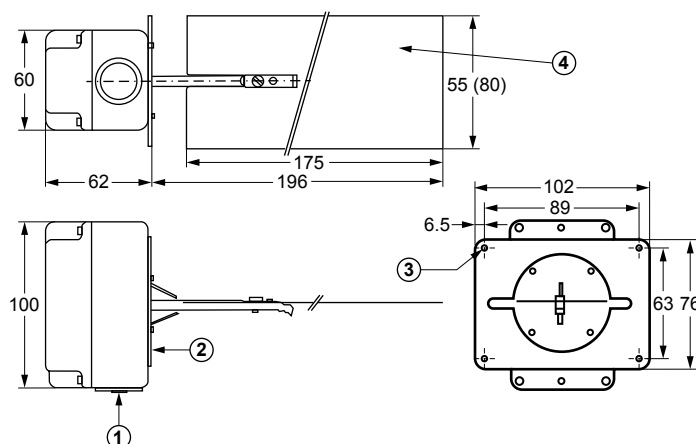The F62 airflow switch detects air flow or the absence of air flow by responding only to the velocity of air movement within a duct. The control can be wired to open one circuit and close a second circuit (SPDT) for either signaling or interlock purposes.
Failure of air flow during normal operation of 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

Dimensions in mm

1	Cable inlet hole ∅ 22.7 mm; Dust cup is installed
2	Mounting plate gasket 0.2 mm thick neoprene cell rubber
3	Four mounting holes ∅ 5 mm.
4	One paddle 55 mm wide (mounted) One paddle 80 mm wide (packed with the control)

Ordering information

IP43

Codes	Max. air velocity	Switch Action	Enclosure	Additional features
F62SA −9100	10 m/sec	SPDT Contacts 15(8) A, 230 V~	Plastic enclosure IP43	With 55 mm paddle mounted, 80 mm separate

Accessories

Codes	Description
PLT112−1R	F62 − Air flow plate 55 x 175 mm
PLT112−2R	F62 − Air flow plate 80 x 175 mm

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Johnson
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Refrigeration components
Float and flow controls

Mechanical air flow switch

F262

Air flow switch

The F262 series airflow switches detect airflow or the absence of airflow by responding only to the velocity of air movement within a duct. The single-pole, doublethrow (SPDT) switch can be wired to open one circuit and close a second circuit for either signaling or interlock purposes.

Airflow failure during the normal operation of air handling systems may cause overheating, coil icing, or other conditions that may be detrimental to the equipment.

Features

▶ Type 3R (NEMA) polycarbonate enclosure
▶ Dependable dust-protected SPDT snap-acting PENN switch
▶ Large wiring space
▶ Easily accessible range adjustment screw

Ordering information

Codes	Description
F262KDH-01C	Airflow switch with a 54 mm wide x 175 mm long paddle installed and a 79 mm wide x 175 mm long paddle supplied with the control

Replacement paddle kits

Codes	Description
PLT112-1R	54 mm wide x 175 mm long paddle
PLT112-2R	79 mm wide x 175 mm long paddle

Technical specifications

Electrical ratings

Volts 50/60 Hz	UL60730				EN60730	
	24	120	208	240	24	230
Horsepower	---	1	1	1	---	---
Full load Amperes	---	16	10	10	---	8
Locked rotor Amperes	---	96	60	60	---	48
Resistive Amperes	16	16	10	10	16	16
Plot duty VA	125	720	720	720	125	720

European product catalogue 2017

Mechanical air flow switch

Technical specifications

Switch	SPDT	
Enclosure		
	UL	Type 3R
	CE	IP43
Wiring connections		Three color-coded screw terminals and one ground terminal
Conduit connection		One 22 mm hole for 1/2 in. trade size (or PG16) conduit
Paddle material		0.15 mm stainless spring steel
Maximum air velocity		2,000 FPM (10.16 m/sec)
Maximum duct air temperature		80°C
Ambient conditions		0 to 40°C
CE Compliance		Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

UL conformity declaration information

Purpose of control	**F262 Series Airflow Switch**	
Construction of control	Electronic independently mounted control	
Number of cycles	100,000 cycles	
Method of mounting control	Mounting to sensed media vessel/orientation	
Type 1 or type 2 action	Type 1.C (Microinterruption)	
External pollution situation	Pollution degree 4	
Internal pollution situation	Pollution degree 2	
Rated impulse voltage	4,000 VAC	
Ball pressure temperature		
Enclosure	130 °C	
Switch component	122 °C	
Control adjustment instruction	---	
Field wiring rating	**Wire/Cord temperature ratings:**	
	60 °C only permitted when ambient air and media are less than 45 °C	
	75 °C only permitted when ambient air and media are less than 60 °C	
	90 °C only permitted when ambient air is less than 60 °C and media is less than 75 °C	
	150 °C permitted when ambient air is less than 60 °C and media is less than 121°C	

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Refrigeration components
Float and flow controls

Johnson
Controls

Mechanical liquid level switch

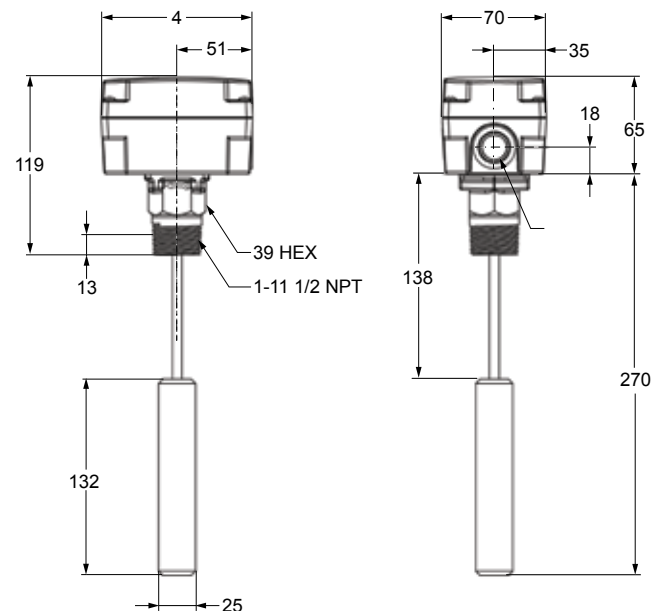## F63

Liquid level float switch

The F63 liquid level switch is designed to maintain a liquid level in indoor or outdoor closed tanks holding water, chlorinated water, ethylene glycol or other non-corrosive liquids.

The switch has 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.

The float switch should not be used for liquids lighter than water (density less than 0.95 kg/dm^3).

Features

▶ Solid polycarbonate float
▶ Vapour tight IP67 enclosure
▶ Convenient wiring terminals

Dimensions in mm

Ordering information

Codes	Connection	Switch action	Enclosure	Additional features
F63BT-9102	1-11½ NPT	SPDT Contacts 15(8) A, 230 V~	Plastic enclosure IP67	Plastic float, VITON diaphragm

Accessories

Codes	Description
FLT001N001R	F63 - Float

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Mechanical liquid level switch

F263

Liquid level float switch

The F263 series liquid level float switches are designed to maintain a liquid level in indoor or outdoor closed tanks that hold water or other nonhazardous liquids. When the liquid level in the tank rises above or falls below the required level, the single-pole, double-throw (SPDT) switch closes one circuit and opens a second circuit.

Features

▶ Viton® diaphragms
▶ Single-pole, double-throw switch
▶ Sturdy type 4 (NEMA) enclosure
▶ Solid polycarbonate float

Ordering information

Codes	Description
F263MAP-V01C	SPDT float switch with Type 4 (NEMA) enclosure and polycarbonate float for liquid temperatures -29 to 100°C); maximum liquid pressure 150 psig (1,035 kPa)

Manufacturer reserves the right to change specifications without prior notice

Mechanical liquid level switch

F263

Technical specifications

Electrical ratings

Volts 50/60 Hz	UL60730				EN60730	
	24	**120**	**208**	**240**	**24**	**230**
Horsepower	---	1	1	1	---	---
Full load Amperes	---	16	10	10	---	8
Locked rotor Amperes	---	96	60	60	---	48
Resistive Amperes	16	16	10	10	16	16
Plot duty VA	125	720	720	720	125	720

Switch		Single-Pole, Double-Throw (SPDT)
Enclosure		
	UL	Type 4 (NEMA)
	CE	IP67
Wiring Connections		Three color-coded screw terminals and one ground terminal
Conduit Connection		One 22 mm hole for 1/2 in. trade size (or PG16) conduit
Pipe Connector		1 in. 11-1/2 NPT threads
Minimum Tank Diameter		229 mm
Maximum Liquid Pressure		150 psig (1,035 kPa)
Liquid Temperature Range		
	Minimum	-29 °C or liquid freezing point
	Maximum	100 °C
Ambient Conditions		
	Minimum	-40 °C
	Maximum	60 °C
CE Compliance		Johnson Controls International Plc, declares that these products are in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.

European product catalogue 2017

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Johnson Controls

Adjustable differential pressure switch

P232

Sensitive differential

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 P232 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 setpoint scale
▶ 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

Dimensions in mm

Ordering information

Codes	Switch point range (in. wc)	Switching differential (in. wc)	Pack
P232A–B–AAC	0,2 to 1,6	< 0.1	ind.

Note
Other models on request, range up to 20 inWC

Adjustable differential pressure switch

P233

Sensitive differential

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

Dimensions in mm

Adjustable differential pressure switch

P233

Ordering information

Codes	Switch point range (mbar)	Switching differential (mbar) **	Contacts	Pack	Additional features
P233F-P3-AAC	0,3 fixed			Ind.	---
P233A-4-AAC					---
P233A-4-AAD *	0,5 to 4			Bulk	---
P233A-4-AHC				Ind.	GMT008N600R + BKT024N002R
P233A-4-PAD *				Bulk	Scale in Pa
P233A-4-PAC	50 to 400 Pa	< 0.3			---
P233A-4-PHC					Scale in Pa, GMT008N600R + BKT024N002R
P233A-4-PKC				Ind.	Scale in Pa, FTG015N602R (2x) + 2 m tube 4/7 mm
P233A-4-AKC	0,5 to 4				FTG015N602R (2x) + 2 m tube 4/7 mm
P233A-6-AAC	0,5 to 6		SPDT contacts, Contact rating 5(2) A 250 VAC		---
P233A-6-AAD *				Bulk	
P233A-10-AAC	1,4 to 10				---
P233A-10-AHC				Ind.	GMT008N600R + BKT024N002R
P233A-10-PAC	140 to 1000 Pa	< 0.5			---
P233A-10-PKC					Scale in Pa, FTG015N602R (2x) + 2 m tube 4/7 mm
P233A-10-AAD *	1,4 to 10			Bulk	---
P233-10-AKC				Ind.	FTG015N602R (2x) + 2 m tube 4/7 mm
P233A-50-AAC	6 to 50	< 1			
P233A-10-PHC	140 to 1000 Pa	< 0,5			Scale in Pa, GMT008N600R + BKT024N002R

Note
* Quantity orders only
** Switching differential is maximum value mid-range

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Adjustable differential pressure switch

P74

Differential pressure

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.

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

Dimensions in mm

Ordering information

Codes	Range (bar)	Mech. differential (bar)	Style	Switch action	Additional features
P74DA-9300		0.7 to 2 adj.	5	DPST, 10A, contacts open low	---
P74DA-9600			13		
P74EA-9300	0.6 to 4.8		5	SPDT, 5 A, contact open high	
P74EA-9600		0.3 fix.	13		
P74EA-9700			15		For NH3
P74EA-9701					Set 1 bar, concealed adjustment, for NH3
P74FA-9700	0 to 1	0.1 fix.		SPDT, 3 A, contact open high	For water
P74FA-9701	2 to 8	0.7 fix.			For NH3

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Adjustable pressure switch

P20

For air-conditioning and heat pump applications

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

Dimensions in mm

Style 13   Style 34   Style 35   Style 45A   Style 50

227
European product catalogue 2017
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Adjustable pressure switch

P20

Ordering information

Codes	Range (bar)	Differential fixed	Set at (bar)	Style	Capillary Length	Switch Action
P20EA-9611D	0.5 to 10	0.9	2	13	120 cm	SPDT, 8 A, open low, auto reset
P20EA-9620D		1.5			90 cm	
P20EA-9621D					120 cm	
P20EA-9160L	7 to 29	3.1	17	45A	90 cm	SPDT, 8 A, open high, auto reset
P20EA-9561K		1.2	16	50		

High Pressure Control

Codes	Range (bar)	Differential fixed	Set at (bar)	Style	Capillary length	Switch action
P20EA-9670X	7 to 29	5.2	28	13	90 cm	SPDT, 8 A, open high, auto reset
P20EA-9681T		7.1	24	13	120 cm	
P20EA-9950C		1.1	10	34	90 cm	
P20EA-9950K		1.2	16			
P20GA-9650X		---	28	13		SPDT, 8 A, open high, manual reset
P20GA-9650T			24			

Low and high pressure control universal replacements

Codes	Range (bar)	Differential fixed	Set at (bar)	Style	Capillary length	Switch action	Additional features
P20EA-9530FC	0.5 to 10	2.1	3	50	90 cm	SPDT, 8 A, auto reset	Open low
P20EA-9630FC		2.1	3	13			
P20EA-9570XC	7 to 29	5.2	28	50			Open high
P20EA-9670XC		5.2	28	13			
P20EL-9670TC	14 to 42		37				
P20FA-9510FC	0.5 to 10	6.5	3	50		SPDT, 8 A, manual reset	Open low
P20FA-9610FC				13			
P20GA-9550XC	7 to 29		28	50			Open high
P20GA-9650XC				13			
P20GL-9650TC	14 to 42		37				

Manufacturer reserves the right to change specifications without prior notice

Adjustable pressure switch

P735

Single pressure

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
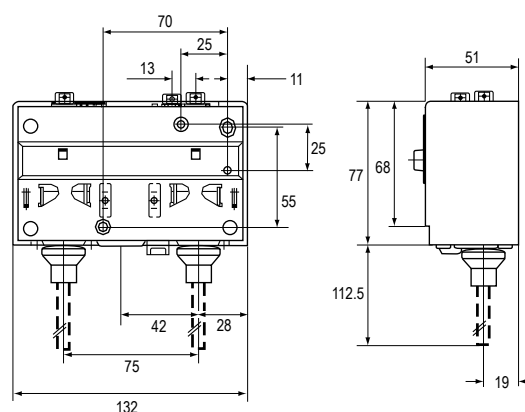steel bellows and connectors.

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.

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

Dimensions in mm

Manufacturer reserves the right to change specifications without prior notice

Adjustable pressure switch

P735

Ordering information

For water

Code	Range (bar)	Differential (bar)	Switch action (wire diag.)	Max. bellows pressure	Special pressue Connection G¼" female Ind. pack.
P735AAA	−0,2 to 10	1 to 4,5	1	15	−9200
	−0,5 to 7	0,6 to 3	1	22	−9201

For non-corrosive refrigerants

Codes	Range (bar)	Differential (bar)	Switch action (wire diag.)	Max. bellows pressure	Style 5 Ind. pack.	Style 5 Bulkpack	Style 28 Ind. pack.	Style 30 Ind. pack.
P735AAA	−0.5 to 7	0.6 to 3	1	22	−9300	−9320	−9800	−9400
	−0.2 to 10	1 to 4.5	1	15	−9301	---		
	3 to 30	3 to 12	2	33	−9350	−9370	---	---
	3.5 to 21	2.1 to 5.5	2	30	−9351	---		
P735BCA	−0.5 to 7	Man. res. **	1	22	−9300	---		
P735BEA	3 to 30	Man. res. *	3	33	−9350	---		

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

For non-corrosive refrigerants type approved pressure limiter/pressure cut out

Codes	Range (bar)	Differential (bar)	Switch action (wire diag.)	Max. bellows pressure	Style 5 Ind. pack.	Style 5 Bulkpack	Style 28 Ind. pack.	PED Approval
P735AAW	−0.5 to 7	0.6 to 3	1	22	−9300	−9320	−9800	---
	3 to 30	3.5 to 12	2	33	−9350	−9370	−9850	●
P735BCB	−0.5 to 7	Man. res. **	1	22	−9300	---	---	---
P735BEB	3 to 30	Man. res. *	3	33	−9350	−9370	---	●

Notes
* Resetable at 3.5 bar below cut-out point
** Resetable at 0.5 bar above cut-out point

Adjustable pressure switch

P736
Dual pressure

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.

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

Dimensions in mm

Adjustable pressure switch

P736

Ordering information

For non-corrosive refrigerants

Codes	Left side		Right side		Contruction LP/HP (max. press.)	Style 5		Style 30
	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		Ind. pack.	Bulkpack	Ind. pack.
P736LCA	–0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	LP: 22 bar HP: 33 bar	–9300	–9320	–9400
P736MCA	–0.5 to 7	0.6 to 3	3 to 30	Man. Res. **		–9300	–9320	–––
P736PGA	–0.5 to 7	Man. Res. *	3 to 30	Man. Res. **		–9300	–––	

Dual pressure fan cycling controls for air-cooled condensers (non-corrosive refrigerants)

Codes	Left side		Right side		Contruction HP/HP (max. press.)	Style 5		Style 30
	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		Ind. pack.	Bulkpack	Ind. pack.
P736ALA	3.5 to 21	1.8 (fixed)	3.5 to 21	1.8 (fixed)	30 bar	–9351	****	–––

For non-corrosive refrigerants type approved pressure limiter/pressure cut out

Codes	Left side		Right side		Contruction LP/HP (max. press.)	Style 5		Style 28	PED approvals
	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		Ind. pack.	Bulkpack	Ind. pack.	
P736LCW	–0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	LP: 22 bar HP: 33 bar	–9300	–9320	–9800	•
P736MCB	–0.5 to 7	0.6 to 3	3 to 30	Man. Res. **		–9300	****	–9800	

Manual reset HP/HP, type approved pressure cut out/ safety pressure cut out

Codes	Left side		Right side		Contruction HP/HP (max. press.)	Style 5		Style 30
	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		Ind. pack.	Bulkpack	Ind. pack.
P736PLM	3 to 30	Man. Res. *	3 to 30	Man. Res. **	30 bar	–––	–9370	–––

Notes
* Resetable at 0.5 bar above cut–out point
** Resetable at 3 bar below cut–out point
*** Can be set-up for quantity orders
    100 kPa = 1 bar ≈ 14.5 psi

Adjustable pressure switch

P77

Single pressure, IP54

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 PED 2014/68/EU Cat. IV (HP models) have the fail-safe function with double bellows.

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, R410A, CO_2 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 are included in the program. Also models tested and approved to PED 2014/68/EU Cat. IV (supersedes DIN and TUV approval) are included in the program.

Dimensions in mm

Style 5   Style 15

Style 28   Style 30

Style 35

Manufacturer reserves the right to change specifications without prior notice

Adjustable pressure switch

P77

Ordering information

For non-corrosive refrigerants

Family codes	Style 5		Style 28	Style 30	Style 35	Range (bar)	Diff. (bar)	Max bellows pressure
	Ind. pack.	Bulkpack	Bulkpack	Ind. pack.	Ind. pack.			
P77AAA	–9300	–9320	–9800	–9400	–9500	–0.5 to 7	0.6 to 3	22
	–9301	---	---	---	---	–0.2 to 10	1 to 4.5	15
	–9302	---	---	---	---	–0.3 to 2	0.4 to 1.5	4
	–9350	–9370	–9850	–9450	–9550	3 to 30	3 to 12	33
	–9351	–9371	---	–9451	---	3.5 to 21	2.1 to 5.5	30
P77BCA	–9300	---	---	–9400	---	–0.5 to 7	Man. res. [1]	22
P77BEA	–9350	---	---	–9450	---	3 to 30	Man. res. [2]	33

For ammonia and non-corrosive refrigerants

Family codes	Style 15		Range (bar)	Diff. (bar)	Max bellows pressure
	Ind. pack.	Bulkpack			
P77AAA	–9700	---	–0.5 to 7	0.6 to 3	14
	–9750	---	3 to 30	3.5 to 12	33
P77BCA	–9700	---	–0.5 to 7	Man res. [1]	14
P77BEA	–9750	---	3 to 30	Man. res. [2]	33

For non-corrosive refrigerants (Pressure limiter, pressure cut-out, safety pressure cut-out, including lockplate assy)

Family codes	Style 5		Style 28	Range (bar)	Diff. (bar)	Max bellows pressure	Approved according to PED 2014/68/EU Cat. IV
	Ind. pack.	Bulkpack	Ind. pack.				
P77AAW	–9300	–9320	–9800	–0.5 to 7	0.6 to 3	22	---
	–9350	–9370	–9850	3 to 30	3.5 to 12	33	•
	–9355	---	–9855	3 to 42	5 to 15	47.6	
P77BCB	–9300	---	–9800	–0.5 to 7	Man. res. [1]	22	---
P77BEB	–9350	–9370	–9850	3 to 30	Man. res. [3]	33	•
	–9355	---	–9855	3 to 42	Man. res. [4]	47.6	
P77BES	–9350	–9370	–9850	3 to 30	Man. res. [3]	33	

For ammonia and non-corrosive refrigerants
(Pressure limiter, pressure cut-out, safety pressure cut-out, including lockplate assy)

Family codes	Style 15		Range (bar)	Diff. (bar)	Max bellows pressure	Approved according to PED 2014/68/EU Cat. IV
	Ind. pack.	Bulkpack				
P77AAW	–9700	---	–0.5 to 7	0.6 to 3	14	---
	–9750	---	3 to 30	3.5 to 12	33	
P77BEB	–9750	---	3 to 30	Man. res. [3]	33	•
P77BES	–9750	---	3 to 30	Man. res. [3]	33	

Notes
1 Resetable at 0.5 bar above cut-out point
2 Resetable at 3 bar below cut-out point
3 Resetable at 3.5 bar below cut-out point
4 Resetable at 5 bar below cut-out point
100 kPa = 1 bar ≈ 14.5 psi

234
European product catalogue 2017
Manufacturer reserves the right to change specifications without prior notice

Adjustable pressure switch

P78

Dual pressure, IP54

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.
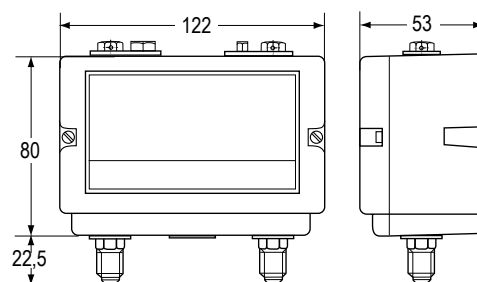Devices conforming to PED 2014/68/EU Cat. IV have a double bellows on
the high pressure versions.

Their IP54 classification means that these pressure controls
are suitable for almost all applications.

Features

▶ High refrigerant pressure.
  Suitable for R410A and CO_2 subcritical applications
▶ Gold plated contacts
▶ 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 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, R410A, CO_2 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
are included in the program. Also models tested and approved
to PED 2014/68/EU Cat. IV (supersedes DIN and TUV approval)
are included in the program.

Dimensions in mm

Style 5   Style 15   Style 28   Style 30

Ordering information

Dual pressure controls for non-corrosive refrigerants

Family codes	Pressure connection			Left side		Right side		Construction LP/HP (max. press.)
	Style 5		Style 30	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)	
	Ind. Pack.	Bulkpack	Ind. Pack.					
P78LCA	–9300	–9320	–9400	–0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	LP: 22 bar HP: 33 bar
P78MCA	–9300	–9320	–9400	–0.5 to 7	0.6 to 3	3 to 30	Man. Res. [2]	
P78PGA	–9300	*	–9400	–0.5 to 7	Man. Res [1]	3 to 30	Man. Res. [2]	

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

Adjustable pressure switch

P78

Ordering information

For ammonia and non-corrosive refrigerants

Family codes	Pressure connection		Left side		Right side		Construction LP/HP (max. press.)
	Style 15		Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)	
	Ind. pack.	Bulkpack					
P78LCA	–9700	*	–0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	LP: 14 bar HP: 33 bar
P78MCA	–9700	*	–0.5 to 7	0.6 to 3	3 to 30	Man. res. [2]	
P78PGA	–9700	*	–0.5 to 7	Man. res [1]	3 to 30	Man. res. [2]	

Fan cycling controls for air-cooled condensers (non-corrosive refrigerants)

Family codes	Pressure connection			Left side		Right side		Construction HP (max. press.)
	Style 5		Style 30	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)	
	Ind. pack.	Bulkpack	Ind. pack.					
P78ALA	–9351	*	–9451	3.5 to 21	1.8 (fixed)	3.5 to 21	1.8 (fixed)	HP: 30 bar

For non-corrosive refrigerants, type approved pressure limiter/pressure cut out/safety pressure cut out - (Except P78PGB-[1])

Family codes	Pressure connection			Left side		Right side		Construction LP/HP (max. press.)	Approved according to PED 2014/68/EU Cat. IV
	Style 5		Style 28	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		
	Ind. pack.	Bulkpack	Ind. pack.						
P78LCW	–9300	–9320	–9800	–0.5 to 7	0.6 to 3	3 to 30	3 (fixed)	LP: 22 bar HP: 33 bar	•
P78MCB	–9300	–9320	–9800	–0.5 to 7	0.6 to 3	3 to 30	Man. res. [3]		
P78MCS	–9300	---	---	–0.5 to 7	0.6 to 3	3 to 30	Man. res. [3]		
P78PGB	–9300	*	–9800	–0.5 to 7	Man. res. [3]	3 to 30	Man. res. [3]		
P78PLM	–9350	*	–9850	3 to 30	Man. res. [3]	3 to 30	Man. res. [3]		

Dual pressure controls for non-corrosive refrigerants, type approved pressure limiter/pressure cut out/safety pressure cut out

Family codes	Pressure connection	Left side		Right side		Construction LP/HP (max. press.)	Approved according to PED 2014/68/EU Cat. IV
	Style 5	Range (bar)	Diff. (bar)	Range (bar)	Diff. (bar)		
	Ind. pack.						
P78LCW	–9355	–0.2 to 10	1 to 4.5	3 to 42	4 (fixed)	LP: 15 bar HP: 47.6 bar	•
P78MCB	–9355	–0.2 to 10	1 to 4.5	3 to 42	Man. res. [4]		
P78PLM	–9355	3 to 42	Man. res. [4]	3 to 42	Man. res. [4]		

Notes
* Can be set-up for quantity orders
1 Resetable at 0.5 bar above cut-out point
2 Resetable at 3 bar below cut-out point
3 Resetable at 3.5 bar below cut-out point
4 Resetable at 5 bar below cut-out point

Fixed setting pressure switch

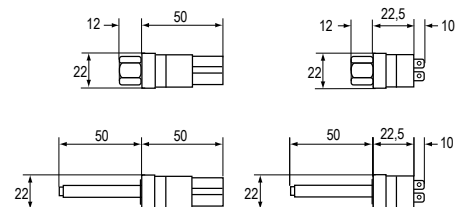## P100

Direct mount pressure switch

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, R290, R600, HFO1234, R744 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

Dimensions in mm

European product catalogue 2017
Manufacturer reserves the right to change specifications without prior notice

Fixed setting pressure switch

P100

Manual reset models

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

Dimensions in mm

Ordering information

Codes	Application	Refrigerant	P (bar) Open	P (bar) Close	P open ± (bar) tolerance	P close ± (bar) tolerance	"1/4" "SAE Fem Flare"	50 mm straight, 6 mm Ø x 7 mm reduced end, copper clad brazing tube (TIF5)	Electr. termination (m)	Switch
P100DA-66D		R134A	16				•	---	2	
P100DA-67D		R134A	16				---	•	2	
P100DA-68D		R407C	26		0,7		•	---	3	
P100DA-69D		R407C	26		0,7		---	•	3	
P100DA-70D	High pressure	R404A	28			---	•	---	3	SPST
P100DA-71D	Manual reset	R404A	28			---	---	•	3	SPST
P100DA-72D		R410A	38		1,0		•	---	2	
P100DA-73D		R410A	38		1,0		---	•	2	
P100DA-74D		R407C	26				•	---	1,2	
P100DA-75D		R410A	42		0,7		•	---	2	
P100DA-76D		R410A	42		0,7		---	•	2	

Dimensions in mm

P100 heavy duty pressure controls - Auto reset

Codes	Application	Refrigerant	P (bar) Open	P (bar) Close	P open ± (bar) tolerance	P close ± (bar) tolerance	"1/4" SAE Fem Flare"	50 mm straight, 6 mm Ø x 7 mm reduced end, copper clad brazing tube (TIF5)	Electr. termination (m)	Switch
P100EE-17D	High pressure Auto reset	R404A	20	25	1,0	1,0	•	---	1,5	
P100EE-18D		R134A	15	11	1,0	1,0	•	---	1,5	
P100EE-60D	Normally closed	R404A	28	21	0,7	0,7	---	•	2	SPDT
P100EE-61D		R404A	28	21	0,7	0,7	---	•	2	
P100EE-68D		R134A	3	25	0,35	0,35	•	---	1,8	

European product catalogue 2017

Manufacturer reserves the right to change specifications without prior notice

Pressure switches accessories

Ordering information

Codes	Description	Minimum order quantity
BKT034N602R	Mounting bracket + screws for P35AC transducer	
BKT275-1	Mounting bracket dual for P20	
210-25R	Mounting bracket for P20/P35 (single)	1
WRN12-1	Wrench P20/P21	
210-604R	Terminal cover P20/P21	50
BKT024N002R	Mounting bracket for P233	
FTG015N602R	Duct mounting kit "staight"	
FTG015N603R	Duct mounting kit "bent"	
GMT008N600R	Duct kit for P233, self locking grommet and tubing	
CNR003N001R	Connector 6 mm for P77/P78, P735/P736	1
CNR003N002R	Connector 8 mm for P77/P78, P735/P736	
CNR012N001R	Adapter R3/8 female to 1/4-18 NPT male for P48	
CNR013N001R	Adapter R 3/8 female to 1/4-18 NPT female for P48	
KIT023N600	Locking kit for P48, P77/P78, P735/P736 – for field installation	
KIT031N600	Valve depressors for conversion style 13 – style 45a	
KIT031N601	Valve depressors for conversion style 51 – style 50	100 (1 box)
KIT034N600	Seal rings for style 50/51	250 (1 box)
271-51L	Mounting bracket for P28, P45, P48, P74, P77/P78, P735/P736	50

Manufacturer reserves the right to change specifications without prior notice

Pressure switches accessories

Ordering information

Capillary kit

Codes	Length (cm)	Style	Minimum order quantity
SEC002N600	90	2x style 13	100
SEC002N602		Style 13 – style 45a	
SEC002N606	200	Style 13 – style 45a	75
SEC002N607		2x style 13	
SEC002N617	100	Style 13 – style 13	
SEC002N621	90	Style 34 – style 34	100
SEC002N622		Style 50 – style 50	
SEC002N624	200	Style 50 – style 50	75
SEC002N626	90	Style 50 – style 51	100
SEC002N627	200	Style 50 – style 51	
SEC002N628	300	Style 50 – style 51	75

Replacement – Time relays P28 – P29

Codes	Timing (s)	Voltage	Switch action
RLY13A603R	90	120 / 240	Manual reset, dual voltage (AC)
RLY13A620R	120		
RLY13A998R	50		
RLY13A626R	90	12	Manual reset, 12 VAC/DC
RLY13A627R	120	24	Manual reset, 24 VAC/DC
RLY13A635R	90		
RLY13A644R	50		

Manufacturer reserves the right to change specifications without prior notice

Johnson Controls

Pressure switches accessories

H735

Syntetic flexible hose

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.

Ordering information

Codes	Pressure connection	Fitting connection	Length (cm)	Additional features
H735AA-30C	Straight x 90° elbow	1/4" metal tube with 7/16"–20 UNF swivel nut connection suitable for 1/4" SAE male flare	30	All models bulk packed
H735AA-40C			40	
H735AA-50C			50	
H735AA-70C			70	
H735AA-90D			90	
H735AA-100C			100	
H735AA-150C			150	
H735AA-200C			200	

Note
Minimum shipping quantity 100 pieces

European product catalogue 2017
Manufacturer reserves the right to change specifications without prior notice

Adjustable oil protection switch

P28

Oil protection

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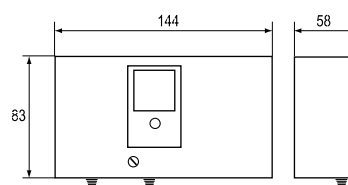These oil protection controls are designed to give protection against low net lube oil pressure on pressure lubricated refrigeration compressors.

Dimensions in mm

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

European product catalogue 2017
Manufacturer reserves the right to change specifications without prior notice

Adjustable oil protection switch

P28

Ordering information

Codes	Range (bar)	Style	Time delay (s)	Voltage	Switch action	Refrigerant	Additional features
P28DA-9341		5	50	115/230		non-corr.	Incl 2 flare nuts 7/16"-20 UNF
P28DA-9660		13	90				---
P28DJ-9360		5	90				IP66 enclosure
P28DJ-9861		15	90			NH3	IP66 enclosure, Incl. 2 connectors CNR003N001
P28DP-9300			---		15(8) A, 230 VAC, open low, alarm and safe light contacts		Without time delay
P28DP-9340			50				---
P28DP-9360		5	90				---
P28DP-9380	0.6 to 4.8		120	230			---
P28DP-9381						non-corr.	Concealed adjustment, set 0.65 bar
P28DP-9640			50				---
P28DP-9660		13	90				---
P28DP-9680			120				---
P28DP-9840			50				---
P28DP-9860		15	90		---	NH3	---
P28DN-9750			50	115/230	---		Concealed adjustment, set 1,5 bar

243
European product catalogue 2017
Manufacturer reserves the right to change specifications without prior notice

Adjustable oil protection switch

P45

Oil protection

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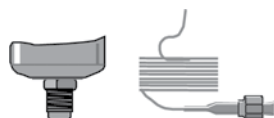The controls measure the pressure differential (net oil pressure) between the pressure generated by the oil pump and the refrigerant pressure at the crankcase. A built-in time delay switch allows pressure build-up during start and avoids nuisance shut-down on pressure drops of short duration during the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

Dimensions in mm

Style 5   **Style 13**

Ordering information

Codes	Range (bar)	Setting (bar)	Time delay (s)	Style	Voltage	Switch action ~15(8) A 230 V open low
P45NBB-9361B		0.6	90	5		
P45NBB-9381B		0.6	120			
P45NBB-9640C		0.7	50		230	
P45NBB-9660C	0.5 to 4	0.7	90			Alarm/safelight contacts
P45NBB-9660Q		1.8	90	13		
P45NBB-9680C		0.7	120			
P45NCA-9056		0.45	50		115/230	
P45NCA-9104		0.7	120			

Manufacturer reserves the right to change specifications without prior notice

Adjustable steam pressure switch

P48

Steam pressure

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.

Models 0 - 10 bar

Dimensions in mm

Ordering information

Codes	Range (bar)	Differential (bar)	Pressure connection	Style	Switch action	Aditional features
P48AAA-9110	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
P48AAA-9120	0.2 to 4	0.25 to 0.8				
P48AAA-9130	-0.2 to 10	1 to 4.5				
P48AAA-9140	1 to 16	1.3 to 2.5				
P48AAA-9150	3 to 30	3 to 12				Automatic reset, stainless steel bellows
P48BEA-9140	4 to 16	---				Manual reset

Pressure actuated water valves

V43/V243

Regulating valves

The V43/V243 pressure-actuated water-regulating valves are designed to regulate water flow through the condenser of large refrigerated cooling systems. These pilot-operated valves open on an increase in refrigerant head pressure and provide modulating operation.

The V43/V243 water-regulating valves are available for commercial and maritime applications.

V43 valves are available for non-corrosive low- and medium-pressure refrigerants such as R-134A, R-404A, R-502 and R-507. Specially designed V43 valves are also available for ammonia service (R-717).

V243 valves are available for non-corrosive high-pressure refrigerants such as R410A.

Commercial V43/V243 valves are constructed with a cast iron body, brass internal parts, and bronze seat material.

To resist the corrosive action of sea water, the V43/V243 maritime and navy models are constructed with a red brass body, bronze and monel interior parts, and monel seat material.
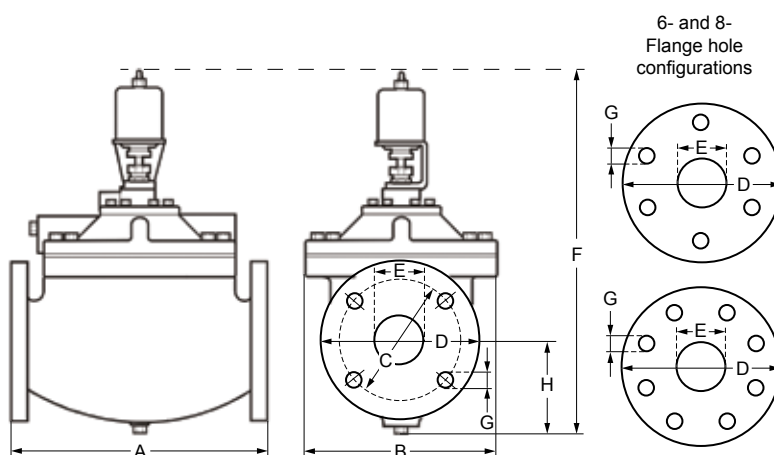
Features
▶ Built-in pilot valve
▶ Easy adjustment
▶ Drain plug
▶ Mesh monel screen

Dimensions in mm

	2 inch	2½ inch	3 inch	4 inch
A [1]	241	273	298	356
B	191	203	229	273
C	121	140	152	191
D	152	178	191	229
E	54	67	80	105
F [2]	387	395	421	462
F [3]	404	412	437	479
G	19.05 – Ø 4	19.05 – Ø 4	19.05 – Ø 4	19.05 – Ø 8
H	92	100	108	128

Notes
1 Flange face to flange face.
2 These are the measurements for the V43 valves.
3 These are the measurements for the V243 valves.

6- and 8-Flange hole configurations

Adjustable steam pressure switch

V43/V243

V43 series - Ordering information

Codes	Pipe size (in.)	Inlet and outlet	Opening point adjustment range psig (kPa)	Ship weight (Kg)
Commercial type – Non-corrosive refrigerants (R)				
V43AT-2C	2 ½	4 Hole ASME Flanged	140 to 260 (1,103 to 1,793)	29.48
V43AW-2C	4	8 Hole ASME Flanged	160 to 260 (1,103 to 1,793)	64.41
Maritime type – Non-corrosive refrigerants (R)				
V43BT-7C	2 ½	4 Hole ASME Flanged	140 to 260 (1,103 to 1,793)	29.48
V43BV-7C	3			40.82

Navy NAVSEA Certified

Codes	Pipe size (in.)	Inlet and outlet	Pressure connector	Opening point adjustment Range – psig (kPa)	Ship weight (Kg)
Navy NAVSEA certified – Non-corrosive refrigerants (R)					
V43BW-7C	4	8 hole ASME flange	1/4 in. male flared conn.	70 to 150 (483 to 1,034)	64.41
V43BW-2C				140 to 260 (1,103 to 1,793)	

V243 series - Ordering information

Codes	Pipe Size (in.)	Inlet and Outlet	Opening Point Adjustment Range – psig (kPa)	Ship weight (Kg)
Commercial type – High pressure refrigerants				
V243HW-1C	4	8 hole ASME flange	200 to 400 (1,379 to 2,758)	64.41

European product catalogue 2017

Adjustable steam pressure switch

V43/V243

Technical specifications

Maximum water supply pressure	150 psig (1,034 kPa)
Maximum head pressure	
V43	300 psig (2,068 kPa)
V243	630 psig (4,344 kPa)
Head pressure range (opening points)	
V43	**Low pressure refrigerants:** R-134A – 70 to 150 psig (482 to 1,034 kPa) **Medium pressure refrigerants:** R-22, R-502, R404A – 160 to 260 psig (1,103 to 1,793 kPa) **Ammonia:** 160 to 260 psig (1,103 to 1,793 kPa)
V243	**High pressure:** R410A – 200 to 400 psig (1,379 to 2,758 kPa)
Factory settings *	
V43	**Low pressure refrigerants:** 90 psig (621 kPa) **Medium pressure refrigerants:** 180 psig (1,241 kPa) **Ammonia:** 180 psig (1,241 kPa)
V243	**High pressure:** 200 psig (1,379 kPa)
Maximum water supply temperature	71 °C
Valve body material	
Commercial	Cast iron
Maritime	Red brass
Internal parts material	
Commercial	Brass
Maritime	Bronze, Monel
Seat material	
Pilot	Monel
Main Valve	**Commercial:** Bronze **Maritime:** Monel
Seat disc material	Buna N™
Packing – Bellows assembly	Brass stem, stainless steel spring, synthetic rubber boot
Pressure connection refrigerant side	
Non-corrosive	1/4 in. SAE male flare
Ammonia	1/4 in. FNPT

Note
* Factory setpoint for the valve is adjustable.

248
European product catalogue 2017
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Virtual Branch eCatalogue
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Johnson
Controls

Refrigeration components
Modulating water valves

Pressure actuated water valves

V46

2-way pressure actuated water valves –
Commercial applications

These pressure actuated modulating valves control the quantity of water to a condenser by directly sensing pressure changes in a refrigerant circuit.
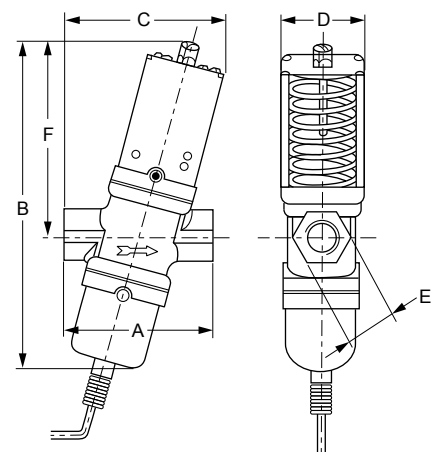
The valves can be used in non-corrosive refrigerant systems. Ammonia power elements and valves designed for salt-water applications are available.

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
▶ 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
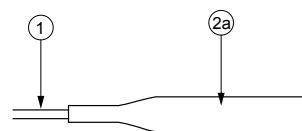▶ Nickel plated seats available for 3/8, 1/2, and 3/4" valves
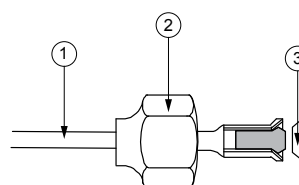▶ Direct/reverse action

Dimensions in mm

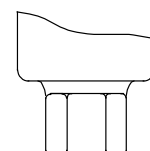| Valve size	A	B	C	D	E	F
3/8"	70	150	75	41	24	92
1/2"	80	166	86	51	27	98
3/4"	90	181	97	55	36	110

Style 13
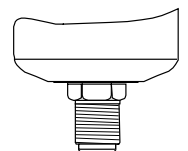**(excl. valve depressor)**
1: 75 cm capillary
2: 7/16-20 UNF flare nut

Style 34
1: 75 cm capillary
2: 1/4" tube for braze connection

Style 50
(incl. valve depressor mounted
into machined flare)
1: 75 cm capillary
2: 1/4" tube for braze connection
3: copper sealring

Style 15
1/4-18NPT (female)

Style 5
7/16-20 UNF

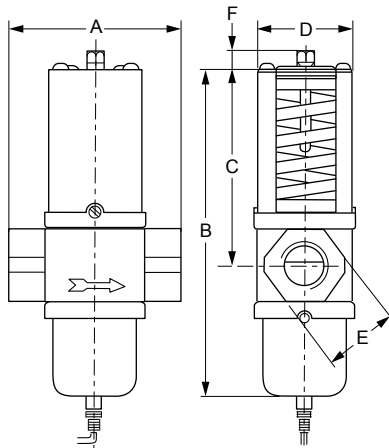Manufacturer reserves the right to change specifications without prior notice

Pressure actuated water valves

V46

Ordering information

Codes	Range (bar)	Body style	Size thread according to ISO 228	Style	Capillary length (cm)	Additional features It is possible to change style 13 into style 45A by ordering KIT031N600
V46AA -9600	5...18	Angled	3/8"	13	75	---
V46AA -9608						With special washer to prevent waterhammer at low flow capacity
V46AA -9602					100	Nickel plated seat/longer capillary
V46AA −9950				34	75	Nickel plated seat/solder connection
V46AA -9951						.040" i.d.cap./solder connection
V46AB −9600			1/2"	13		---
V46AB −9950				34		Solder connection/"062" id.cap
V46AC −9600			3/4"	13		---
V46AC −9951				34		Solder connection
V46AA −9300	5...23	Angled	3/8"	5	---	---
V46AA −9301						Nickel plated seat, high range. With washer to prevent waterhammer at low flow capacity
V46AA −9606				13	75	Nickel plated seat, high range
V46AA -9609						Nickel plated seat, high range. With washer to prevent waterhammer at low flow capacity
V46AA −9510				50		High range
V46AB −9300			1/2"	5	---	---
V46AB −9605				13	75	Nickel plated seat, high range
V46AB -9951				34		Solder connection, high range
V46AB -9510				50		High range
V46AC -9300			3/4"	5		---
V46AC -9605				13		Nickel plated seat, high range
V46AC -9510				50		High range

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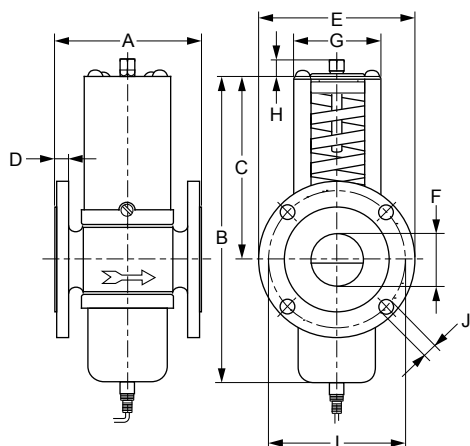
Pressure actuated water valves

V46

Dimension in mm

Valve size	A	B	C	D	E	F
1"	124	233	138	71	48	13
1¼"	126	242	144		57	

Ordering information

Codes	Range (bar)	Body style	Size thread according to ISO 7-Rc	Style	Capillary length	Additional features It is possible to change style 13 into style 45A by ordering KIT031N600
V46AD -9300	5...18	Straight	1"	5	---	---
V46AD -9510				50	75	
V46AD -9600				13		
V46AE -9300			1¼"	5	---	
V46AE -9510				50	75	
V46AE -9600				13	75	
V46AD -9511	10...23		1"	50	75	High range
V46AE -9512			1¼"			

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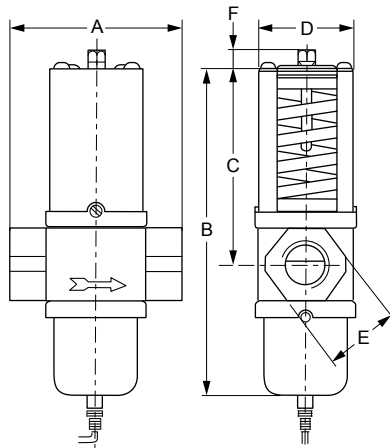
Pressure actuated water valves

V46

Dimensions in mm

Valve size	A	B	C	D	E	F	G	H	I	J
1½"	137	242	144	18	150	47	67	13	110	
2"	168	299	164	20	165	57	89	16	125	18
2½"	172				185	70			145	

Ordering information

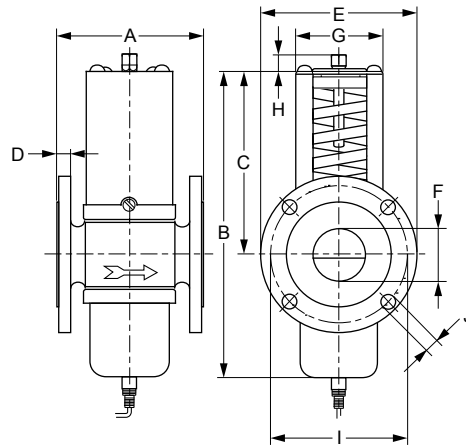| Codes	Range (bar)	Body style	Size DIN2533 flang connections	Style	Capillary length	Additional features It is possible to change Style 13 into Style 45A by ordering KIT031N600
V46AR-9300	5...18		1½ "	5	---	---
V46AR-9600				13	75	
V46AS-9300	5...11.5	Straight	2"			
V46AS-9301	11...18			5	---	---
V46AT-9300	5...11.5		2½"			
V46AT-9301	11...18					

Pressure actuated water valves

V46

Dimension in mm

Valve size	A	B	C	D	E	F
3/8"	67	136	79	41	24	
1/2"	80	153	86	51	29	10
3/4"	86	163	96	55	35	
1"	124	233	138	71	52	13
1¼"	124	242	144	71	62	13

Ordering information

Codes	Range (bar)	Body style	Size thread according to ISO 228	Style	Capillary length	Additional features It is possible to change style 13 into style 45A by ordering KIT031N600
V46BA-9600	5...18	Straight	3/8"	13	75	---
V46BB-9600	5...18	Straight	1/2"	13	75	---
V46BC-9600	5...18	Straight	3/4"	13	75	---
V46BD-9600	5...18	Straight	1"	13	75	---
V46BE-9510	5...18	Straight	1¼"	50	75	---
V46BE-9600	5...18	Straight	1¼"	13	75	---
V46BA-9510	5 ...23	Straight	3/8"	50	75	---
V46BB-9510	5 ...23	Straight	1/2"	50	75	---
V46BC-9510	5 ...23	Straight	3/4"	50	75	---
V46BC-9511	5 ...23	Straight	3/4"	50	140	Longer capillary
V46BD-9510	10...23	Straight	1"	50	75	---
V46BE-9511	10...23	Straight	1¼"	50	150	Longer capillary

Manufacturer reserves the right to change specifications without prior notice

Pressure actuated water valves

V46

Dimensions in mm

Valve size	A	B	C	D	E	F	G	H	I	J
1½"	135	242	144	14	150	47	67	13	110	
2"	162	299	164	16	165	57	89	16	125	18
2½"	172				185	70			145	

Ordering information

Codes	Range (bar)	Body style	Size DIN 86021 flange connections	Style	Capillary length
V46BR-9510	5...18	Straight	1½"	50	75
V46BR-9600				13	
V46BS-9300	5...11.5		2"	5	---
V46BS-9301	11...18				
V46BT-9300	5...11.5		2½"		
V46BT-9301	11...18				

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Johnson
Controls

Refrigeration components
Modulating water valves

Pressure actuated water valves

V46SA

Pressure actuated water valves, low flow

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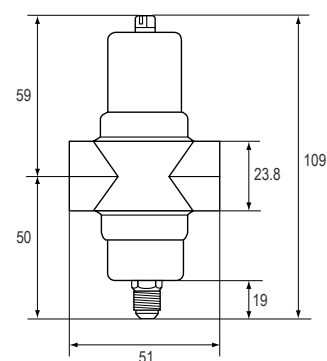
The valve can be ordered style 5 (without capillary), style 13, style 34 and style 50 (incl. 75 cm capillary).

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

Dimensions in mm

Ordering information

Codes	Range (bar)	Body style	Size thread according to ISO 228	Style	Capillary length	Additional features It is possible to change style 13 into style 45A by ordering KIT031N600
V46SA-9101	5...23	Straight	3/8"	45A	75	Capillary soldered to power element
V46SA-9110				50		Capillary separate
V46SA-9300				5	---	---
V46SA-9600				13	75	Capillary separate
V46SA-9950				34		---
V46SA-9951						Capillary soldered to power element

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Pressure actuated water valves
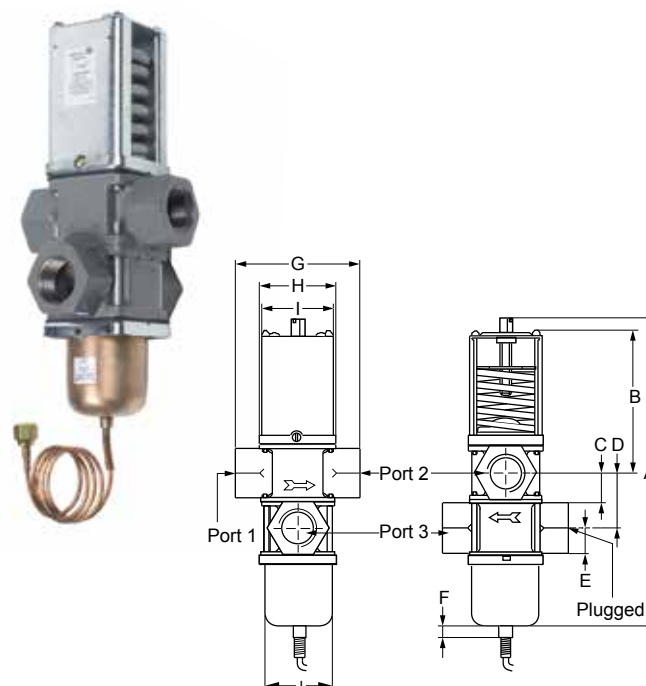
V48

3-way pressure actuated water valves

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 Kv values
▶ Pressure actuated
▶ Can be used as mixing or diverting valve

Dimensions in mm

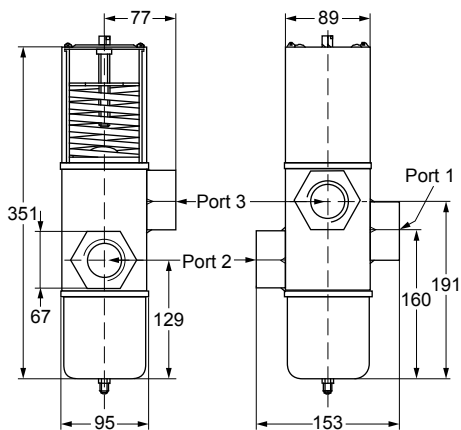| Valve size	A	B	C	D	E	F	G	H	I	J
Commercial type										
1/2"	201	86	24	38	29	8	81	51	47	45
3/4"	218	96	27	45	35		86	55	52	48
1"	296	138	29	51	48		124	71	67	59
1¼"	315	144	32	60	57		126			59
Maritime type										
3/4"	218	96	27	45	35	8	86	55	52	48

Ordering information

Codes	Range (bar)	Body style	Size thread	Style	Capillary length	Additional features It is possible to change Style 13 into Style 45A by ordering KIT031N600
Commercial type						
V48AB -9510	4...20	Straight	1/2" according to ISO 7-Rc	50	75	---
V48AB -9600	4...16			13		
V48AC -9510	4...20		3/4" according to ISO 7-Rc	50		
V48AC -9600	4...16			13		
V48AD -9510	6...20		1" according to ISO 7-Rc	50		
V48AD -9600	4...16			13		
V48AD -9602	4...16					Bodies in line (port 3 below port 2)
V48AE -9510	6...20		1¼ " according to ISO 7-Rc	50		---
V48AE -9600	4...16			13		
Maritime types						
V48BC -9600	4...16	Straight	3/4" according to ISO 228	13	75	Seawater resistant

European product catalogue 2017
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Pressure actuated water valves

V48AF commercial type

(drawing dimensions: 77, 89, 351, Port 3, Port 1, Port 2, 67, 129, 95, 153, 160, 191)

Ordering information

Code	Range (bar)	Body style	Size thread according to ISO 7-Rc	Style	Additional features It is possible to change style 13 into style 45A by ordering KIT031N600
V48AF-9300	6...14	Straight	1 1/2"	5	---

257
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Pressure actuated water valves

V246 - V248

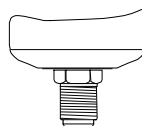*Water regulating valves for high pressure refrigerants*

The V246 - V248 series 2-way and 3-way pressure actuated water regulating valves for high-pressure refrigerants regulate water flow and control refrigerant head pressure in systems with single or multiple watercooled condensers. These valves have an adjustable opening point in a refrigerant pressure range of 200 to 400 psig (13.8 to 27.6 bar).

These series valves are designed specifically for condensing units cooled either by atmospheric or forced draft cooling towers. They are used on single or multiple condenser hook-ups to the tower to provide the most economical and efficient use of the tower. V246 - V248 valves may be used with standard non-corrosive or ammonia refrigerants.

For applications where the coolant may be corrosive to the internal parts, maritime models are available, which have nickel copper (Monel®) internal parts.

Features

▶ No close fitting or sliding parts in water passages
▶ Accessible range spring
▶ Take-apart construction
▶ Pressure-balanced design
▶ Corrosion-resistant material for internal parts

Style 5
7/16-20 UNF

Ordering information
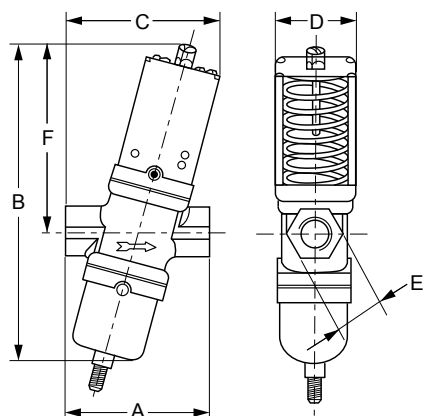
Standard production models - Range 13.8 to 27.6 bar

Codes	Construction	Valve size and connection	Element style	Shipping weight (kg)
V246GA1A001C	Direct acting, Commercial	3/8 in. BSPP Screw, ISO 228	Style 5	1.86
V246GB1A001C		1/2 in. BSPP Screw, ISO 228		1.4
V246GC1A001C		3/4 in. BSPP Screw, ISO 228		1.7
V246GD1B001C		1 in. BSPT Screw, ISO 7		4.2
V246GE1B001C		1-1/4 in. BSPT Screw, ISO 7		4.5
V246GR1B001C		1-1/2 in. Flange, DIN2533		6.2
V246GS1B001C		2 in. Flange, DIN2533		12.3
V246HA1B001C	Direct acting, Maritime	3/8 in. BSPP Screw, ISO 228		1.86
V246HB1B001C		1/2 in. BSPP Screw, ISO 228		1.4
V246HC1B001C		3/4 in. BSPP Screw, ISO 228		2.0
V246HD1B001C		1 in. BSPT Screw, ISO 228		4.3
V246HE1B001C		1-1/4 in. BSPT Screw, ISO 228		4.7
V246HR1B001C		1-1/2 in. Flange, DIN86021		6.2
V246HS1B001C		2 in. Flange, DIN86021		12.3

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Pressure actuated water valves
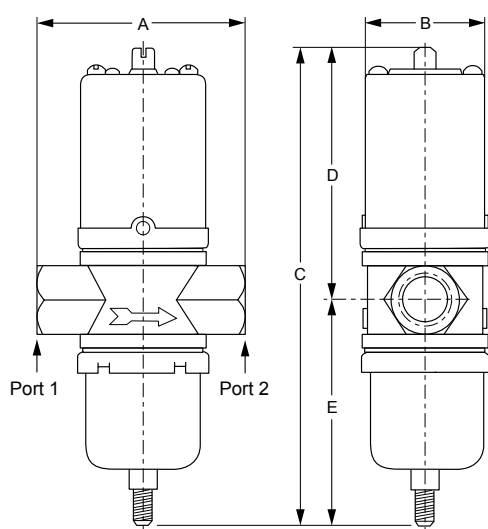
V246

Dimensions in mm

Standard production models – Range 13.8 to 27.6 bar

V246 screw connection valves – Commercial service

Valve size	A	B	C	D	E	F
3/8"	70	176	75	41	24	92
1/2"	80	191	86	51	27	98
3/4"	90	217	97	55	36	110

V246 screw connection valves – Commercial service

Valve size	A	B	C	D	E
1"	124	71	267	151	116
1-1/4"	126		276	156	121

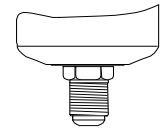### V246 screw connection valves – Maritime service

Valve size	A	B	C	D	E
3/8"	67	41	166	89	77
1/2"	78	51	182	96	86
3/4"	86	55	203	106	98
1"	124	71	267	151	116
1-1/4"	126		276	156	121

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Pressure actuated water valves
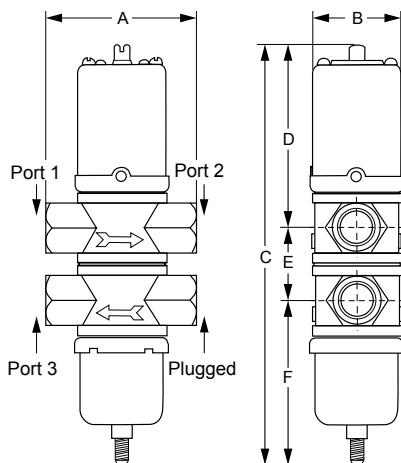
V248

Ordering information

Style 5
7/16-20 UNF
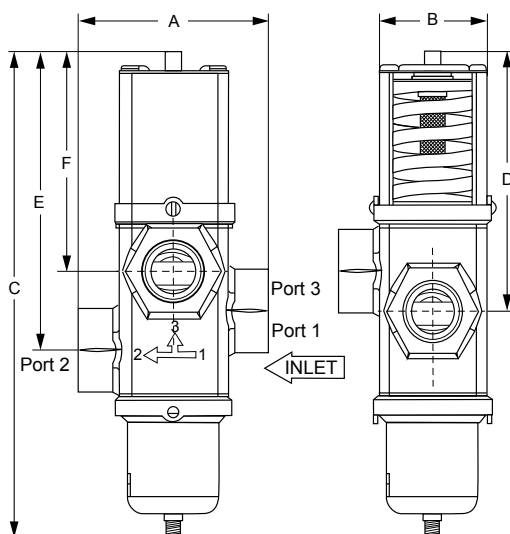
Standard production models - Range 13.8 to 27.8 bar

Codes	Construction	Valve size and connection	Element style	Shipping weight (kg)
V248GB1B001C	Direct acting, Commercial	1/2 in. BSPT Screw, ISO 7	Style 5	2.3
V248GC1B001C		3/4 in. BSPT Screw, ISO 7		3.0
V248GD1B001C		1 in. BSPT Screw, ISO 7		5.5
V248GE1B001C		1-1/4 in. BSPT Screw, ISO 7		5.0
V248GF1B001C		1-1/2 in. BSPT Screw, ISO 7		11.3
V248HC1B001C	Direct acting, Maritime	3/4 in. BSPP Screw, ISO 228		3.0

Dimensions in mm

½ in. through 1¼ in.

Valve size	A	B	C	D	E	F
½ in.	79	51	220	96	38	86
¾ in.	86	55	248	106	45	98
1 in.	124	71	318	151	52	115
1¼ in.	126		336	156	60	121

1½ in.

Valve size	A	B	C	D	E	F
1½ in.	152	89	387	206	237	175

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Temperature actuated water valves

V47

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).
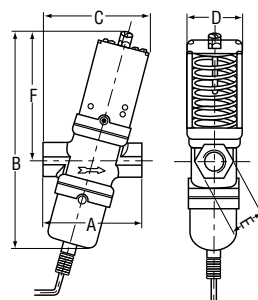
The valve opens at increasing bulb temperature.

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

Dimension in mm

Valve size	A	B	C	D	E	F
3/8"	70	150	75	41	24	92
1/2"	80	166	86	51	27	98
3/4"	90	181	97	55	36	110

Ordering information

Codes	Range (°C)	Body style	Size thread according to ISO 228	Capillary length	Bulb style 4 length (mm)
V47AA –9161	46...82		3/8"		
V47AB –9160	24...57	Angled	1/2"	1.8 m plain	82
V47AC –9160			3/4"		

Dimension in mm

Valve size	A	B	C	D	E	F
1"	124	233	138	72	48	13
1¼"	125	243	144		57	

Ordering information

Codes	Range (°C)	Body style	Size thread according to ISO 7-Rc	Capillary length	Bulb style 4 length (mm)
V47AD –9160	24...57		1"		
V47AD –9161	46...82	Straight		1.8 m arm.	152
V47AE –9160	24...57		1¼"		
V47AE –9161	46...82				

Manufacturer reserves the right to change specifications without prior notice

Johnson Controls

Temperature actuated water valves

Dimension in mm

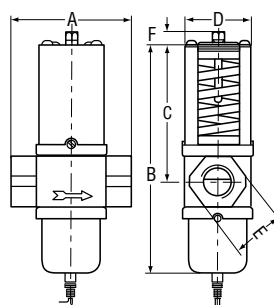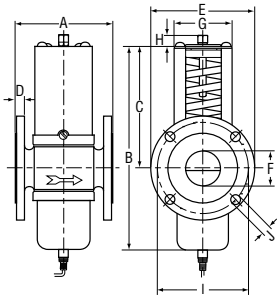| Valve size	A	B	C	D	E	F	G	H	I	J
1½"	137	244	144	18	150	47	67	13	110	18

Ordering information

Codes	Range (°C)	Body style	Size DIN 2533 flange connections	Capillary length	Bulb style 4 length (mm)
V47AR -9160	24...57	Straight	1½"	1.8 m arm.	152
V47AR -9161	46...82				

Mechanical humidity stat

W43

Room humidistats

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

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
▶ Field adjustable high and low limit stops
▶ Separate mounting plate

Dimensions in mm

Manufacturer reserves the right to change specifications without prior notice

1-phase condenser fan speed control

P215PR

Direct-mount single phase controller

These direct mount pressure actuated condenser fan speed controllers are designed for speed variation of single-phase motors.

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.

A pressure actuated 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 95% over the proportional band using the phase cutting principle.

This provides speed variation of permanent split capacitor or shaded pole motors that do not draw more than 4 A (rms) full load current.

Cut-off models (fan stops at low pressure) as well as minimum speed models (fan keeps running at 30%) are available.

The controllers can be used in non-corrosive refrigerant systems.

Features

▶ Condenser pressure control by fan speed variation
▶ Pressure input
▶ Direct mount
▶ Setpoint screw on top
▶ Built-in suppression filter
▶ IP65
▶ Compact design
▶ Attractive styling
▶ Quick connector plug included
▶ CE
▶ New range 5-15 bar for R134a

Style 47
Direct mount
7/16 –20 UNF female
(incl. valve depressor)

Style 28
Braze connection
6 mm ODM

Dimensions in mm

Ordering information

Codes	Range (bar)	Element style	Setpoint (bar)	Prop. band (bar)	Supply voltage 50/60 Hz	Rating	Controller mode	Extra features
P215PR-9200	10 to 25		19	4.5				
P215PR-9202	22 to 42	47	26	5.5				---
P215PR-9203	5 to 15		9	2.5				
P215PR-9800	10 to 25	28	19	4.5	230 VAC	4 Amp	Cut-off	
P215PR-9230								
P215PR-9232	22 to 42		26	5.5				Bulk Pack
P215PR-9233	5 to 15	47	9	2.5				
P215PR-9250	10 to 25		19	4.5				Bulk Pack, 2 m cable connector incl.

Note
For a 4 Amp rating and UL approval please contact your sales representative.

1-phase condenser fan speed control

P215RM

Remote-mount single phase controller

The new P215RM (Remote Mount) is an addition model to our very successful P215PR Direct Mount FSC which is in program since 2004.

We have designed the P215RM for situations where mounting space is limited or if the refrigeration line is to thin so it cannot carry the weight off the P215PR. Also new on this product is the all-in bracket design which is part of the complete Aluminium housing.

The P215RM can be screwed to a side panel and connected to the refrigeration line by using a flexible hose or a copper capillary.

Features

▶ Quick and easy to install due to integral mounting bracket
▶ Easy mounting with style 5 pressure connection
▶ No need to use a male / male adaptor between P215RM and flex hose
▶ Three ranges available 5 - 15 bar, 10 - 25 bar, 22 - 42 bar
▶ Output current maximum 4A at 55 °C operating ambient temperature
▶ Global design CE approval

Dimensions in mm

Ordering information

Codes	Range (bar)	Element style	Setpoint (bar)	Prop. band (bar)	Supply voltage 50/60 Hz	Rating	Controller mode	Extra features
P215RM-9700	10 to 25		19	4.5				
P215RM-9702	22 to 42	5	26	5.5	230 VAC	4 Amp	Cut-off	---
P215RM-9703	5 to 15		9	2.5				

European product catalogue 2017
Manufacturer reserves the right to change specifications without prior notice

1-phase condenser fan speed control

P216

Condenser fan speed controller

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. 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. This provides speed variation of permanent split capacitor or shaded pole motors which do not draw more than 12 A (rms) full load current.

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. The motor manufacturer should have approved his product for this speed control principle. It is recommended to confirm with the electric motor manufacturer, that the motor can be used with a controller, using the phase cutting principle for speed variation. You can also provide a copy of this P216 product data sheet to the motor manufacturer/supplier for review.

Features
▶ The new benchmark in standard FSC
▶ Easy to Install and Easy to operate
▶ Output Range: 0,5 to 12 Amp (1 phase)
▶ Input 0-10 Vdc
▶ Including 0-50 bar pressure transducer P499VCS-405C
▶ Heatpump mode
▶ Reverse operation mode
▶ Master / Slave mode
▶ Fixed pressure ranges for direct replacement (P215)
▶ Setpoint and Min speed potmeters
▶ Operate with High Efficiency AC-fan motors who comply to ERP 2015 directive.

Dimensions in mm

Ordering information

Codes	Description
P216EEA-2K	Wallmount P216EEA-101C + P499VCS-405C pressure transducer
P216EEA-101C	Wall mounted FSC
P499VCS-405C	Pressure transmitter with range 0-50 bar, Output 0-10V. 2 meter fixed cable. Pressure connection 7/16-20UNF female thread

European product catalogue 2017

1-phase condenser fan speed control

P266

Pressure actuated single phase digital controller

The P266 pressure actuated single phase digital controller is a cost-effective, weather-resistant, durable motor speed control. The P266 control is designed for approved single-phase, Permanent Split-Capacitor (PSC) motors commonly used in a wide variety of refrigeration and air conditioning condenser fan applications.

The P266 series controls are designed to replace the Johnson Controls® P66 series and P215 series fan speed controls, providing additional features and flexibility, greater energy efficiency, and longer motor life in a compact, rugged, weather-resistant package.

P266 models are available for 208 to 240 VAC and 440 to 575 VAC range applications. P266 controls have current ratings from 4 to 12 A depending on the voltage and model.

Some P266 models provide optional control of up to three auxiliary (fixed-speed) fans or fan stages. Also, some models provide two additional high-voltage triacs, which allow you to split the source power to the main and auxiliary windings, and connect a low-speed capacitor to increase efficiency at low speed operation.

Features
▶ Global design CE / UL / CSA / C-tick
▶ Microprocessor based
▶ Field programmable, digital setting
▶ One or two electronic pressure transducers (P266SNR)
▶ Pressure range 0 - 35 bar or 0 - 52 bar
▶ Patented design
▶ Output 8 or 12 Amp at 60 °C ambient temperature
▶ Robust aluminium IP54 enclosure with integral heatsink
▶ Multi triac control providing energy savings up to 25%
▶ Optional auxiliary (vernier) control
▶ Auto selection 50 / 60 Hz

Dimensions in mm

European product catalogue 2017
Manufacturer reserves the right to change specifications without prior notice

1-phase condenser fan speed control

Ordering information

Codes	Description	Transducer model included in kit	Voltage range (VAC)	Maximum output (Ampères)	High VAC triacs	Available auxiliary fan control circuits
P266EAA-1K *		P266SNR-1C 0-35 bar (0-508 psi)				---
P266EAA-3K *		P266SNR-2C 0-52 bar (0-754 psi)			3	
P266EBA-1K *		P266SNR-1C 0-35 bar (0-508 psi)				3
P266EBA-3K *		P266SNR-2C 0-52 bar (0-754 psi)		8		
P266ECA-1K *	P266 fan speed control with Internal transformer and **one** P266 pressure transducer and one 2 m cable	P266SNR-1C 0-35 bar (0-508 psi)	208 to 240			---
P266ECA-3K		P266SNR-2C 0-52 bar (0-754 psi)				
P266EDA-1K *		P266SNR-1C 0-35 bar (0-508 psi)			1	3
P266EDA-3K *		P266SNR-2C 0-52 bar (0-754 psi)				
P266EEA-1K *		P266SNR-1C 0-35 bar (0-508 psi)		12		---
P266EFA-3K *		P266SNR-2C 0-52 bar (0-754 psi)				3

Note
Factory default settings: Start Voltage is set to 40% of the supply line-voltage. End Voltage is set to 95% of the supply line-voltage.
Start Pressure is set to 44% of the P266 transducer's total pressure range. End Pressure is set to 51% of the P266 transducer's total pressure range.

P266SNR electronic pressure transducers

Codes	Description
P266SNR-1C	Electronic pressure transducer: 0 to 35 bar total range with a 1/4 in. SAE female flare connection and a 2 meter cable.
P266SNR-2C	Electronic pressure transducer: 0 to 52 bar total range with a 1/4 in. SAE female flare connection and a 2 meter cable.
P266PRM-1K	P266 Utility Com. Tool Kit. Communication Software Package to program and monitor P266 Control parameters.

1-phase condenser fan speed control

P315PR

Direct-mount pressure actuated for EC motors

The direct mount pressure actuated condenser fan speed controllers are designed for speed variation of electronically commutated (EC) motors. 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 controllers can be used in non-corrosive refrigerant systems.

A pressure actuated device provides the most direct and fastest response to pressure variations in the refrigerant system.
The controller varies the supply voltage to the motor from 5% to at least 95% over the proportional band.

Features

▶ Fan speed variation cndenser pressure control
▶ Pressure input
▶ Direct mount option
▶ Setpoint screw location on top of device
▶ IP65 enclosure
▶ Compact design
▶ Attractive styling
▶ Quick connector plug included
▶ Suitable to control 1 or 3 phase EC motor

Circle 65

75
106
26

HEX 19

Dimensions in mm

Ordering information

Codes	Range (bar) *	Element style	Setting (bar)	Prop. band (bar)	Controller mode **	Minimum shipping quantity	Additional features
P315PR-9200C	8 to 25	47	16	4	N/A	1	---
P315PR-9200D						25	Bulk Pack
P315PR-9202C	22 to 42		26	5		1	---
P315PR-9203C	5 to 15		6	4			
P315PR-9203D						25	Bulk Pack

Note
* 1 bar = 100 kPa ≈ 14.5 psi
** Minimum speed.

European product catalogue 2017
Manufacturer reserves the right to change specifications without prior notice

3-phase condenser fan speed control

VFD68

Variable Frequency Drives

The VFD68 Variable Frequency Drive provides three-phase motor speed control in a variety of HVAC/R applications. The VFD68 drive is designed primarily for condenser fan speed control on HVAC and refrigeration condensing units, but can also be set up to control a variety of pumps, blowers and fans.

The VFD68 drive accepts an input signal from P499 electronic pressure transducer, or other devices that provide a 0 to 5 VDC, 0 to 10 VDC, or 4 to 20 mA signal.

The application-specific design of the VFD68 drive provides a simple interface, which makes the drive easy to understand and operate.

You can quickly and easily reconfigure the VFD68 drive to control variable speed pumps in cooling and heating applications, or to control variable speed supply fans in VAV applications.

The VFD68 drive is an RS485, RTU-compliant ModBus® slave device and can be integrated into a ModBus network.

Applications

The VFD68 drive accepts input signals from a variety of pressure transducers, temperature sensors, and low-voltage controllers to provide continuous response to changing condenser load conditions.

The VFD68 drive allows the system to:

▶ Maintain optimum condenser head pressure
▶ Operate in low ambient temperature conditions down to -40 °C
▶ Reduce short-cycling, which occurs when using
▶ Use on/off fan controls
▶ Maintain a more stable evaporator temperature
▶ Operate more efficiently, reducing electricity cost.

The VFD68 drive can also:

▶ Help optimize compressor operation, reduce wear, and extend compressor life by stabilizing the condenser head pressures
▶ Reduce motor repair and replacement costs by eliminating the condenser fan short-cycling
▶ Extend refrigerated product life and provide more consistent comfort cooling by stabilizing evaporator temperatures

Features

▶ Selectable input types allows use with 0 to 5 VDC (ratiometric), 0 to 10 VDC, or 4 to 20 mA input signals from transducers, sensors, and controllers.
▶ High input signal selection of two similar inputs (230 or 460 volt models only) provides fan speed control of dual circuit condensing units, based on the highest pressure circuit.
▶ Compact design provides for easy and flexible installation.
▶ Three-phase, 230, 460, or 575 VAC models can control a wide variety of three-phase motors ranging up to 10hp.
▶ Simple and advanced end-user settings provide quick and simple application setup and operation, as well as advanced setup parameters for custom applications.

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Manufacturer reserves the right to change specifications without prior notice

3-phase condenser fan speed control

VFD68

Ordering information

230 VAC ±10% production models

Codes	Description
VFD68BBB-2C	VFD68 drive; 0.1 kw (1/8 hp); 128 x 68 x 81 mm
VFD68BCB-2C	VFD68 drive; 0.2 kw (1/4 hp); 128 x 68 x 81 mm
VFD68BDC-2C	VFD68 drive; 0.4 kw (1/2 hp); 128 x 68 x 113 mm
VFD68BFD-2C	VFD68 drive; 0.75 kw (1 hp); 128 x 68 x 133 mm
VFD68BGG-2C	VFD68 drive; 0.5 kw (2 hp); 128 x 108 x 136 mm
VFD68BHG-2C	VFD68 drive; 2.2 kw (3 hp); 128 x 108 x 136 mm
VFD68BJK-2C	VFD68 drive; 3.7 kw (5 hp); 128 x 170 x 142 mm
VFD68BKL-2C	VFD68 drive; 5.5 kw (7-1/2 hp); 150 x 220 x 155 mm
VFD68BLL-2C	VFD68 drive; 7.5 kw (10 hp); 150 x 220 x 155 mm
VFD68BMP-2C	VFD68 drive; 11 kw (15 hp); 260 x 220 x 190
VFD68BNP-2C	VFD68 drive; 15 kw (20 hp); 260 x 220 x 190

Accessories

The P499R / P499A / P499V models can be connected to the VFD68

VFD68 460 V kit models (drive - EMC filter)

VFD68 KIT	VFD68	EMC filter
VFD68CDF-2K	VFD68CDF-2C	FFR-CSH-036-8A-RF1
VFD68CFF-2K	VFD68CFF-2C	FFR-CSH-036-8A-RF1
VFD68CGG-2K	VFD68CGG-2C	FFR-CSH-036-8A-RF1
VFD68CHH-2K	VFD68CHH-2C	FFR-CSH-080-16A-RF1
VFD68CJJ-2K	VFD68CJJ-2C	FFR-CSH-080-16A-RF1
VFD68CKL-2K	VFD68CKL-2C	FFR-MSH-170-30A-RF1
VFD68CLL-2K	VFD68CLL-2C	FFR-MSH-170-30A-RF1

460 VAC ±10% production models

Codes	Description
VFD68CDF-2C	VFD68 Drive; 0.4 kw (1/2 hp); 128 x 108 x 130 mm
VFD68CFF-2C	VFD68 Drive; 0.75 kw (1 hp); 128 x 108 x 130 mm
VFD68CGG-2C	VFD68 Drive; 1.5 kw (2 hp); 128 x 108 x 136 mm
VFD68CHH-2C	VFD68 Drive; 2.2 kw (3 hp); 128 x 108 x 156 mm
VFD68CJJ-2C	VFD68 Drive; 3.7 kw (5 hp); 128 x 108 x 166 mm
VFD68CKL-2C	VFD68 Drive; 5.5 kw (7-1/2 hp); 150 x 220 x 155 mm
VFD68CLL-2C	VFD68 Drive; 7.5 kw (10 hp); 150 x 220 x 155 mm
VFD68CMP-2C	VFD68 Drive; 11 kw (15 hp); 260 x 220 x 190
VFD68CNP-2C	VFD68 Drive; 15 kw (20 hp); 260 x 220 x 190

575 VAC +5/-10% production models

Codes	Description
VFD68DFM-2C	VFD68 Drive; 0.75 kw (1 hp); 150 x 140 x 136 mm
VFD68DGM-2C	VFD68 Drive;1.5 kw (2 hp); 150 x 140 x 136 mm
VFD68DHM-2C	VFD68 Drive; 2.2 kw (3 hp); 150 x 140 x 136 mm
VFD68DJN-2C	VFD68 Drive; 3.7 kw (5 hp); 150 x 220 x 148 mm
VFD68DKN-2C	VFD68 Drive; 5.5 kw (7-1/2 hp); 150 x 220 x 148 mm
VFD68DLN-2C	VFD68 Drive; 7.5 kw (10 hp); 150 x 220 x 148 mm

Modular electronic control system

System 450™

Modular electronic controls

System 450™ is a family of modular, digital electronic controls that is easily assembled and set up to provide reliable temperature, pressure, and humidity control for a wide variety of Heating, Ventilating, Air Conditioning and Refrigeration (HVACR) and commercial/industrial process applications.

The System 450 control system is designed to replace System 350™ control system and System 27, and provide many additional features and benefits with less than a dozen model variations.
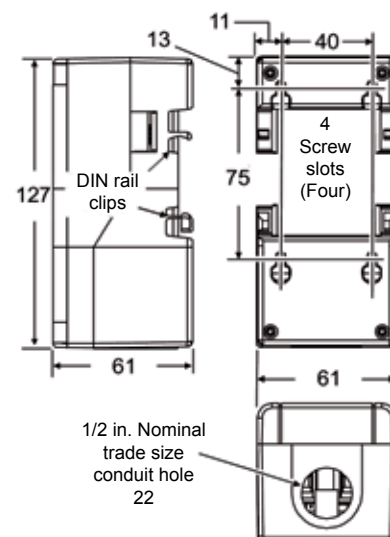
All System 450 control modules are multipurpose and field configurable out-of-the-box; each module is designed for use in temperature, pressure, and humidity systems. A System 450 control system can be easily assembled and configured to monitor and control temperature, pressure, and humidity simultaneously.

A single C450 control module can be set up as a stand-alone control or connected to expansion modules to control up to ten outputs based on any of the three available inputs.

A control system may consist of relay outputs (Single-Pole, Double-Throw [SPDT]), analog outputs (0–10 VDC or 4–20 mA), or any combination of relay and analog outputs.

Features

▶ Durable, compact modular design with plug-together connectors and DIN rail or direct wall mount capability

▶ Multipurpose, field-configurable modules designed for global use

▶ Backlit Liquid Crystal Display (LCD) and four-button touchpad user interface

▶ Up to three inputs and up to ten outputs (relay or analog)

▶ Versatile, all-in-one, stand-alone control modules

▶ An extensive suite of compatible temperature and humidity sensors as well as pressure transducers

▶ High input signal selection

▶ Differential control

▶ Adjustable user-defined reset setpoint (C450R Only)

▶ Adjustable minimum and maximum setpoint temperature (C450R only)

▶ Selectable warm weather shutdown temperature (C450R only)

▶ Adjustable setback temperature (C450R only)

Dimensions in mm

Manufacturer reserves the right to change specifications without prior notice

Modular electronic control system

System 450™

Ordering information

System 450 control modules are capable of monitoring up to three input sensors and controlling up to ten outputs that can be any combinationof relay and analogue outputs (provided by expansion modules).

Codes	Description
	C450 control module types
C450CBN-3C	Control module 1 stage
C450CCN-3C	Control module 2 stage
C450CEN-1C	Control module with Ethernet communications, LCD, and four-button touchpad UI. (No onboard outputs available on control modules with network communications capabilities.)
C450CRN-1C	Control module with RS485 Modbus communications, LCD, and four-button touchpad UI. (No onboard outputs available on control modules with network communications capabilities.)
C450CPN-3C	Control module – 1 analog output (PI)
C450CQN-3C	Control module – 2 analog 0utput (PI)
C450RBN-1C	Reset control module – 1 relay stage
C450RCN-1C	Reset control module – 2 relay stage
C450RBN-3C	Reset control module with LCD, four-button touchpad UI, and SPDT relay output; provides one SPDT output relay. One A99BC-25C temperature sensor with 0.25 m silicon leads and one A99BC-300C temperature sensor with 3 m silicon leads are included in the box with the reset control module.
C450RCN-3C	Reset control module with LCD, four-button touchpad UI, and SPDT relay output; provides two SPDT output relays. One A99BC-25C temperature sensor with 0.25 m silicon leads and one A99BC-300C temperature sensor with 3 m silicon leads are included in the box with the reset control module.
	C450 expansion module types
C450SBN-3C	Expansion module 1 relay stage
C450SCN-3C	Expansion module 2 relay stage
C450SPN-1C	Expansion module – 1 analog output (PI)
C450SQN-1C	Expansion module – 2 analog output (PI)
	C450 power module
C450YNN-1C	Power module 230/24 VAC – 50/60 Hz
	C450 sensor types
A99	Temperature sensors, all models, Range –40 / 120 °C
P499RCP-401C	Pressure transmitter – Range –1 / 8 bar
P499RCP-402C	Pressure transmitter – Range –1 / 15 bar
P499RCP-404C	Pressure transmitter – Range 0 / 30 bar
P499RCP-405C	Pressure transmitter – Range 0 / 50 bar
HE-67S3-0N00P	Humidity transmitter duct mount (include A99)
HE-67S3-0N0BP	Humidity transmitter wall mount (include A99)
DPT2650-0R5D-AB	Delta P transmitter 0 to 1 mbar
DPT2650-0I0D-AB	Delta P transmitter 0 to 25 mbar

Modular electronic control system

System 450™

Specifications SPDT relay output contacts

▶ AC motor ratings at 208/240 VAC
▶ Full-load Amperes: 4,9 Amp
▶ Locked-rotor Amperes: 29,4 Amp
▶ Non-inductive load at 24/240 VAC: 10 Amp
▶ Pilot duty at 24/240 VAC: 125 VA

A99	All A99 models can be used on the C450	
P499	P499RCP-401C	Range -1 to 8 bar
	P499RCP-402C	Range -1 to 15 bar
	P499RCP-404C	Range 0 to 30 bar
	P499RCP-405C	Range 0 to 50 bar
HE	HE-67S3-0N00P	Hum transmitter duct mount (include A99)
	HE-67S3-0N0BT	Hum transmitter wall mount (include A99)
DTP	DPT2650-0R5D-AB	Delta P transmitter 0 to 0,5 INWC (or 0 to 1 mbar)
	DPT2650-010D-AB	Delta P transmitter 0 to 10 INWC (or 0 to 25 mbar)

Manufacturer reserves the right to change specifications without prior notice

Johnson Controls

Electronic control devices

ER line

Electronic refrigeration line

Devices are designed to be incorporated in refrigerated display cases and cold storage rooms.

ER Line proposes progressive offer from basic controls to advanced controls including real time clock, energy saving and network communication to be integrated with monitoring system.
It also introduces specific products for supermarkets
(e.g. compressor rack).

Hardware features
▶ Robust front panel for durability and long term usage
▶ Direct 230 V supply, no external transformer required
▶ Up to 5 relays in a single package
▶ NTC or PTC (A99) sensors
▶ Removable plug connectors for quick mounting and wiring
▶ Embedded real time clock, no additional clock card required
▶ Embedded RS485 port, no additional communication card required

Application features
▶ Positive or negative temperature units with a single product
▶ Minimum and maximum temperature monitoring
▶ Comprehensive controls
▶ Light and standby switching
▶ Energy saving (2nd setpoint)

Ordering information

Products	Type	Mounting	Wiring	Compressor relays	Fan relays	Defrost relays	Auxiliary relays	Real time clock	RS485
ER54	Evaporator control	Panel	Removable plug connectors	•	•	•	•	•	•
ER55-DR	Cold room control	Din rail	Removable plug connectors	•	•	•	• (2 relays)	•	•
ER55-SM	Cold room control	Split	Fixed screw connectors	•	•	•	• (2 relays)	•	•
ER65	Rack control	Din rail	Removable plug connectors	• (4 relays)	---	---	•	---	•

Please refer to product bulletins for complete information

Accessories

Codes	Description	Applied products
ER-NTC-0C	NTC sensor, cable 2 m, universal replacement	All ER products
ER-COM-1C	RS485 cable, 1.5 m, plug connector	ER54, ER55-SM
ER-COM-2C	RS485 cable, 1.5 m, RJ connector	ER55-DR
P499Axx-xxx	Pressure transducer, 4-20 mA (See also P499 catalogue section)	ER65

European product catalogue 2017

Manufacturer reserves the right to change specifications without prior notice

Electronic control devices

ER line

ER54 evaporator controllers - Ordering information

Panel mount controller, cool thermostat, comprehensive controls, RS485, real time clock, plug connectors.
Delivered with one NTC sensor

Codes	RS485	Power supply	Protection class	Temperature range	Display	Inputs	Outputs
ER54-PMW-501C	MODBUS	230 VAC, +/-10% Consumption 3W	IP55 (front) IP20 (back)	-40 to 70 °C Accuracy: +/-0.3 °C	LED 3 digits Decimal displaying	· 3 temperatures · 2 voltage free contacts	· Compressor: SPST 12(5)A · Fan: SPST 7(2)A · Defrost: SPST 7(2)A · Auxiliary: SPST 7(2)A
ER54-PMW-001C	N2 Open						

European product catalogue 2017
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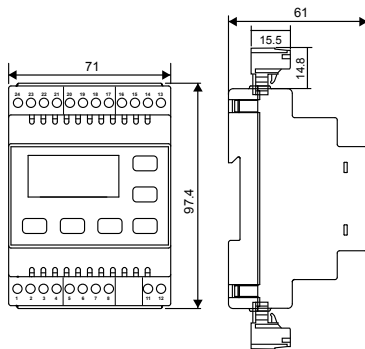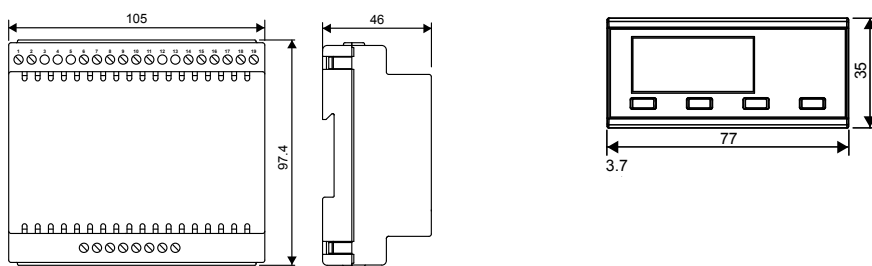
Electronic control devices

ER Line

ER55 cold room controllers - Ordering information

DIN rail mounting controller, cool thermostat, comprehensive controls, RS485, real time clock, plug connectors.
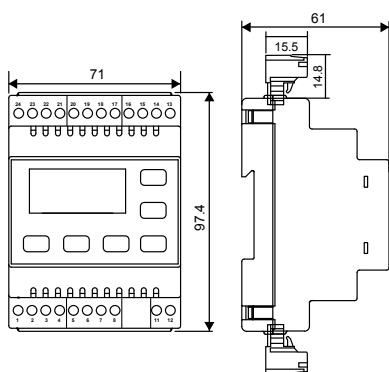*Delivered with one NTC sensor*

Codes	RS485	Power supply	Protection class	Temperature range	Display	Inputs	Outputs
ER55-DR230-501C	MODBUS	230 VAC, +/-10% Consumption 3W	IP20	-40 to 70°C Accuracy: +/-0.3°C	LED 3 digits Decimal displaying	· 3 temperatures · 2 voltage free contacts	· Compressor: SPST 7(2)A · Fan: SPST 7(2)A · Defrost: SPST 16(4)A · Auxiliary 1: SPDT 7(2)A · Auxiliary 2: SPST 7(2)A
ER55-DR230-001C	N2 Open						

Split mounting controller, cool thermostat, comprehensive controls, RS485, real time clock, plug connectors.
Delivered with two NTC sensors

Codes	RS485	Power Supply	Protection Class	Temperature Range	Display	Inputs	Outputs
ER55-SM230-501C	MODBUS	230 VAC, +/-10% Consumption 3W	IP20	-40 to 70°C Accuracy: +/-0.3°C	Remote LED 3 digits Decimal displaying	· 3 temperatures · 2 voltage free contacts	· Compressor: SPST 16(8)A · Fan: SPST 8(3)A · Defrost: SPST 16(4)A · Auxiliary 1: SPST 7(2)A · Auxiliary 2: SPST 7(2)A
ER55-SM230-001C	N2 Open						

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Electronic control devices

ER Line

R65 rack controllers – Ordering information

DIN rail mounting controller, pressure or temperature control, 4 compressors or fans sequencer, RS485, plug connectors.
Sensor to be ordered separately (see also P499 pressure transducer section).

Codes	RS485	Power supply	Protection class	Temperature range	Display	Inputs	Outputs
ER65-RK230-501C	MODBUS	230 VAC, +/-10% Consumption 3W	IP20	–40 to 70°C Accuracy: +/-0.3°C	· LED 3 digits · Decimal displaying	· 1 temperature · 1 pressure · 2 voltage free contacts · 3 supplied contacts (230 V)	· Stages (x4): SPST 5(1)A · Alarm: SPDT 7(2)A
ER65-RK230-001C	N2 Open						

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Multi-stages control devices

MS line

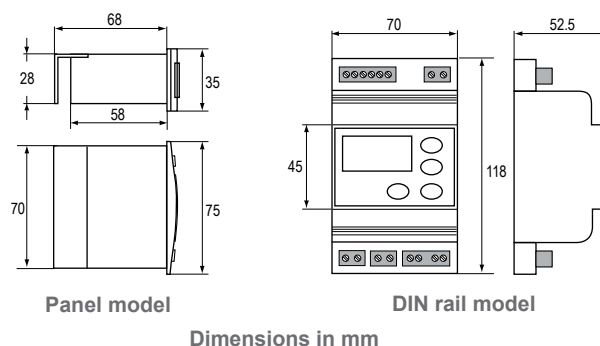### *General purpose and multi-stages*

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 temperature (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 IP68 sensor
▶ Wide range of enclosures for sensors available
▶ Keyboard lock
▶ SMD technology

Panel model   **DIN rail model**

Dimensions in mm

Ordering information

MS display

Codes	Range	Power supply	Enclosure	Input	Protection class	Additional features
DIS12T-1C	-40 to +70 °C	12 VAC/DC	Panel	A99 sensor (incl.)	Overall IP20 Front IP54	· Accuracy: ±1 Unit · Power Consumption: 1.5 VA 50/60 Hz
DIS230T-1C		230 VAC				
DIS12V-1C	0 to +100% (Rh)	12 VAC		0-10 V from humidity sensor (not Incl.)		
DIS230V-1C		230 VAC				

MS1 one-stage control

Codes	Range	Power supply	Enclosure	Input	Output rating 250 VAC	Alarm output	Protection class	Additional features
MS1PM12RT-1C	-40 to +70 °C	12 VAC/DC	Panel	A99 sensor (incl.)	SPST 8(3)A	Open Collector 40 VDC/100 mA	Overall IP20 Front IP54	· Accuracy: ±1 Unit · Power Consumption: 2 VA 50/60 Hz
MS1PM230T-1C		230 VAC			SPDT 8(3)A			
MS1DR230T-1C		230 VAC	DIN rail		SPST 8(3)A		IP20	
MS1PM12RV-1C	-40 to +100	12 VAC	Panel	0-10 V	SPST 8(3)A		Overall IP20 Front IP54	
MS1PM230V-1C		230 VAC			SPDT 8(3)A			
MS1DR230V-1C		230 VAC	DIN rail		SPST 8(3)A		IP20	

European product catalogue 2017

Multi-stages control devices

MS line

Oredering information

MS2 two-stage control

Codes	Range	Power supply	Enclosure	Input	Output rating 250 VAC	Protection class	Additional features
					Each stage (1-2)		
MS2PM12RT-1C		12 VAC/DC	Panel		SPST 8(3)A	Overall IP20 Front IP54	
MS2DR230T-1C	-40 to +70 °C	230 VAC	DIN rail	A99 sensor (incl.)	SPST 8(3)A	IP20	• Accuracy: ±1 °C • Power Consumption: 2 VA 50/60 Hz
MS2DR48DT-1C		12-24 VAC/DC 48 VDC			SPDT 8(3)A		
MS2PM12RV-1C	-40 to +100	12 VAC	Panel	0-10 V	SPST 8(3)A	Overall IP20 Front IP54	
MS2DR230V-1C		230 VAC	DIN rail		SPST 8(3)A	IP20	

MS4 four-stage control

Codes	Range	Power supply	Enclosure	Input	Output rating 250 VAC	Protection class	Additional features
					Each stage (1 to 4)		
MS4PM12RT-1C		12 VAC/DC	Panel		SPST 8(3)A	Overall IP20 Front IP54	
MS4DR230T-1C	-40 to +70 °C	230 VAC	DIN rail	A99 sensor (incl.)	SPST 8(3)A		• Accuracy: ±1 Unit • Power Consumption: 2 VA 50/60 Hz
MS4DR48T-1C		12-24 VAC/DC 48 VDC			SPDT 8(3)A	IP20	

280
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Pressure transducer

P499

Electronic pressure transducer

The P499 series is a new global pressure transducer with an excellent price performance ratio.

The P499 exceeds the latest industrial CE/UL requirements including surge protection, and is over voltage protected in both positive and reverse polarity.

The P499 is designed to produce a linear analogue signal based on the sensed pressure.

The pressure port is machined from a solid piece of 17-4PH stainless steel. There are no O-rings or welds that are exposed to the pressure media.

This results in a leak proof ,all metal sealed pressure system which withstand more than 10 million pressure cycles without failure.

Features

▶ Single-piece machined steel pressure port
▶ Environmentally sealed electronics
▶ Reliable, repeatable performance and long operating life
▶ Slender body design
▶ Available in several pressure ranges up to 50 bar.

Shielded cable female
Dimensions in mm

Hirchman female
Dimensions in mm

Packard female
Dimensions in mm

281
European product catalogue 2017
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Pressure transducer

P499

Ordering information

2 meter cable connections models

Codes	Press. connection	Output
P499ABS-401C	Male	
P499ABS-404C		
P499ACS-401C		0.4 to 20 mA
P499ACS-404C	Female	
P499ACS-405C		
P499VBS-401C	Male	
P499VBS-404C		
P499VCS-401C		DC 0 V – 10 V
P499VCS-404C	Female	
P499VCS-405C		

Hirschmann DIN connector

Codes	Press. Connection	Output
P499ABH-401C	Male	
P499ABH-402C		
P499ABH-404C		0.4 to 20 mA
P499ACH-401C		
P499ACH-402C		
P499ACH-404C	Female	
P499RCH-401C		0.5 – 4.5 V
P499RCH-404C		
P499VBH-401C	Male	
P499VBH-404C		0 – 10 V
P499VCH-401C	Female	
P499VCH-404C		

Packard connector

Codes	Press. Connection	Output
P499ACP-401C		
P499ACP-402C		
P499ACP-403C		0.4 to 20 mA
P499ACP-404C		
P499ACP-405C	Female	
P499RCP-401C		
P499RCP-402C		0.5 – 4.5 V
P499RCP-404C		
P499RCP-405C		
P499VCP-404C		0 – 10 V

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Leak Detectors

The JCI product range offers Leak Detectors (in order to comply to the EU F-gas Directive) for the following gases:
▶ Ammonia (NH3)
▶ Synthetic refrigerants HFC (R134a, R410a etc) as shown in this catalogue
▶ Carbon dioxide (CO2)
▶ Hydro Carbons (R290, R600)

The MPU multi point units need to be used in combination with the MP series of detectors.
The GD/GS series of detectors are standalone detectors and have 3 alarm relays that are factory calibrated depending on the gas type.

Factory-set alarm levels (by experience appropriate alarm levels and ranges)

Detector type	Range	Alarm levels
NH3-1000	0-1000 ppm	150 / 300 / 500 ppm
NH3-4000	0-4000 ppm	150 / 300 / 3000 ppm
NH3-10000	0-10000 ppm	500 / 3000 / 8000 ppm
HFC	0-4000 ppm	100 / 1000 / 2000 ppm
CO2	0-10000 ppm	2000 / 5000 / 8000 ppm
Flammable / explosive gas	0-40% LEL	5 / 10 / 20% LEL

Codes	Model	Details	
	GD	· Room mounting · Ambient temperature: -40 °C..+50 °C · Humidity: 0..95% Rh (non condensing) · IP21	
GD24-HFC-4000		0-4000 ppm, 12..24V AC/DC, max 2 W	
GD230-HFC-4000		0-4000 ppm, 230V AC, max 2 W	
	GS	· Splash proof, room mounting · Ambient temperature: -40 °C..+50 °C · Humidity: 0..95% Rh (non condensing) · IP54	
GS24-HFC-4000		0-4000 ppm, 12..24V AC/DC, max 2 W	
GS230-HFC-4000		0-4000 ppm, 230V AC, max 2 W	
	MP-D	· Room mounting · Ambient temperature: -40 °C..+50 °C · Humidity: 0..95% Rh (non condensing) · IP21	
MP-D-HFC-4000		0-4000 ppm	**38-220**
	MP-DS	· Splash proof, room mounting · Ambient temperature: -40 °C..+50 °C · Humidity: 0..95% Rh (non condensing) · IP54	
MP-DS-HFC-4000		0-4000 ppm	**38-420**
	MPU	· Ambient temperature: 0 °C..+50 °C · Humidity: 10..95% Rh (non condensing) · IP66	
MPU2C		2 channels, 230V AC / 24V DC, max 10 W	**20-310**
MPU4C		4 channels, 230V AC / 24V DC, max 10 W	**20-300**
MPU6C		6 channels, 230V AC / 24V DC, max 10 W	**20-305**
---		Custom preset alarm levels. Price per channel/detector	**60-300**

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P599 Industrial Pressure Transducer

The new P599 Pressure Transducer series with piezoresistive technology has a rugged construction and is specially designed to withstand harsh environments.

- Stainless Steel diaphragm and housing
- Special Protection against pressure spikes in the pressure port
- 50% smaller and lighter than our P499 series
- Pressure range up to 160 bar for CO_2 application
- ATEX approved for applications with flammable Refrigerants like R290
- Hermetical sealed construction
- Complete portfolio available

P598 OEM Pressure Transducer

The new P598 Pressure Transmitter series is specially designed for high volume OEM production without any concession on quality and performance.

- Price attractive solution for high volume production
- Pressure range up to 50 bar
- New Innovating MEMS technology
- Very compact
- Better performance at a lower cost

P77X / P78X
Adjustable Pressure Switch series

This new pressure switch series addressing the need from the market for Refrigeration system switches that can operate with Hydro-Carbons like R290.

- Atex approved for R290 applications
- Robust Aluminum housing IP54
- PED certified
- High Pressure Model: P77XAAW-18500
  Low Pressure Model: P77XAAW-18000
  High-Low Pressure Model: P78XLCW-18000

QREV Quick Reaction Electronic Expansion Valve

The QREV modulated the refrigerant flow into the evaporator according to the most optimum Super-Heat value.
The valves is controlled by the Precise Super Heat Controller in a closed loop system.

- Capacity up to 100kW (Refrigerant R410a)
- Very compact Design
- Quick Response time (0,25 msec from close to open)
- Closed Loop Control
- Innovating MEMS technology
- Direct TXV or EEV replacement
- High Reliability

PSHC Precise Super Heat Controller

The PSHC is a direct mount controller that measures the Refrigeration Pressure and Temperature and calculate the correct super heat control signal for the QREV valve.

- Super Heat Controller for the QREV valve
- Real Time controller
- Very compact direct mount design
- RS485 serial bus with Modbus RTU protocol
- Integrated pressure and temperature sensor
- Upgradable as new Refrigerants are released
- Standard loaded with 17 different refrigerant types
- Very price competitive solution

Virtual Branch eCatalogue
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Johnson
Controls

Security products
P2000

P2000 SMS

P2000 Security Management System

Version 3.14

The Johnson Controls® P2000 Security Management System (SMS) represents the latest technology in integrated security solutions. Using Microsoft® Windows® Operating Systems (OSs), users can easily configure and use the P2000 software. An underlying Microsoft SQL Server™ database engine offers high performance without high overhead. The enhanced graphical user interface (GUI) provides operators access to interactive real-time facility maps featuring dynamic icons, to monitor and control major facility systems and functions. Authorized operators can create cardholder records, define hardware components, and control access using badging, Closed Circuit Television (CCTV), Digital Video Recorders (DVR), area control, mustering, and elevator control to name a few, as well as monitor local and remote transactions and alarm activity in real time.

The version 3.14 enables the advanced Web User HTLM5 interface through: Geo location mapping, Case management, ONVIF Video viewer and Alarm management options. Scalable, the P2000 is available in three editions: Express, Professional and Corporate.

COMMON OPTIONS to all P2000 editions

- ▶ Map for real time monitoring
- ▶ Alarm management + response
- ▶ Cardholder management
- ▶ Web visitor management
- ▶ Cardholders DB sharing (MIS)
- ▶ Security threat levels
- ▶ Area control
- ▶ Hour on site reporting
- ▶ Evacuation control (Mustering)
- ▶ Guard tour
- ▶ Elevators low level interface
- ▶ Cabinet control
- ▶ BAS integration (METASYS)
- ▶ P2000 VMS integration

EXPRESS EDITION
main feature and Integration options

- ▶ 1 workstation, 32 doors and 10.000 cardholders
- ▶ P2000 VMS integration
- ▶ Other video system integration
- ▶ Video badging station option
- ▶ HID® Edge EVO® / Assa Abloy® Aperio® options
- ▶ Intercom option
- ▶ Fire / Intrusion OPC Options
- ▶ Server Virtualization (HA) option
- ▶ Advanced HTLM5 web User Interface
- ▶ Mobile application for Apple iOS® and Android®

PROFESSIONAL EDITION
adds to express the following features

- ▶ Up to 5 Workstations, 128 doors
- ▶ 25.000 cardholders
- ▶ DB partitioning
- ▶ Archive report server options
- ▶ Elevators option
- ▶ Enterprise (WAN Participant)

CORPORATE EDITION
adds to professional the following features

- ▶ 5 workstations upgradable to 40
- ▶ 25.000 cardholders upgradable to 10 millions
- ▶ Up to 2.048 doors
- ▶ Enterprise (WAN central site)
- ▶ FDA Cfr 21 P11 option for pharmaceutical ind.

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P2000 SMS

P2000 Security Management System

Ordering information

Codes	Description
P2K-SW-EXP314	P2000 Express up to 32 readers, 1 user client and up to 10 K cards
P2K-SW-PRO314	P2000 Professional 128 readers, 5 client user max, 25 K cards
P2K-SW-COR314	P2000 Corporate 2.048 readers, from 5 to 40 clients and from 25 K to 10 ML cards
Corporate software options	
P2K-SW-C25K314	Upgrades the Corporate Edition cardholder database capacity by 25,000 cardholder records. Available in increments of 25,000.
P2K-SW-5USR314	Upgrades the Corporate Edition to allow an additional 5 concurrent user connections. Available in increments of 5.
P2K-SW-ENT314	P2000 Enterprise Access Management option. This option enables two or more existing P2000 installations to form an enterprise system. One P2K-SW-ENT313 required for each participating P2000. Central site must be a Corporate Edition system.
P2K-SW-CGTRK314	P2000 Change Tracking option for Food and Drug Administration (FDA) Title 21 Code of Federal Regulations (CFR) Part 11 compliance.
Corporate and professional software options	
P2K-SW-ARS314	P2000 Archive Report Server software option
P2K-ELV-CMPS314	P2000 Otis® Compass® destination elevator system interface
P2K-ELV-KONE314	P2000 KONE® high-level elevator IP system interface
P2K-ELV-OTIS314	P2000 Otis EMS high-level elevator serial system interface
P2K-ELV-TK314	P2000 ThyssenKrupp high-level elevator serial interface
P2K-SW-ENT314	P2000 Enterprise Access Management option. This option enables two or more existing P2000 installations to form an enterprise system. One P2K-SW-ENT313 required for each participating P2000. Central site must be a Corporate Edition system.
All editions software options	
P2K-DV-AVGN314	P2000 Avigilon® Control Center VMS integration option
P2K-DV-CISCO314	P2000 Cisco Video Surveillance Manager option
P2K-DV-BVMS314	P2000 Bosch® VMS integration option
P2K-DV-GNTEC314	P2000 Genetec® integration option
P2K-DV-MILE314	P2000 Milestone XProtect® integration option
P2K-DV-NICE314	P2000 NICE® integration option
P2K-DV-NXTVA314	P2000 Verint® Nextiva® integration option
P2K-DV-ONSSI314	P2000 OnSSI® integration option
P2K-DV-PAN314	P2000 Panasonic® integration option
P2K-DV-RPEYE314	P2000 Honeywell® Rapid Eye® integration option
P2K-DV-XPRT314	P2000 Pelco® X-portal integration option
P2K-P-EDGE314	P2000 HID Edge® and Edge EVO (1 license every 8 readers)
P2K-P-MERC314	P2000 Authentic Mercury panel interface option
P2K-P-ASSA314	P2000 ASSA ABLOY IP controller interface (8 readers)
P2K-IA-GE314	P2000 OPC intrusion interface (Europe only)
P2K-FA-NOTE314	P2000 OPC fire interface (1 connection – Europe only)
P2K-CS-SIA314	P2000 SIA interface to Bosch D6600 (1 connection)
P2K-INT-CMD314	P2000 Commend® intercom interface
P2K-INT-ZEN314	P2000 Zenitel intercom interface

Note
* New Options introduced by Version 3.14

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Johnson Controls

P2000 controllers

S321-IP

Dual door network controller

The S321-IP is an advanced, intelligent, network controller capable of monitoring and controlling one or two fully-configured doors for small-to-large security installations.

The S321-IP can be used as a standalone device, with all cardholders and configuration data saved locally at the controller, or can be seamlessly integrated with the P2000. S321-IP host communications use a standard TCP/IP network protocol and are easily integrated into the P2000 Security Management System.

The controller can be programmed either from its own user interface from any network-connected computer and standard browser, or through the P2000 interface.

The S321-IP controller can store locally up to 5.000 cardholders and manage 40 holidays and 64 time zones.

Features

▶ Interfaces to one or two readers
▶ 8 inputs, 4 outputs
▶ Four-state (supervised) inputs and two-state (unsupervised) inputs
▶ Up to 5,000 cardholder badges
▶ 4 MB flash memory
▶ 10/100Base-T network connection
▶ Up to 128-bit badge numbers, 2 schedules per badge
▶ RTC with 40 holidays and 64 schedules
▶ Can be updated remotely using File Transfer Protocol (FTP)
▶ Browser-based Graphical User Interface (GUI)
▶ Expandable modular design
▶ Input voltage +12 to +24 VDC; 16 to 24 VAC
▶ Mounting: DIN rail or flat surface
▶ Dimensions: 144 x 150 x 55 mm

SPC10000-1A10 security panel assembly

Security control panel with S321-IP controller and power supply

Ordering information

Codes	Description
S321-IP	Dual door network controller
SPC10000-1A10	Security panel with S321 and power supply

SPC1000-1A10

Features

▶ S321-IP pre-assembled in a security panel
▶ Power supply: 1 module 24V@5 Amp, nominal Input: 85/240 VAC
▶ Dimensions (W x H x D): 406 x 406 x 168 mm
▶ Battery brackets for 2 x S300-BAT (12V 7Ah)
▶ Key lock and tamper switch

286
European product catalogue 2017
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P2000 controllers

CK721-A

High-speed high-traffic network controller

The CK721-A is an advanced, intelligent, network controller capable of handling high volume, high-speed traffic with host security management systems. The controller is able to perform manual and automatic control functions using add-on modules to connect readers, monitor 2- or 4-state inputs, and add output points. Communication between the CK721-A and modules is achieved via an RS485 connection.
The expandable modular design allows an unlimited number of CK721-A controllers to be connected via Ethernet. Each CK721-A can support up to 64 readers; for a total capacity of 2,048 readers in a network with the P2000 Security Management System.
CK721-A host communications use a standard TCP/IP on a 10/100Base-T network and are easily integrated into the P2000 security management system. The controller can be programmed by using its own user interface or by using the Microsoft® Windows® based P2000 interface.
Its easy integration with P2000 software allows the CK721-A to take advantage of all the P2000 software features, including alarm monitoring, history reporting, input/output linking, card and system activated events and local, central or shared operation; history and event transactions are uploaded to the host for storage and report generation.
The CK721-A/P2000 server encrypted communications provides secure network communications between the CK721-A controller and the P2000 server using the Advanced Encryption Standard (AES256).

Features
The CK721-A supports the following functional capacity:
▶ Embedded 32-bit processor
▶ 128 MB flash memory
▶ 10/100Base-T network connection, encrypted
▶ DB9 port for configuration, commissioning, and service maintenance
▶ Up to 64 readers per controller
▶ Storage capacity for up to 200,000 cardholders
▶ Supports OSDP Version 1.1
▶ Accepts up to 128-bit badge numbers
▶ 12 facility codes per reader (768 per controller)

▶ 40 holidays
▶ 64 time zones
▶ 32 access group/time zone pairs per badge
▶ Supports Wiegand® interface, proximity, magnetic stripe, smart card, most biometric readers and bar code card technologies. Custom Card engineered formats are also accepted.
▶ RS485 expansion Bus supports Reader module: S300-DIN-RDR2SA and S300-DIN-RDR8S and auxilliary I/O modules: S300-DIN-I8O4 and S300-DIN-I32O16
▶ Mounting DIN rail or Flat surface
▶ Dimensions (W x H x D): 131 x 270 x 62 mm

Expansion modules - Ordering information
Readers and I/O boards
Communication between the CK721-A and modules is achieved via an RS485 connection:

Codes	Description
S300-DIN-RDR2SA	The two-door module RDR2SA provides two doors full control connecting cards readers through Wiegand ports or via OSDP in RS485.
S300-DIN-RDR8S	The eight-door module RDR8SA provides eight doors full control connecting cards readers through Wiegand ports or via a single RS485 multidrop (OSDP).
S300-DIN-I8O4	The I8O4 module provides, on a limited footprint, up to 8 supervised inputs, plus power fails and Tamper inputs, and 2 relay plus 2 open- collector outputs.
S300-DIN-I32O16	The I32O16 module provides up to 16 supervised inputs, plus power fails and Tamper inputs, and 16 relay plus 16 open- collector outputs.

Johnson Controls

P2000 readers modules

S300-DIN-RDR2SA

2 door module

The S300-DIN-RDR2SA module provides interface control for access and security devices associated with up to two doors. The module connects up to 2 readers via Wiegand Ports or in RS485 with Open Supervised Device Protocol (OSDP) Version 1.1.

The RDR2SA provides inputs and outputs for interface and command two doors, supervised inputs for: door status, aux inputs and exit buttons. Two additional inputs are dedicated to power failure and enclosure Tamper status. Any points not used for the door can be configured as general purpose I/O points, possibly eliminating the need to purchase additional I/O modules for certain installations.

The RDR2SA provides power for the card reader hardware, and output relays for the doors. The door locking hardware is powered locally.

The RDR2SA uses standard RS485 communications and can interface the following controllers: CK722, CK721-A, and the legacy controller: CK721, CK720 and CK705.
Please note, the CK721-A using firmware versions earlier than 3.0, CK721 controllers, and CK720/705 controllers are not supported by P2000 Version 3.13 and later.

In the RDR2SA, each of the 2 door interfaces consists of:
· Wiegand® Data0 and Data1 interface or RS485 OSDP V. 1.1
· Supervised door monitor switch input, normally open or normally closed, based on wired configuration
· Supervised auxiliary input
· Supervised "request to exit" switch input, normally open
· Door strike relay, Single Pole Double Throw (SPDT)
· Alarm shunt relay, SPDT
· Red lamp driver (open collector)
· Green lamp driver (open collector)
· +12 VDC 250 mA per reader power supply

In addition, each module has the following common inputs:
· Calibration resistor input
· Supervised power fail input
· Supervised panel tamper input

Features
▶ 2 reader interfaces: 2-wire Wiegand interfaces or two RS485 bus ODSP Version 1.1.
▶ 4 open collectors for readers green and red LED indicators (max 12 VDC / 100 mA)
▶ 8 supervised inputs with calibration
▶ 4 relay (Lock+Shunt) outputs 1 A maximum, 24 VDC, 25 VA maximum
▶ Communication bus to CK controller: RS485 at 9.600 or 19.200 Baud
▶ Input voltage power 12 to 24 VDC or 16 to 24 VAC at 24 W
▶ Power to reader: 12 VDC, 250 mA (typical)
▶ Mounting specifications DIN rail or flat surface
▶ Dimensions (W x H x D): 144 x 150 x 55 mm

288
European product catalogue 2017
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P2000 readers modules

S300-DIN-RDR8S

8 door module

The S300-DIN-RDR8S module provides interface control for access and security devices associated with up to eight doors.
The module connects up to 8 readers via Wiegand Ports or in RS485 with Open Supervised Device Protocol (OSDP) Version 1.1.

The RDR8S provides inputs and outputs for interface and command each of the 8 doors, supervised inputs for: Door Status, Aux inputs and Exit Buttons. Two additional inputs are dedicated to Power Failure and Enclosure Tamper status. Any points not used for the door can be configured as general purpose I/O points, possibly eliminating the need to purchase additional I/O modules for certain installations.

The RDR8S provides power for the card reader hardware, and output relays for the doors. The door locking hardware is powered locally.

The RDR8S uses standard RS485 communications and can interface with the following controllers: CK722 and CK721-A version 3.0 and higher.
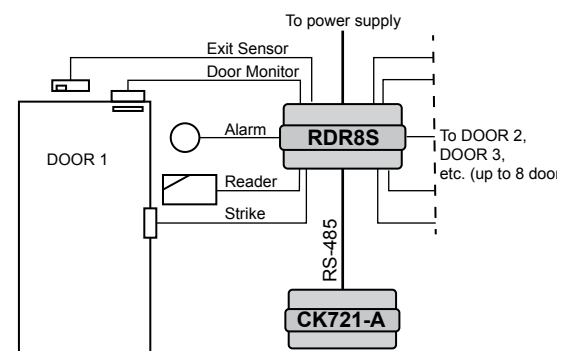
In the RDR8S each of the 8 door interfaces consists of:

· Wiegand® Data0 and Data1 interface or RS485 OSDP V. 1.1
· Supervised door monitor switch input, normally open or normally closed, based on wired configuration
· Supervised Auxiliary inputs
· Supervised "request to exit" switch input, normally open
· Supervised tamper input
· Supervised spare input
· Door strike relay, Single Pole Double Throw (SPDT)
· Alarm shunt relay, SPDT
· Red lamp driver (open collector)
· Green lamp driver (open collector)
· +12 VDC 250 mA per reader power supply

In addition, each module has the following common inputs :

· Calibration resistor input
· Supervised power fail input
· Supervised panel tamper input

Features

▶ 8 reader interface: 2-wire Wiegand interfaces or multidrop bus RS485 ODSP Version 1.1
▶ 16 open collectors for readers Green and Red LED indicators (max 12 VDC / 100 mA)
▶ 16 supervised Inputs with calibration
▶ 16 relay outputs 1 A maximum, 24 VDC, 25 VA maximum
▶ Communication bus to CK controller: RS485 at 9.600 or 19.200 Baud
▶ Input Voltage Power 12 to 24 VDC or 16 to 24 VAC at 24 W
▶ Power to reader: 12 VDC, 250 mA (typical)
▶ Mounting specifications DIN rail or flat surface
▶ Dimensions (W x H x D): 1307 x 2688 x 636 mm

289
European product catalogue 2017
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P2000 I/O modules

S300-DIN-I8O4

8 input and 4 output module

The S300-DIN-I8O4 module provides auxiliary inputs and outputs to monitor and control other systems installed in the building.

The supervised 8 inputs, 4 relays and 4 open collectors, are organized into 2 terminals. The outputs can be used for light activation or to open multiple doors in rack. Using the event process of the P2000 SMS inputs can be used for special activation or to monitor status and alarms. Two additional inputs are dedicated to Power Failure and Enclosure Tamper status.

The I8O4 uses standard RS485 communications and can interface with the following controllers: CK722, CK721-A and with legacy controller: CK721, CK720 and CK705.

In the I8O4 module each of the two I/O Terminals consists of:
- 4 supervised inputs
- 2 relay outputs
- 2 open collector outputs

In addition each module has:
- 1 calibration resistor input
- 1 supervised power fail input
- 1 supervised panel tamper input

Features
▶ 8 supervised inputs with calibration
▶ 4 relay outputs 1 A maximum, 24 VDC, 25 VA maximum
▶ 4 open collectors (max 12 VDC / 100 mA)
▶ Communication bus to CK controller: RS485 at 9.600 or 19.200 Baud
▶ Input voltage power 12 to 24 VDC or 16 to 24 VAC at 24 W
▶ Mounting specifications DIN rail or flat surface
▶ Dimensions (W x H x D): 1307 x 2688 x 636 mm

P2000 I/O modules

S300-DIN-I32O16

32 input and 16 output module

The S300-DIN-I3204 module provides auxiliary inputs and outputs to interface difference services in the plants.

The supervised 8 inputs, the 4 relay and the 4 open collectors are organized into 8 terminals. The outputs can be used for light activation or to open multiple doors in rack. Using the event process of the P2000 SMS inputs can be used for special activation or to monitor status and alarms. Other two inputs are dedicated to Power Failure and Enclosure Tamper status.

The I32O16 uses standard RS485 communications and can interface with the following controllers: CK722, CK721-A and with legacy controller: CK721, CK720 and CK705.

In the I32O4 module, each of the eight I/O Terminals consists of:

- 4 supervised inputs
- 2 relay outputs
- 2 open collector outputs

In addition each module has:

- 1 calibration resistor input
- 1 supervised power fail input
- 1 supervised panel tamper input

Features

▶ 8 supervised Inputs with calibration
▶ 4 relay outputs 1 A maximum, 24 VDC, 25 VA maximum
▶ 4 open collectors (max 12 VDC / 100 mA)
▶ Communication bus to CK controller: RS485 at 9.600 or 19.200 Baud
▶ Input voltage power 12 to 24 VDC or 16 to 24 VAC at 24 W
▶ Mounting specifications DIN rail or flat surface
▶ Dimensions (W x H x D): 1307 x 2688 x 636 mm

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P2000 SPA

Security panel assembly

Pre-wired, preassembled control panel

The Security Panel Assembly is a pre-wired, preassembled standard control panel and enclosure that contains a single or a combination of controllers and modules. These pre-designed solution save both time and money. Various models are available to accommodate a variety of common applications.

The control panel is shipped complete, mounted in a steel enclosure. The panel is equipped with the required number of 24 VDC power supplies. The power supply has Uninterruptible Power Supply (UPS) capability with the addition of factory-wired gel cell batteries (S300-BAT), which are sold separately.

These enclosures are designed specifically for security control requirements, with battery brackets that do not need to be removed to install the batteries, a lift-off door, a pre-wired door tamper switch, and a lockable door with key. Space is reserved on specific models for the addition of future components.

Ordering information

| Codes | Dimensions L x H x D (mm) | Doors (q.) | Controller | | Doors module | Power supply | Battery |
			CK721-A	S321-IP	S300-DIN-RDR2SA	S300-DIN-L-PS	S300-BAT
SPC10000-1A10	410 x 410 x 168	2	---	1	---	1	2 *
SPA10000-1A10	410 x 410 x 168	0	1	---	0	1	2 *
SPA1B100-1A10	400 x 400 x 168	2	1	---	1	1	2 *
SPB10000-1A10	400 x 400 x 168	2	---	---	1	1	2 *
SPA1B100-1B10	510 x 610 x 168	2	1	---	1	1	2 *
SPA1B200-1B10	510 x 610 x 168	4	1	---	2	1	2 *
SPA1B100-1C10	610 x 610 x 168	2	1	---	1	1	2 *
SPA1B200-1C10	610 x 610 x 168	4	1	---	2	1	2 *
SPA1B300-2C10	610 x 610 x 168	6	1	---	3	2	4 *
SPA1B100-1D10	610 x 760 x 168	2	1	---	1	1	2 *
SPA1B200-1D10	610 x 760 x 168	4	1	---	2	1	2 *
SPA1B300-2D10	610 x 760 x 168	6	1	---	3	2	4 *
SPA1B400-2D10	610 x 760 x 168	8	1	---	4	2	4 *
SPA1B400-2E10	510 x 1071 x 168	8	1	---	4	2	4 *

Note
S300-DIN-L-PS   Power Supply switching, output: 24V@5 Amp, Input: 85/240 vac
S300-BAT   Lead acid battery for security application, 12 VDC, 7 Ah - ***** Not included in the Security Panel

P2000 security enclosure

Security enclosure

Enclosures and spare parts

Panels and components can be ordered separately for field installation of security enclosures or as replacement items for Security Panel Assemblies. In addition to the complete enclosure with door, and optional mounted subpanel, we offer individual components such as battery bracket and Tamper switch kits that can be ordered separately or as spare parts.

The enclosures, designed specifically for security control requirements, come with pre-engineered and pre-mounted studs for field installation of the battery brackets, as well as standard electrical conduit knockouts.

The lift-off door comes with a lock and key.

Ordering information

SEC-ENC security enclosure

Codes	Dimensions L x H x D (mm)	Enclosure, battery brackets and Tamper switch not included	Battery brackets kit for S300-BAT
SEC-ENC1616WD	410 x 410 x 168	Security enclosure with door	Up to 1 max
SEC-ENC2024WD	510 x 610 x 168		
SEC-ENC2424WD	610 x 610 x 168		Up to 2 max
SEC-ENC2430WD	610 x 760 x 168		
SEC-ENC3042WD	760 x 1070 x 168		Up to 3 max
SEC-ENC1616WDP	410 x 410 x 168	Security enclosure with door and perforated subpanel	Up to 1 max
SEC-ENC2024WDP	510 x 610 x 168		
SEC-ENC2424WDP	610 x 610 x 168		Up to 2 max
SEC-ENC2430WDP	610 x 760 x 168		
SEC-ENC3042WDP	760 x 1070 x 168		Up to 3 max

SEC-ENC security enclosure spare parts and kits

Codes	Dimensions L x H x D (mm)	Spare parts and kits
SEC-ENC1616SDR	410 x 410 x 168	Security enclosure replacement door
SEC-ENC2024SDR	510 x 610 x 168	
SEC-ENC2424SDR	610 x 610 x 168	
SEC-ENC2430SDR	610 x 760 x 168	
SEC-ENC3042SDR	760 x 1070 x 168	
PAN-ENC1616PSP	410 x 410 x 168	Security enclosure replacement subpanel
PAN-ENC2024PSP	510 x 610 x 168	
PAN-ENC2424PSP	610 x 610 x 168	
PAN-ENC2430PSP	610 x 760 x 168	
PAN-ENC3042PSP	760 x 1070 x 168	
SEC-ENCBATBRK	---	Security enclosure battery bracket kit (kit contains brackets for two batteries)
SEC-ENCTMPRSW	---	Security enclosure Tamper switch kit

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P2000 VMS
Video Management System
Version 6.13

The Johnson Controls® P2000 Video Management System is an intelligent video security solution that offers a single, innovative, open IP video platform for video management, video analytics, system integration, and alarm management.

P2000 VMS provides a feature-rich, easy-to-use interface that installs on standard commercial-off-the-shelf hardware and software platforms, that incorporates IT-friendly features to make administration simple.

With support for hundreds of IP cameras and analog camera encoders, from several manufacturers, P2000 VMS makes it easy to find the right camera without compatibility worries.

With three software Editions the P2000 VMS has a solution for every topology and size of installation. Licensing a camera has never been so simple. P2000 VMS allows you to add licenses one at a time, limited only by the server hardware. No additional charge for servers and clients or the P2000VMS.

P2000VMS is natively integrated in the P2000 Security Management System. This allows operators to control all their security platforms from a single location, such as access control, intercom, intrusion detection, and video.

STANDARD EDITION
Single site, single server recording system
▶ Multiple web clients
▶ Low to medium camera counts
▶ Easy migration from DVN5000 or other DVR systems
▶ Mobile bridge to Android and iOS Apps option
▶ Video analytics options
▶ P2000 SMS native integration

PROFESSIONAL EDITION
Single or multisite, multiserver system
Professional includes all standard edition features and:
▶ Medium to high cameras counts
▶ Highly scalable, advanced functionality
▶ Active directory support
▶ Alarm management
▶ Server farms and virtualization
▶ Videowall management

ENTERPRISE EDITION
Multiserver with fail-over back up
Enterprise includes all Professional edition features and:
▶ Medium to very high cameras counts
▶ Redundancy and failover recording
▶ Business intelligence reports

Video Analytics included in all P2000 VMS editions are:
▶ Camera signal loss detection
▶ Camera covered, painted or moved
▶ Motion detection

LEGACY DVN5000
When a DVN unit, with firmware version 2.10 or higher, is implemented in a P2000VMS system, the driver supports Pan, Tilt and Zoom (PTZ) and I/O operation.
Images are recorded at P2000 VMS server at resolution max 4CIF and up to 30 FPS.

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P2000 VMS

Optional video analytics

The following video analytic can be added at any camera, at any time and at any of the three P2000 VMS editions.

Area alarms and restricted zones

· Area alarms or restricted zones refers to the ability to highlight multiple zones in a field of view and alert on activity in any one of them while ignoring activity in unselected areas.

Automatic license plate recognition

· Available in four and eight camera pack, this analytic provides out-of-the-box Automatic License Plate Recognition (ALPR) functionality. It can be used for parking applications. License plates and their corresponding images are stored and can be easily searched. Various alarm scenarios can be achieved by using white or black lists.

Automatic PTZ tracking

· The auto-PTZ tracking function will automatically control PTZ cameras when relevant activity or a rule- break is detected.

Dwell time and loitering

· The loitering/dwell time function recognizes how long a particular target stays in a defined field of view. In security applications, this analytic can help with identifying potential threat by detecting loitering people or vehicles. It support business intelligence.

Item left behind and removed detection

· The left/removed item function alerts on background image changes due to new or removed objects in the field of view.

Motion tracking

· The motion tracking function compares relevant pixel changes between images and alerts on relevant foreground motion while ignoring irrelevant motion.

Object classification

· The object classification functionality is able to segment objects between people, vehicles and unknown objects.

People and vehicle counting

· The counting functionality counts objects entering and leaving a field of view or crossing a virtual fence. This analytic is great for tracking attendance in large venues and counting vehicles in parking garages.

Virtual fence and tripwire

· A virtual fence refers to an invisible digital fence or tripwire that can send an alert when an object crosses in one or both directions. Especially useful in perimeter security.

Wrong direction

· The wrong direction function will alert on motion going against the specified flow of traffic.

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P2000 VMS

Video Management System

Feature summary

Notification

	Standard	Professional	Enterprise
E-mail notification	•	•	•
Android and Apple smartphones or tablets	Add on	Add on	Add on

Video analytics

	Standard	Professional	Enterprise
Camera loss detection (e.g. cord cut)			
Camera obstructed/moved (scene change)	•	•	•
Basic Video Motion Detection (VMD)			
Indoor people tracking			
Outdoor people and vehicle tracking			
Left and removed item detection			
Left and removed item detection with	Add on	Add on	Add on
Outdoor automatic PTZ tracking			
Automatic license plate recognition			

Client features

	Standard	Professional	Enterprise
Supported operating system	Windows 7, 8, and Server 2008+ (32 or 32 bits)		
Number of concurrent server connections	Unlimited	Unlimited	Unlimited
Customizable user interface			
Graphical timeline			
View multiple timelines			
Hierarchical site map navigation			
Camera list navigation			
Cameras from multiple servers and sites			
Multi-monitor support			
Camera sequence			
Panoramic (360-degree) support	•	•	•
Manually trigger outputs			
Integrated messenger			
Alarm console			
Video export			
Bookmark events			
Integrated alarm log			
Integrated remote support module			

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P2000 VMS

Video Management System

Features summary

Difference between the three P2000 VMS Editions

	Standard	Professional	Enterprise
Max cameras per server	Unlimited *	Unlimited	Unlimited
Max servers per system	1	Unlimited	Unlimited
Server redundancy	---	---	•
Failover recording	---	---	•
Redundant recording	---	---	•
Edge storage (failover)	•	•	•
Active directory support	---	•	•
Prevent concurrent user logons	---	•	•
Supervisor logon mode	---	•	•
Map	•	•	•
Video wall	---	---	Add-on
Mobile client	Add-on (Mobile Bridge Server)		
Web client	•	•	•
Alarm management	•	•	•
3rd party access control integration	---	•	•
2-way audio	•	•	•
Multicast video	•	•	•
Dynamic stream switching	•	•	•
Client side 360 dewarp **	•	•	•
Camera support	More than 30 Brands + ONVIF		

Note
* Depending on server hardware capability, it can be limited up to 300 cameras.
**Dewarp supports 360 degree cameras

Management features	Standard	Professional	Enterprise
Automatic camera detection	•	•	•
Centralized device management	•	•	•
Automatic configuration backups	•	•	•
Uninterrupted configuration changes	•	•	•
Remote diagnostics	•	•	•
SNMP health monitoring	---	•	•
CPU overload protection	---	•	•
Guard tours	•	•	•
Manual control	•	•	•
Preset on event	•	•	•
OPC option	---	•	•

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P2000 VMS

Features summary

Client features

	Standard	Professional	Enterprise
Multilanguage *			
Manual movement control			
Point and click control			
Zoom on marked area			
Go to preset positions	•	•	•
Joystick support			
Customizable multi-camera layouts			
Configurable display options (fixed)			
Configurable display options (motion)			
Configurable display options (alarm)			

User access to clients

	Standard	Professional	Enterprise
Microsoft active directory integrated	---		
User monitoring			
Permissions per user	•	•	•
Permissions per user group			
Security profiles			
Support for cross domain authentication	---		

Reports

	Standard	Professional	Enterprise
Login report			
Alarm counts and statistics	•	•	•
Object count reports (e.g. people, vehicles)			
Heat map, report with highest and lowest traffic areas			

Note
* Supported languages: English, French, Spanish, Portuguese and German (partial)

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P2000 VMS

Ordering information

P2000 Video Management Software standard edition

Codes	Description
P2K-SV-SL-S	Standard edition license per video channel
P2K-SV-EU-SP	Edition upgrade – Standard to Professional
P2K-SV-EU-SE	Edition upgrade – Standard to Enterprise
P2K-VU-S	Version upgrade – Standard edition

P2000 Video Management Software Professional edition

Codes	Description
P2K-SV-SL-P	Professional edition license per video channel
P2K-SV-EU-PE	Edition upgrade – Professional to Enterprise
P2K-VU-P	Version upgrade – Professional edition

P2000 Video Management Software Enterprise edition

Codes	Description
P2K-SV-SL-E	Enterprise edition license per video channel
P2K-VU-E	Version upgrade – Enterprise edition

P2000 Video Management System options

Codes	Description
P2K-VW	Video Wall license for Enterprise or Professional edition
P2K-MBS	Mobile Bridge license suitable to any editions

Software License – Video Analytics (VA)

Codes	Description
P2K-VA-01	Indoor people tracking. This analytic is used indoors for a variety of applications such as area alarm and restricted zone, people counting, dwell (loitering) detection, motion detection and tracking, virtual fence (trip wire) and wrong direction detection.
P2K-VA-02	Outdoor people and vehicle tracking license per camera. This analytic is used outdoors for applications such as object classification (people/vehicle/others), area alarm and restricted zone, dwell (loitering) detection, motion detection and tracking, virtual fence (trip wire), and wrong direction detection.
P2K-VA-03	Left and removed item detection used to detect items left and removed in a user defined alarm area.
P2K-VA-04	Left and removed Item detection with indoor people tracking combines P2K-VA-03 features with P2K-VA-01.
P2K-VA-05	Outdoor automatic PTZ tracking license per device automatically tracks moving objects using a PTZ camera. Includes P2K-VA-02.
P2K-VA-06	Automatic license plate recognition license per 4 cameras used to detect vehicle license plates. Also includes P2K-VA-02.
P2K-VA-07	Automatic license plate recognition license per 8 cameras used to detect vehicle license plates. Also includes P2K-VA-02.

Note
Licenses are per video channel.
Video Analytics can be added at any P2000 VMS Software editions.

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