



PRESSURE INDEPENDENT CONTROL VALVE

Maple Energy FIT-MP System
Energy-Saving Pressure Independent
Temperature Control System

DN15-50 / 1/2"-2"



SPECIFICATIONS

Maple PICV valve:

Static pressure	: 2500 kPa / 360 psi
Ambient temperature	: +1°C to +50°C / +34°F to +122°F
Media temperature	: -20°C to +120°C / -4°F to +248°F
Material:	
- Housing and cover/headnut	: DN15-32 (1/2"-1 1/4"): Forged brass ASTM CuZn40Pb2 or DZR CuZn36Pb2As DN40-50 (1 1/2"-2"): Forged brass ASTM CuZn40Pb2 or Ductile iron ASTM A395 Grade 60-40-18
- Composite components	: Glass-reinforced PSU/POM/PPS
- Metal components (internal)	: Stainless steel
- O-rings	: EPDM
- Cone	: DN15-32 (1/2"-1 1/4"): PPS
- Seats	: DN40-50 (1 1/2"-2"): EDPM
- Diaphragm	: DN15-25 (1/2"-1") with 20 mm (3/4") insert: EPDM DN25-32 (1"-1 1/4") with 40 mm (1 1/2") insert: Hydrogenated acrylonitrilebutadiene-rubber
DN40-50 (1 1/2"-2") (one-unit)	: Hydrogenated acrylonitrile-butadiene-rubber
Stroke	: DN15-25 (1/2"-1") with 20 mm (3/4") insert: 3.4 mm / 0.13 in DN25-32 (1"-1 1/4") with 40 mm (1 1/2") insert: 5.2 mm / 0.2 in DN40-50 (1 1/2"-2") (one-unit): 6.2 mm / 0.24 in
Maximum close off pressure	: 800 kPa / 116 psi
Maximum operational ΔP	: DN15-32 (1/2"-1 1/4"): 800 kPaD / 116 psid DN40-50 (1 1/2"-2"): 600 kPaD / 87 psid
Control characteristic	: Linear flow
Control range	: 1:800 / IEC 60534
Rangeability	: 100:1
Turn down ratio	: 100:1
Shut-off leakage	: ANSI / FCI 70-2 2006, Class IV / IEC 60534-4, Class IV
Flow rate range	: 0.0103-3.79 l/sec / 0.163-60.0 GPM
End connection ¹	: Fixed female ISO or NPT
Body taps	: 1/4" ISO

Note 1: NPT only available ex. US-factory.



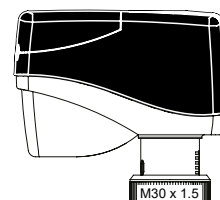
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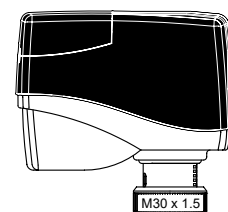
SPECIFICATIONS (...continued)

Maple PICV Actuator:

Maple Actuator ²	MFN.0.2	MFN.1.2	MFH	MFH.1
Supply voltage	24V AC/DC $\pm 10\%$, 50/60Hz			
Type	Electrical, bi-directional synchronous motor			
Power consumption	AC: 2.5VA operating (4.7VA max) DC: 1.2W operating (2.2W max)	AC: 5.8VA operating (6.8VA max) DC: 2.9W operating (3.3W max)	AC: 6VA operating (8.5VA max) DC: 2.6W operating (4.1W max)	AC: 7.9VA operating (9VA max) DC: 3.7W operating (4.5W max)
Control signal	Analog 2-10V DC, <0.5mA			
Feedback	Yes, control signal			
Failsafe function	No	Yes	No	Yes
Auto stroke	Yes			
Operation time	max 22 sec/mm	max 22 sec/mm (failsafe: 5sec/mm)	max 22 sec/mm	max 22 sec/mm (failsafe: 5sec/mm)
Ambient temperature	0°C to +50°C / +32°F to +122°F			
Media temperature	0°C to +120°C / +32°F to +248°F			
Humidity rating	0..85% rH, no condensation			
Protection	IP54 including upside-down, class III, indoor use only			
Cable	Fixed, 5 wires x 0.50mm ² , 1.5 meter / 5 wires x AWG20, 4.9 ft			
Closing point detection	Yes			
Weight	0.25 kg / 0.55 lb	0.27 kg / 0.60 lb	0.30 kg / 0.67 lb	0.34 kg / 0.75 lb



Maple MFN.0.2/1.2



Maple MFH/MFH.1

Note 2: Maple warranty is voided using other actuators than supplied by Maple

Maple Intelligent Interface:

Supply voltage : 24V AC/DC

Power consumption : 4W

Cable : 3 groups:

Group 1: fixed, 1 wire with quick-connector, 3 meter / 9 ft (T1)
fixed, 1 wire with quick-connector, 1 meter / 3 ft (T2)
fixed, 3 wires, 0.6 meter / 2 ft (analogue actuator communication)

Group 2: fixed, 2 wires 0.6 meter / 2 ft (power and ground)
fixed, 3 wires 0.6 meter / 2 ft (BACnet BMS communication)

Group 3: fixed, 1 wire with quick-connector, 1 meter / 3 ft (P1)
fixed, 1 wire with quick-connector, 1 meter / 3 ft (P2)
fixed, 3 wires, 0.6 meter / 2 ft (BACnet actuator communication -not in use on Maple FIT-MP)

Communication standard : RS485

Control signal : 2-10V DC

Output signal : 2-10V DC

Humidity rating : 5..95% rH, no condensation

Protection : IP54 including upside-down mounting

Housing material : UL94 V0-rated plastic

CE conformity : Yes

BACnet device profile : BACnet Application Specific Controller (B-ASC) type server

BACnet protocol : BACnet Master Slave/Token passing (MS/TP)

BACnet baud rates supported: 9600, 19200, 38400, 57600, 76800 and 115200

BACnet services (BIBBS) supported: DS-RP-B, DS-WP-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DS-RPM-B and DM-RD-B



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SPECIFICATIONS (...continued)

Temperature sensors (T1 and T2):

Supply voltage	: NA
Cable	: No cable, but with quick-connector
Signal output	: Resistive
Media temperature	: -20°C to +120°C / -4° to +248°F
Working pressure	: 40 bar / 580 psi
Housing material	: 304 stainless steel
Protection	: IP65
Probe length	: 12.7 mm / 0.5 in
Probe diameter	: 6 mm / 0.236 in
CE conformity	: Yes
Connection	: 1/4" ISO

Performance data:

- Sensor type	: PT1000
- Accuracy	: 0.5% FS (Full Scale)
- Linearity	: ±0.5% FS (Full Scale)
- Long time stability	: 0.1% FS (Full Scale)
- Response time: at 50°C (122°F)	: 2.3 sec / at 90°C (194°F): 5.4 sec.

Pressure sensors (P1 and P2):

Supply voltage	: 12V DC
Cable	: No cable, but with quick-connector
Output	: 4-20mA
Media temperature	: -10°C to +85°C / 14°F to +185°F
Pressure range ³	: 0-25 bar / 0-360 psi
Housing material	: 304 stainless steel
Protection	: IP65
CE conformity	: Yes
Connection	: 1/4" ISO

Performance data:

- Accuracy	: ±1.5% FS (Full Scale) (tolerances can be software compensated in the Maplef Intelligent Interface)
- Stability	: 0.5% FS (Full Scale) ±0.05%
- Thermal effect on zero	: ±0.1% FS (Full Scale)
- Thermal effect on span	: ±0.05% FS (Full Scale)
- Electronic proof	: Short circuit protection
- Response time	: <20 msec (20 sec mean value calculated in the Maplef Intelligent Interface)

Note 3: Calibrated at factory at 24V DC



PRESSURE INDEPENDENT CONTROL VALVE

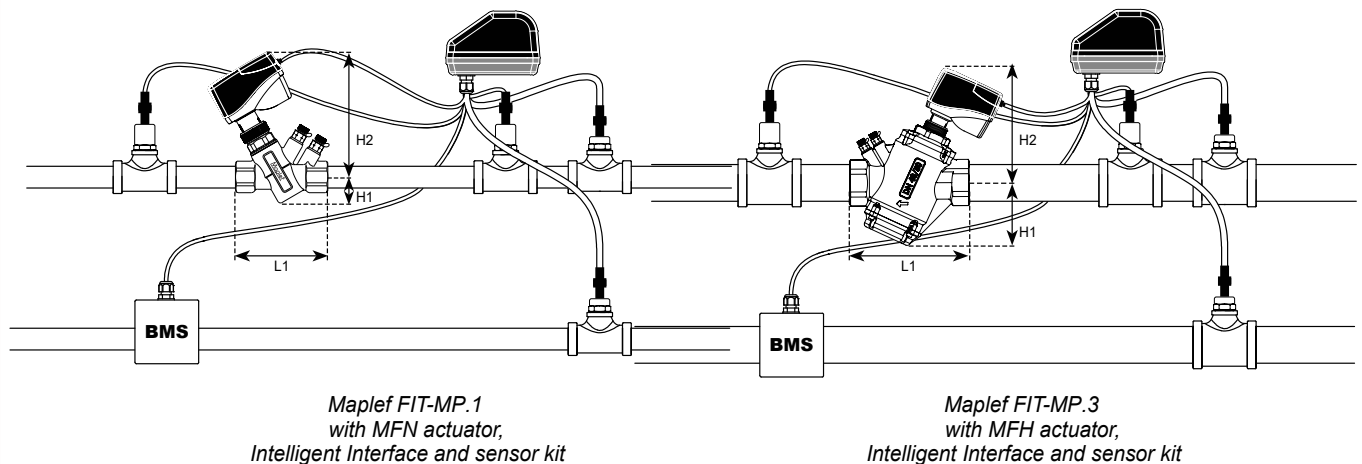
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DIMENSIONS AND WEIGHTS (NOMINAL)

Model No	Valve Size mm (in)	PICV Valve			Weight4 kg (lb)
		L1 mm (in)	H1 mm (in)	H2 mm (in)	
FITMP.x.15.x.x.2	15 (1/2)	81 (3.19)	31 1.22)	124 (4.88)	1.51 (3.33)
FITMP.x.20.x.x.2	20 (3/4)	85 3.35)			1.53 (3.37)
FITMP.x.25K.x.x.2	25 (1)	102 (4.02)			1.73 (3.81)
FITMP2.25.x.x.2	25 (1)	128 (5.04)	47 (1.85)	144 (5.67)	1.70 (3.75)
FITMP.2.32.x.x.2	32 (1 1/4)				2.71 (5.97)
FITMP.3.40.x.x.2	40 (1 1/2)	191 (7.50)	100 (3.94)	195 (7.67)	5.30 (11.7)
FITMP.3.50.x.x.2	50 (2)				4.80 (10.6)

Note 4: Weight includes PICV valve (brass), PICV actuator non-failsafe, Intelligent Interface and sensor kit.





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MODEL NUMBER SELECTION

FITMP

Control range:

0	=	16-600 kPaD / 2.3-87 psid (for size DN15/20/25, 1/2"-1")
1	=	30-800 kPaD / 4.4-116 psid (for size DN15/20/25, 1/2"-1")
2	=	16-800 kPaD / 2.3-116 psid (for size DN25/32, 1"-1 1/4")
3	=	16-600 kPaD / 2.3-87 psid (for size DN40/50, 1 1/2"-2")

Housing size and material:

15	=	DN15 / 1/2" (Forged brass)
20	=	DN20 / 3/4" (Forged brass)
25K	=	DN25 / 1" for 20 mm insert (Forged brass)
25	=	DN25 / 1" for 40 mm insert (Forged brass)
32	=	DN32 / 1 1/4" (Forged brass)
40	=	DN40 / 1 1/2" (Forged brass)
41	=	DN40 / 1 1/2" (Ductile iron)
50	=	DN50 / 2" (Forged brass)
51	=	DN50 / 2" (Ductile iron)

P/t plug requirements:

B	=	Pressure/temperature plugs (standard)
P	=	Plugs

Type of actuator:

1	=	2-10V modulating
2	=	2-10V modulating and failsafe

Sensor kit:

2	=	PICV valve, pressure/temperature sensor kit, Bluetooth® and ΔT control
3	=	PICV valve, temperature sensor kit, Bluetooth® and ΔT control

2 wall brackets included (standard)

Example:

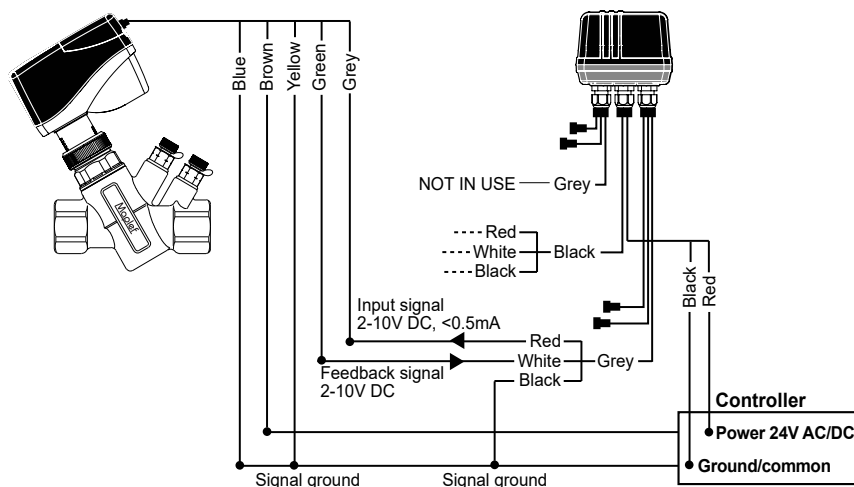
FITMP.1.15.B.1.2 = Maplef Energy FIT-MP System DN15 (1/2"), 30-800 kPaD (4.4-116 psid) with p/t plugs and 2-10V modulating actuator, pressure/temperature sensor kit, Bluetooth® and ΔT control incl. 2 wall brackets.

For **NPT threaded solution**, please add "N" at the end of the model number.

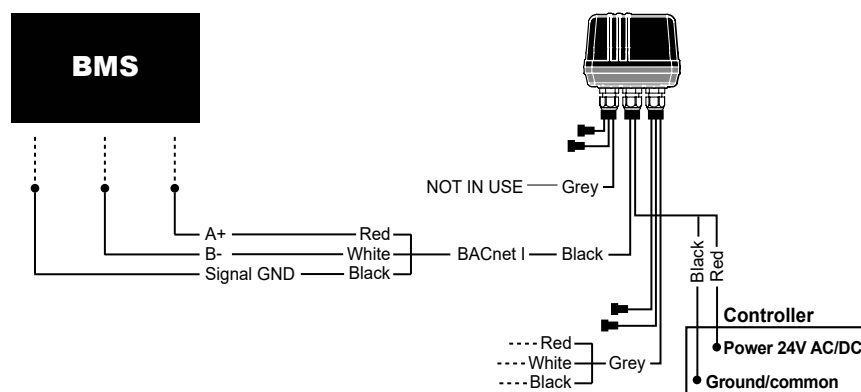


DN15-50 / 1/2"-2"

Maplef Intelligent Interface



Maplef Intelligent Interface





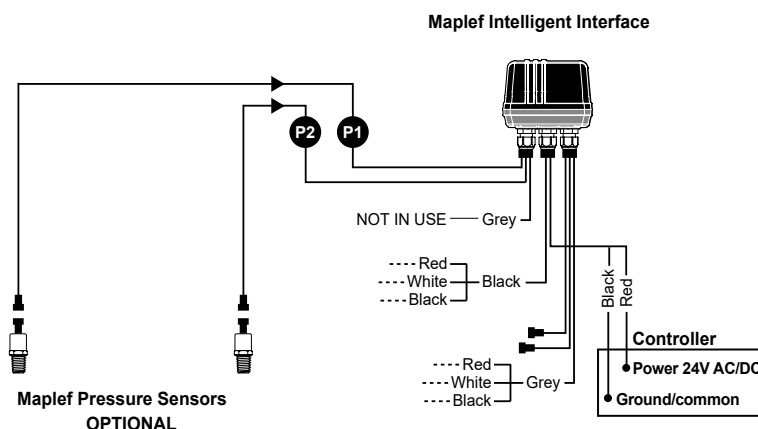
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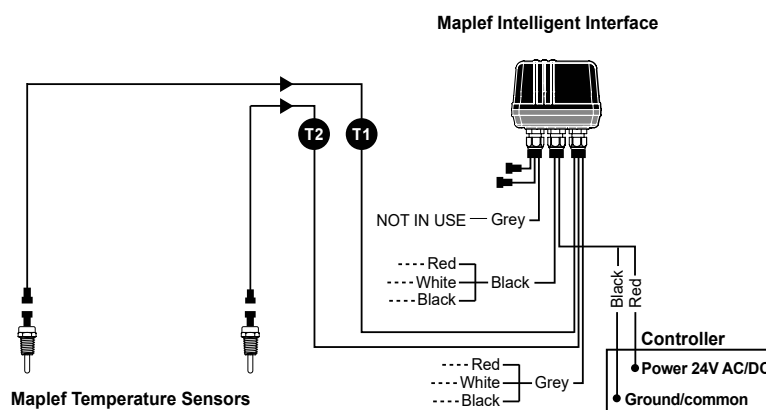
DN15-50 / 1/2"-2"

WIRING INSTRUCTION

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DESCRIPTION

The Maple Energy FIT System measures energy usage while monitoring coil performance to adjust a PICV to optimize coil performance. The PICV maintains the correct flow despite pressure changes and guarantees the flow and actuator position only change when demand requirements change or ΔT is outside of specification.

The pressure sensors measure upstream and downstream pressure allowing the BMS to reduce system pressure to save pump energy when pressure drop is higher than the PICV's requirements.

The Maple Intelligent Interface calculates the BTU and displays the data via Bluetooth® on an Android or iPhone mobile device or sends it back to the BMS via BACnet communications.

The Maple Energy FIT System is fully customizable and allows selection of components that work best to optimize the application's unique energy goals.



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FLOW RATE SETTING - VALVE SIZE DN15-50 (1/2"-2")

Nominal flow rate	Maple FIT-MP.0 (grey o-ring)			Maple FIT-MP.1 (black o-ring)			Maple FIT-MP.2 (black O-ring)			Maple FIT-MP.3 ⁷			Setting
	Insert size: 20 mm · 3/4"			Insert size: 20 mm · 3/4"			Insert size: 40 mm · 1 1/2"			DN40-50 · 1 1/2"-2"			
	16-600 kPaD ⁵ · 2.3-87 psid ⁵			30-800 kPaD ⁶ · 4.4-116 psid ⁶			16-800 kPaD · 2.3-116 psid (at setting: 2.6)			16-600 kPaD · 2.3-87 psid			
	l/sec	l/hr	GPM	l/sec	l/hr	GPM	l/sec	l/hr	GPM	l/sec	l/hr	GPM	
	-	-	-	0.0178	64	0.282	0.240	865	3.81	0.528	1900	8.36	1.0
	0.0103	37	0.163	0.0393	142	0.624	0.282	1010	4.46	0.633	2278	10.0	1.1
	0.0233	84	0.370	0.0580	209	0.920	0.322	1160	5.10	0.738	2655	11.7	1.2
	0.0322	116	0.510	0.0743	268	1.180	0.361	1300	5.72	0.843	3033	13.3	1.3
	0.0419	151	0.664	0.0887	319	1.41	0.399	1430	6.32	0.947	3410	15.0	1.4
	0.0500	180	0.792	0.102	366	1.61	0.435	1570	6.90	1.05	3787	16.7	1.5
	0.0569	205	0.902	0.113	408	1.80	0.471	1700	7.47	1.16	4163	18.3	1.6
	0.0650	234	1.03	0.124	446	1.96	0.506	1820	8.02	1.26	4537	20.0	1.7
	0.0719	259	1.14	0.134	482	2.12	0.540	1940	8.56	1.36	4909	21.6	1.8
	0.0781	281	1.24	0.143	516	2.27	0.573	2060	9.08	1.47	5279	23.2	1.9
	0.0839	302	1.33	0.152	549	2.42	0.605	2180	9.59	1.57	5646	24.8	2.0
	0.0889	320	1.41	0.161	580	2.56	0.636	2290	10.1	1.67	6011	26.4	2.1
	0.0942	339	1.49	0.170	611	2.69	0.667	2400	10.6	1.77	6372	28.0	2.2
	0.0981	353	1.55	0.178	641	2.82	0.696	2510	11.0	1.87	6730	29.6	2.3
	0.103	371	1.63	0.186	671	2.95	0.725	2610	11.5	1.97	7083	31.2	2.4
	0.106	381	1.68	0.194	700	3.08	0.753	2710	11.9	2.06	7432	32.7	2.5
	0.109	394	1.73	0.202	728	3.21	0.780	2810	12.4	2.16	7776	34.2	2.6
	0.113	406	1.79	0.210	756	3.33	0.807	2900	12.8	2.25	8115	35.7	2.7
	0.115	414	1.82	0.218	783	3.45	0.832	3000	13.2	2.35	8449	37.2	2.8
	0.119	428	1.88	0.225	810	3.56	0.858	3090	13.6	2.44	8777	38.6	2.9
	0.122	439	1.93	0.232	835	3.68	0.882	3180	14.0	2.53	9098	40.0	3.0
	0.125	449	1.98	0.239	860	3.79	0.906	3260	14.4	2.61	9413	41.4	3.1
	0.127	458	2.02	0.245	883	3.89	0.930	3350	14.7	2.70	9721	42.8	3.2
	0.130	468	2.06	0.252	906	3.99	0.953	3430	15.1	2.78	10021	44.1	3.3
	0.133	477	2.10	0.257	927	4.08	0.975	3510	15.5	2.86	10314	45.4	3.4
	0.135	486	2.14	0.263	946	4.17	0.997	3590	15.8	2.94	10599	46.6	3.5
	0.137	494	2.17	0.268	965	4.25	1.02	3670	16.1	3.02	10875	47.8	3.6
	0.140	503	2.21	0.273	982	4.32	1.04	3740	16.5	3.10	11142	49.0	3.7
	0.142	511	2.25	0.277	998	4.39	1.06	3820	16.8	3.17	11400	50.2	3.8
	0.144	518	2.28	0.281	1010	4.46	1.08	3890	17.1	3.24	11649	51.3	3.9
	0.146	526	2.31	0.285	1020	4.51	1.10	3960	17.4	3.30	11888	52.3	4.0
	0.148	532	2.34	0.288	1040	4.57	1.12	4030	17.7	3.37	12116	53.3	4.1
	0.149	538	2.37	0.291	1050	4.61	1.14	4100	18.1	3.43	12334	54.3	4.2
	0.151	544	2.39	0.294	1060	4.66	1.16	4170	18.4	3.48	12540	55.2	4.3
	0.153	549	2.42	0.296	1070	4.70	1.18	4240	18.7	3.54	12735	56.0	4.4
	0.154	553	2.43	0.299	1080	4.73	1.20	4300	19.0	3.59	12919	56.8	4.5
	0.155	559	2.46	0.301	1080	4.77	1.21	4370	19.2	3.64	13090	57.6	4.6
	0.156	563	2.48	0.303	1090	4.80	1.23	4440	19.5	3.68	13249	58.3	4.7
	0.158	567	2.50	0.305	1100	4.83	1.25	4500	19.8	3.72	13395	58.9	4.8
	0.159	571	2.51	0.307	1100	4.86	1.27	4570	20.1	3.76	13527	59.5	4.9
	0.160	575	2.53	0.308	1110	4.89	1.29	4630	20.4	3.79	13647	60.0	5.0

Accuracy: Greatest of either ±10% of controlled flow rate or ±5% of maximum flow rate.

Note 5: If used in pressure range 200-600 kPaD (29-87 psid), accuracy of -20% / +0% applies.

Note 6: If used in pressure range 400-800 kPaD (58-116 psid), accuracy of -20% / +0% applies.

Note 7: FIT-MP.3 range recommended from setting 2.0 and up.

Maple recommends that the Maple Energy FIT System is selected to ensure that the set maximum flow rates are minimum 50% of the rated valve maximum capacity.



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BACNET FUNCTIONS

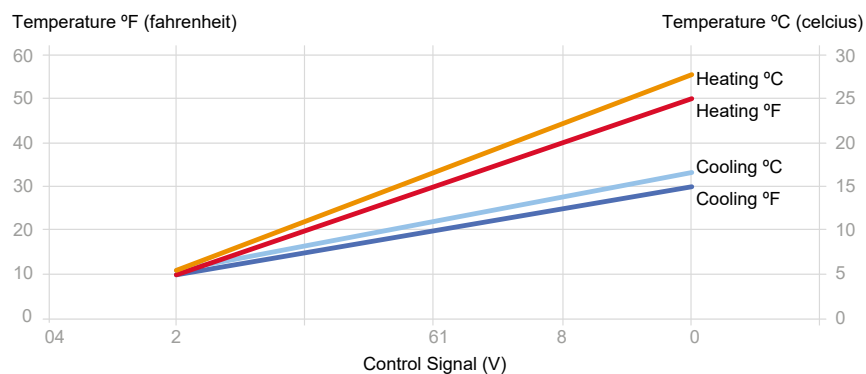
No BACnet - Interface to/from Actuator

Description	Write	Read
Current flow rate (input signal)		✓
Motor position (feedback)		✓

BACnet I - Interface to/from BMS

Description	Write	Read
Control priority (ΔT control, comfort control or smart control)	✓	✓
P1		✓
P2		✓
ΔP		✓
ΔP alarm (on/off)	✓	✓
T1		✓
T2		✓
ΔT		✓
ΔT target	✓	✓
Flow		✓
BTU (immediate)		✓
BTU accumulated (period)		✓
Room temperature	✓	✓
Room temperature target	✓	✓

CONTROL CURVE VS. ΔT





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GENERAL SPECIFICATIONS

1. PRESSURE INDEPENDENT TEMPERATURE CONTROL SYSTEM

- 1.1. Contractor shall install where indicated in drawings.
- 1.2. System shall include a Pressure Independent Dynamic Control Valve, a sensor kit and an electronic unit.
 - 1.2.1. The PICV valve shall accurately control flow independent of system pressure fluctuations.
 - 1.2.2. The sensor kit shall include 2 temperature sensors and 2 pressure sensors. Temperature sensors shall measure the ΔT across the coil and pressure sensors shall measure ΔP across the PICV.
 - 1.2.3. The intelligent interface shall accurately change PICV flow to maintain target ΔT . In addition, the electronic unit shall calculate BTU heat transfer and supply continuous information on ΔT and flow.

2. VALVE ACTUATOR

- 2.1. Actuator housing shall be rated to IP54. 360° mounting shall be acceptable.
- 2.2. Actuator shall be driven by 24V AC/DC and accept 2-10V DC control signal.
- 2.3. Actuator shall use full stroke and provide full authority.
- 2.4. Actuator shall have visible indication of stroke position.
- 2.5. Feedback signal shall be equal to control signal, 2-10V DC.
- 2.6. Optional failsafe versions shall be available.
- 2.7. Optional auto stroke function shall be available.
- 2.8. Override shall be possible.

3. VALVE HOUSING

- 3.1. Housing DN15-32 (1/2"-1 1/4") shall consist of forged brass ASTM CuZn40Pb2 or DZR CuZn36Pb2As and DN40-50 (1 1/2"-2") shall consist of forged brass ASTM CuZn40Pb2 or Ductile iron ASTM A395 Grade 60-40-18.
- 3.2. Housing shall be rated at no less than 2500 kPa (360 psi) static pressure and +120°C (+248°F).
- 3.3. Housing shall be permanently marked to show direction of flow.
- 3.4. Dual pressure/temperature test plugs for verifying accuracy of flow performance shall be standard on all valve sizes.

4. FLOW REGULATOR / AUTOMATIC BALANCING UNIT

- 4.1. Flow regulation unit shall consist of glass-reinforced PPS, PSU and POM with EPDM or HNBR diaphragm and EPDM sealings depending on size.
- 4.2. Flow regulation unit shall be adjustable with the valve in-line and the system in operating.
- 4.3. Flow regulation unit shall be externally adjustable to 1 to 41 different flow rates without limiting the stroke length; minimum range shall be capable of being activated by minimum 16 kPaD (2.3 psid) and shall be capable of controlling the flow within $\pm 10\%$ of controlled flow or $\pm 5\%$ of maximum flow.

5. INTELLIGENT INTERFACE / ELECTRONIC UNIT

- 5.1. Intelligent interface shall consist of UL94 V0-rated plastic.
- 5.2. Intelligent interface shall be rated to IP54 including upside-down mounting.
- 5.3. Intelligent interface shall be driven by 24V AC/DC.
- 5.4. Intelligent interface shall be Bluetooth® enabled.
- 5.5. Intelligent interface shall be capable of communicating via BACnet with the control system and wireless feedback signal to handheld devices. Shall communicate with both Android and iPhone devices and display via App.

6. TEMPERATURE SENSOR

- 6.1. Temperature sensors shall consist of 304 stainless steel.
- 6.2. Temperature sensors shall be IP65.
- 6.3. Temperature sensors shall provide a resistive output signal corresponding to water temperature.

7. PRESSURE SENSOR

- 7.1. Pressure sensors shall consist of 304 stainless steel.
- 7.2. Pressure sensors shall IP65.
- 7.3. Pressure sensors shall be driven by 12V DC.
- 7.4. Pressure sensors shall provide a 4-20mA output signal corresponding to water pressure.



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APPLICATION AND SCHEMATIC EXAMPLE

