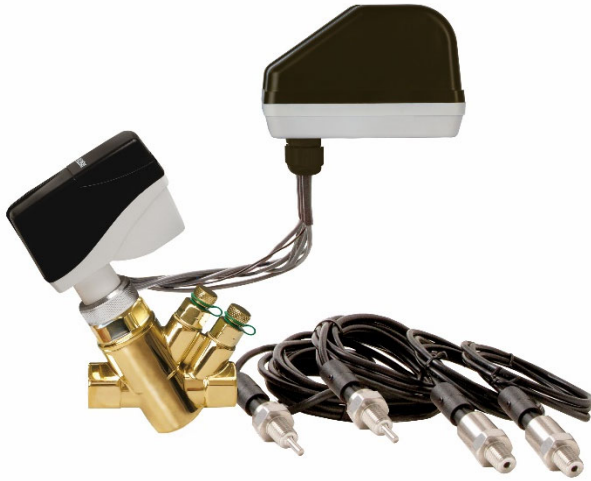


ENERGY-SAVING PRESSURE-INDEPENDENT SYSTEM WITH BACNET



The *EPIC System* measures energy usage while monitoring coil performance to adjust a Pressure Independent (PI) Control Valve to optimize coil performance.

The PI Valve maintains the correct flow, in spite of pressure changes, and guarantees the flow only changes when demand requirements change or Delta T is outside of specification.

The optional pressure transducers measure upstream and downstream pressure allowing the Building Management System (BMS) to reduce system pressures to save pump energy when pressure drop is higher than the PI valve's requirements.

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

PI VALVE SPECIFICATIONS

PSI / Temperature Rating:	360 PSI / 248° F
Actuator Ambient Temp.:	34° F to 122° F
Flow Insert:	Glass reinforced PSU/POM/PPS and Stainless Steel
Diaphragm:	Small: EPDM; Medium and Large: Hydrogenated acrylonitrile-butadiene-rubber
Stroke:	Small: 3.4mm/0.13"; Medium: 5.2mm/0.2"; Large: 6.2mm/0.24"
Body Material:	Forged brass
End Connections:	Female NPT
O-Rings:	EPDM
Body Tappings:	P/T Test Valves on AB Valve Housing
Shut Off Leakage:	IEC 60534-4 – Class IV
Maximum Close Off:	116 PSI
Maximum Operational ΔP:	Small & Medium (1/2"-1-1/4"): 116 PSID; Large (1-1/2"-2"): 87 PSID
Control Range:	1:800 / IEC 60534
Turndown Ratio:	1:100
Shut Off Leakage:	ANSI Class IV / IEC 60534-4 Class IV

PI VALVE ACTUATOR SPECIFICATIONS (FN0.2&FN1.2/FH&FH.1

Supply Voltage:	24 VAC/VDC 50/60 HZ
Power Consumption:	Small/Medium Non-Failsafe with AC: 2.5 VA Operating / 4.7 VA Max Small/Medium Non-Failsafe with DC: 1.2 W Operating / 2.2 W Max Small/ Medium Failsafe with AC: 5.8 VA Operating / 6.8VA Max Small/Medium Failsafe with DC: 2.9 W Operating / 3.3 W Max Large Non-Failsafe with AC: 6 VA Operating / 8.5 VA Max Large Non-Failsafe with DC: 2.6 W Operating / 4.1 W Max Large Failsafe with AC: 7.9 VA Operating / 9VA Max Large Failsafe with DC: 3.7 W Operating / 4.5 W Max
Signal:	2-10V DC Analog; <0.5mA
Feedback Position Output:	2-10V DC
Operation Time Standard:	Small: 75 seconds; Medium: 115 seconds; Large: 137 seconds (from closed to fully open)
Operation Time to Failsafe:	Small: 17 seconds; Medium: 26 seconds; Large: 31 seconds

PRESSURE INDEPENDENT**1/2" – 2"**

Housing Insulation: IP 54 including upside down mounting, class III, indoor use only
Housing Material: UL94 V0-rated plastic

GRISWOLD EPIC INTELLIGENT INTERFACE SPECIFICATIONS

Supply Voltage: 24 VAC/VDC
Power Consumption: 4W
Cable: Group 1: fixed, 1 wire with quick connector, 9 ft (T1)
fixed, 1 wire with quick-connector, 3 ft (T2)
fixed, 3 wires, 2 ft (analog actuator communication)
Group 2: fixed, 2 wires, 2 ft (power and ground)
fixed, 3 wires, 2 ft (BACnet BMS Communication)
Group 3: fixed, 1 wire with quick-connector, 3 ft (P1)
fixed, 1 wire with quick connector, 3 ft (P2)
fixed, 3 wires, 2 ft (not in use)
Control Signal: 2-10 VDC
Output Signal: 2-10 VDC
Humidity Rating: 5.95% rH, no condensation
Housing Insulation: IP 54 including upside down mounting
Housing Material: UL94 V0-rated plastic
CE Conformity: Yes
Communication Std: RS485
BACnet Device Profile: BACnet Application Specific Controller (B-ASC) type server
BACnet Protocol: BACnet Master Slave/Token Passing (MS/TP)
BACnet Baud Rates: 9600, 19200, 38400, 57600, 76800, and 115200
BACnet Services (BIBBS): DS-RP-B, DW-WP-B, DM-DDB-B, DM-DOB-B, DM-DDC-B, DC-RPM-B, and DM-RD-B

TEMPERATURE SENSOR (T1 & T2) SPECIFICATIONS

Supply Voltage: N/A
Media Temperature: -4° to 248°F
Working Pressure: 580 PSI
Single Output: Resistive
Cable Connection: Quick Connector
Pipe Connection: 1/4" NPT
Housing Material: 304 Stainless Steel
Protection: IP65
Probe Length: 0.5"
Probe Diameter: 0.236"
CE Conformity: Yes
Sensor Type: PT1000
Accuracy: 0.5% Full Scale
Linearity: +/-0.5% Full Scale
Long Time Stability: 0.1% Full Scale
Response Time: 2.3 seconds at 122°F / 5.4 seconds at 194°F

OPTIONAL PRESSURE TRANSDUCER (P1 & P2) SPECIFICATIONS

Supply Voltage: 12 VDC
Cable Connection: Quick Connector
Output: 4-20mA
Media Temperature: 14°F to 185°F
Pressure¹: 0-360 PSI
Connection: 1/4" NPT

NOTES

¹ Calibrated at factory at 24Vdc.

GRISWOLD®
CONTROLS
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FLOW RATES PI VALVE

GPM				SETTING ⁴
1/2"-1"		1"L-1-1/4"	1-1/2"-2"	
2.3-87 PSID ⁵	4.4-116 PSID ⁵	2.3-116 PSID ⁵	2.3-87 PSID ⁵	
-	0.282	3.81	8.36	1.0
0.163	0.624	4.46	10.0	1.1
0.370	0.920	5.10	11.7	1.2
0.510	1.18	5.72	13.3	1.3
0.664	1.41	6.32	15.0	1.4
0.792	1.61	6.90	16.7	1.5
0.902	1.80	7.47	18.3	1.6
1.03	1.96	8.02	20.0	1.7
1.14	2.12	8.56	21.6	1.8
1.24	2.27	9.08	23.2	1.9
1.33	2.42	9.59	24.8	2.0
1.41	2.56	10.1	26.4	2.1
1.49	2.69	10.6	28.0	2.2
1.55	2.82	11.0	29.6	2.3
1.63	2.95	11.5	31.2	2.4
1.68	3.08	11.9	32.7	2.5
1.73	3.21	12.4	34.2	2.6
1.79	3.33	12.8	35.7	2.7
1.82	3.45	13.2	37.2	2.8
1.88	3.56	13.6	38.6	2.9
1.93	3.68	14.0	40.0	3.0
1.98	3.79	14.4	41.4	3.1
2.02	3.89	14.7	42.8	3.2
2.06	3.99	15.1	44.1	3.3
2.10	4.08	15.5	45.4	3.4
2.14	4.17	15.8	46.6	3.5
2.17	4.25	16.1	47.8	3.6
2.21	4.32	16.5	49.0	3.7
2.25	4.39	16.8	50.2	3.8
2.28	4.46	17.1	51.3	3.9
2.31	4.51	17.4	52.3	4.0
2.34	4.57	17.7	53.3	4.1
2.37	4.61	18.1	54.3	4.2
2.39	4.66	18.4	55.2	4.3
2.42	4.70	18.7	56.0	4.4
2.43	4.73	19.0	56.8	4.5
2.46	4.77	19.2	57.6	4.6
2.48	4.80	19.5	58.3	4.7
2.50	4.83	19.8	58.9	4.8
2.51	4.86	20.1	59.5	4.9
2.53	4.89	20.4	60.0	5.0

NOTES

⁴ Valve is set to maximum setting at factory. Please set maximum flow to at least 50% of valve capacity for optimum control.

⁵ Valve must be within PSID range to control flow and provide accurate BTU values.

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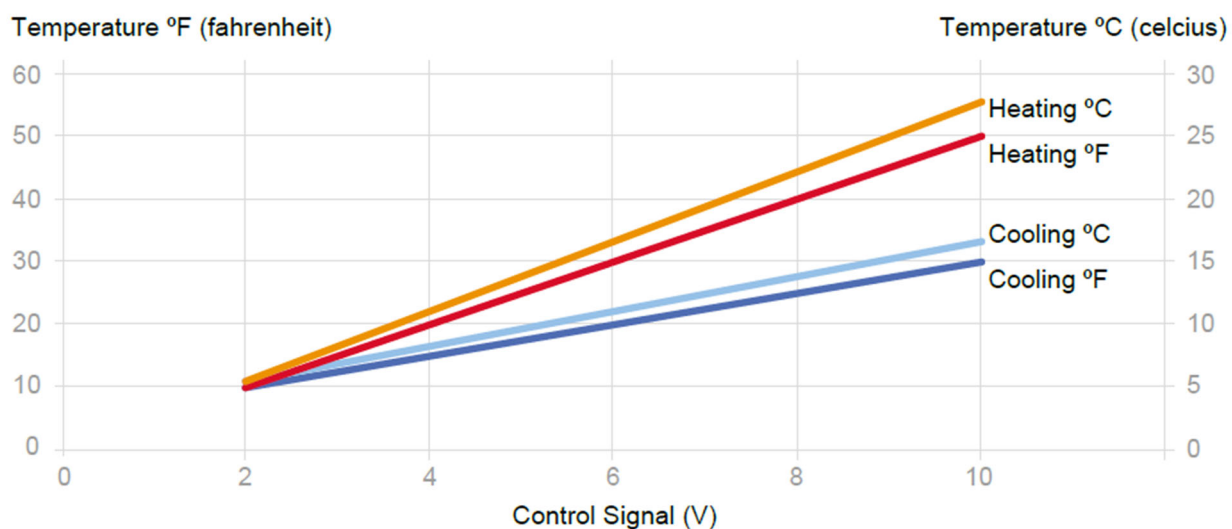
 **GRISWOLD[®] CONTROLS**
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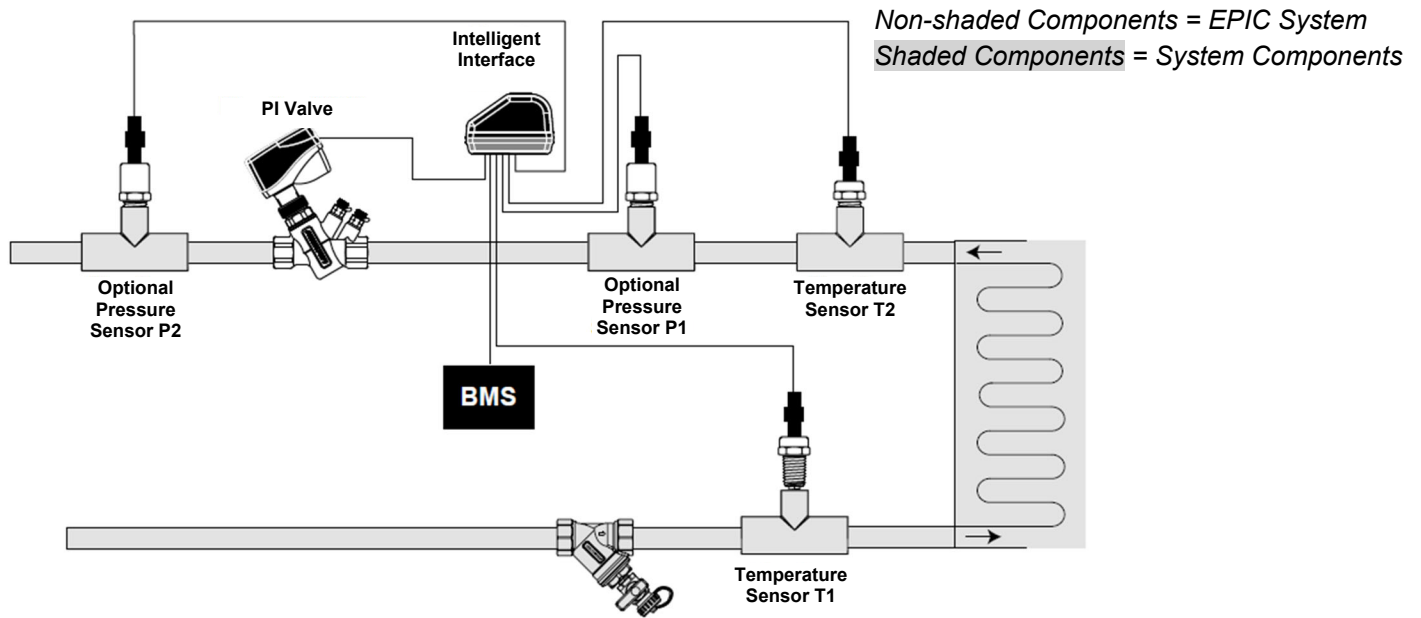
BACNET FUNCTIONS

	NO BACNET I – INTERFACE TO/FROM ACTUATOR	
DESCRIPTION	WRITE	READ
Current flowrate (input signal)		•
Actuator Position (feedback)		•

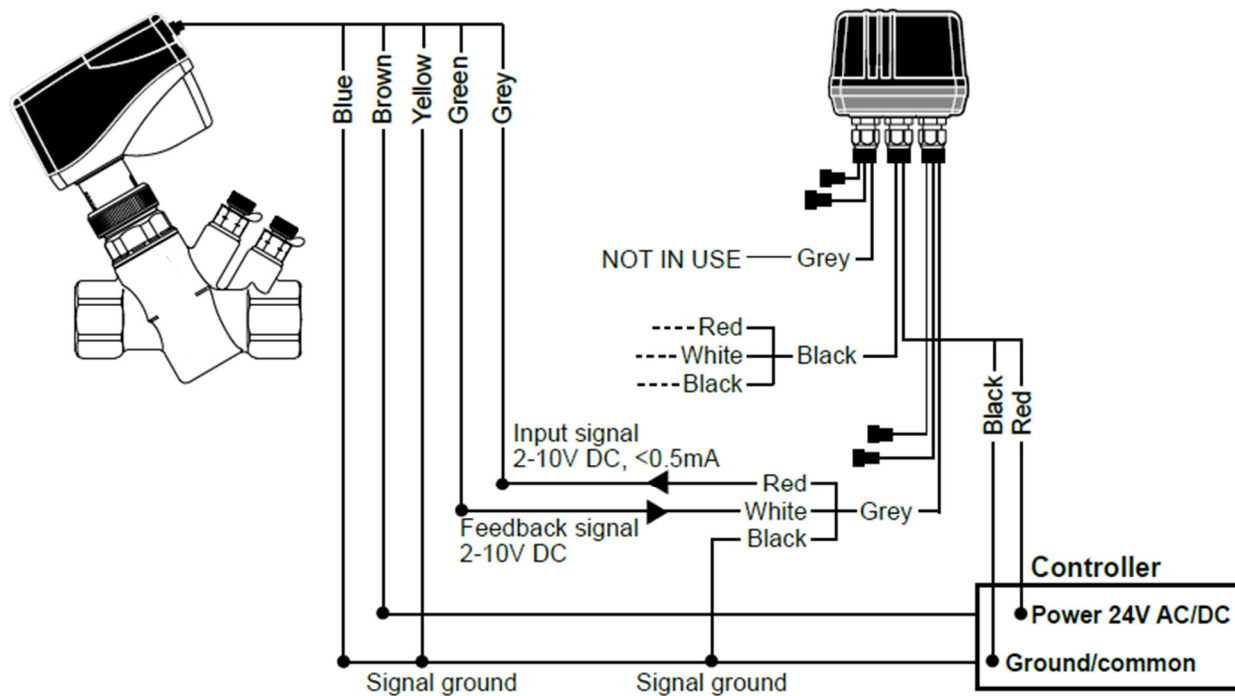
	BACNET I – INTERFACE TO/FROM BMS	
DESCRIPTION	WRITE	READ
Control Priority (ΔT or Control Signal)	•	•
P1		•
P2		•
ΔP		•
ΔP alarm (on/off)	•	•
T1		•
T2		•
ΔT		•
ΔT Target	•	•
Flow		•
BTU (Immediate)		•
BTU Accumulated (Period)		•

CONTROL CURVE VS ΔT

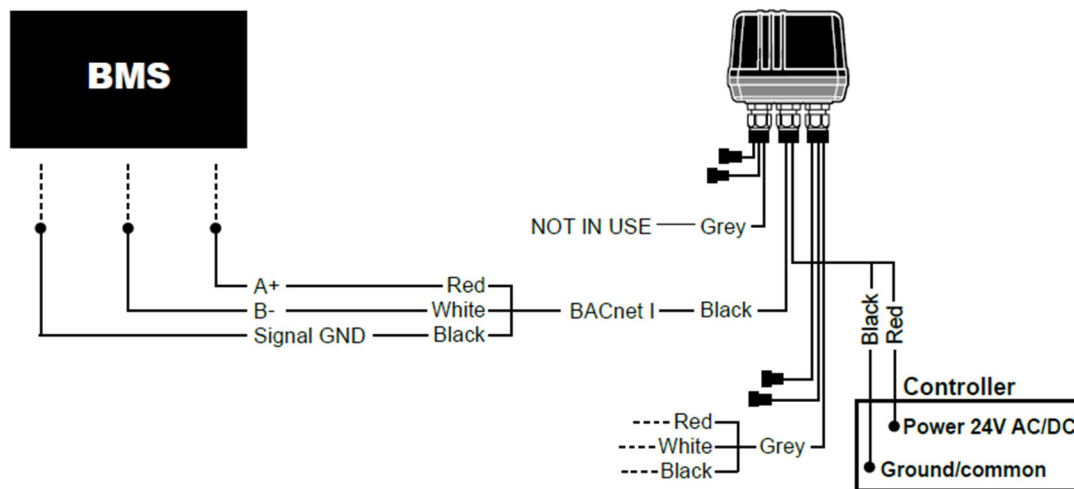




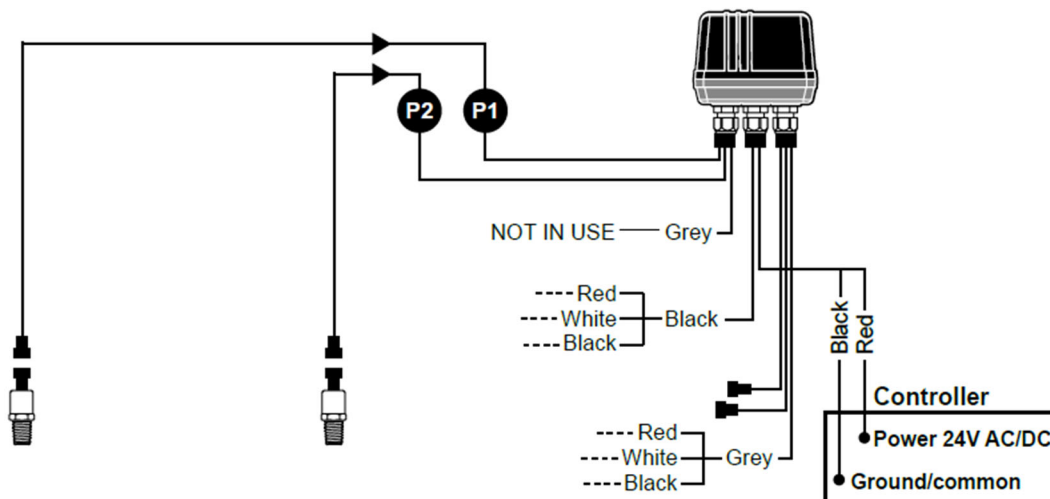
WIRING DIAGRAM PI VALVE & INTELLIGENT INTERFACE



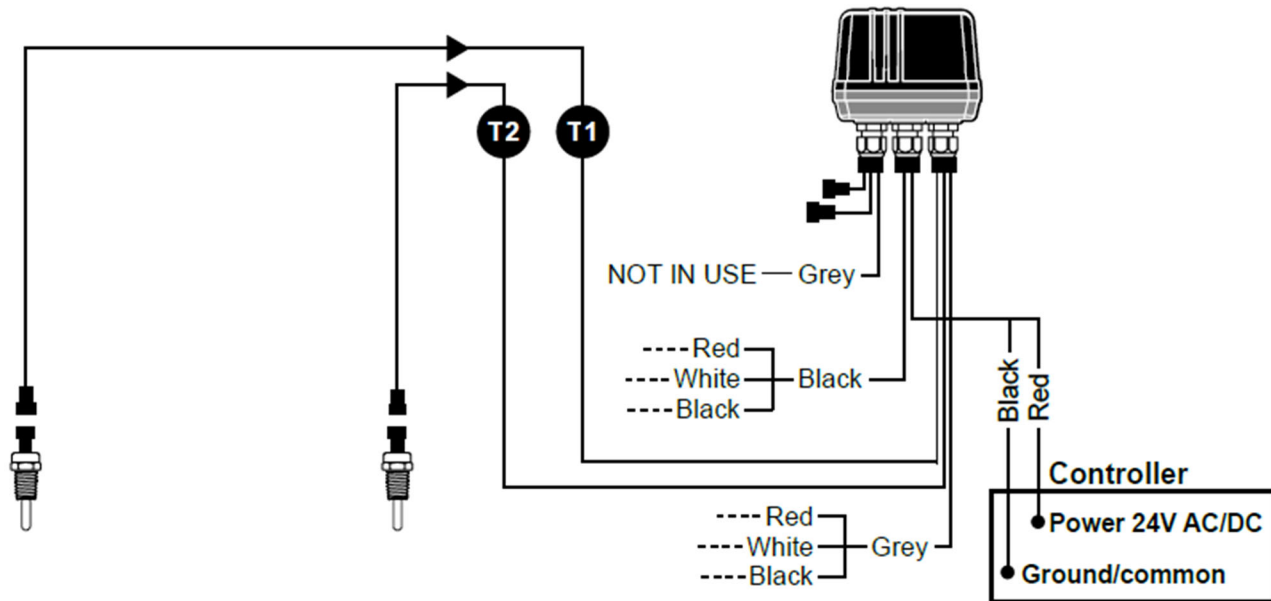
WIRING DIAGRAM BMS & INTELLIGENT INTERFACE



WIRING DIAGRAM OPTIONAL PRESSURE TRANSDUCER (P1 & P2)



WIRING DIAGRAM TEMPERATURE SENSOR (T1 & T2)



WRITTEN SPECIFICATIONS

1. PRESSURE INDEPENDENT AND TEMPERATURE INDEPENDENT SYSTEM
 - 1.1. Contractor shall install where indicated in drawings.
 - 1.2. System shall include a pressure independent modulating dynamic control valve, a sensor kit and an electronic unit.
 - 1.2.1. The valve shall accurately control flow independent of system pressure fluctuations.
 - 1.2.2. The sensor kit shall include 2 temperature sensors and 2 optional pressure sensors. Temperature sensors shall measure the ΔT across the coil and pressure sensors shall measure the ΔP across the PICV.
 - 1.2.3. The intelligent interface shall accurately modulate PICV flow to maintain target ΔT . In addition, the intelligent interface shall calculate BTU heat transfer and supply continuous information on ΔT , ΔP and flow.
2. PRESSURE INDEPENDENT MODULATING DYNAMIC FLOW CONTROL VALVE
 - 2.1. Valve shall be electronic, dynamic, modulating 2-way control device
 - 2.2. Maximum flow setting shall be adjustable while valve is in line and operating.
 - 2.3. Flow regulation unit shall be manufactured of stainless steel and hydrogenated acrylonitrile-butadiene rubber and shall be capable of controlling flow within $\pm 10\%$ of controlled flow rate or $\pm 5\%$ of maximum flow rate.
 - 2.4. Flow regulation unit shall be accessible for change-out or maintenance.
 - 2.5. VALVE HOUSING
 - 2.5.1. Housing shall consist of forged brass rated at no less than 360psi static pressure and 248°F (120°C).
 - 2.5.2. Housing shall be permanently marked to show direction of flow.
 - 2.5.3. Dual pressure/temperature test plugs for verifying accuracy of flow performance shall be standard on all valve sizes.
 - 2.6. VALVE ACTUATOR
 - 2.6.1. Valve actuator housing shall be rated to IP54 insulation.
 - 2.6.2. Actuator shall use full stroke and provide full authority.
 - 2.6.3. Actuator shall have visible indication of stroke position.
 - 2.6.4. Actuator shall be driven by a 24Vdc motor, and shall accept 2-10 VDC signal.
 - 2.6.5. Actuator shall be capable of providing 2-10 Vdc feedback signal to the control system.
 - 2.6.6. Optional fail safe system to power valve to either open or closed position from any position in case of power failure shall be available.
3. INTELLIGENT INTERFACE
 - 3.1. Intelligent interface shall consist of UL94 V0-rated plastic.
 - 3.2. Intelligent interface shall be rated to IP54 including upside-down mounting.
 - 3.3. Intelligent interface shall be driven by a 24V DC signal.
 - 3.4. Intelligent interface shall be Bluetooth® enabled.
 - 3.5. 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.
4. TEMPERATURE SENSOR
 - 4.1. Temperature sensors shall consist of 304 stainless steel.
 - 4.2. Temperature sensors shall be IP65.
 - 4.3. Temperature sensors shall provide a resistive output signal corresponding to water temperature.
5. OPTIONAL PRESSURE SENSOR
 - 5.1. Pressure sensors shall consist of 304 stainless steel.
 - 5.2. Pressure sensors shall IP65.
 - 5.3. Pressure sensors shall be driven by a 12V DC signal.
 - 5.4. Pressure sensors shall provide a 4-20mA output signal corresponding to water pressure.