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 ΔT is outside of specification.

The 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

Static Pressure:	580psid
Media Temperature:	-4° to 248°F
Ambient Temperature:	14° to 122°F
Body Material:	Ductile Iron, ASTM A395, Class 60-40-18
Flow Regulation Unit:	316 Stainless Steel
Diaphragm:	Hydrongenated acrylonitrile butadiene rubber
End Connections[1]:	ANSI Class 150/300
Stem Seals:	EPDM and Nitrile O-Rings
Test Ports:	1/4" ISO
Rangeability:	>100:1
Turn Down Ratio:	228:1
Maximum Close Off Pressure:	116 PSID
Maximum Operational ΔP:	116 PSID
Shut Off Leakage:	ANSI/FCI 70-2 2006 /IEC 60534-4 Class IV

PI VALVE ACTUATOR SPECIFICATIONS

Supply Voltage:	22-26 VAC/VDC
Power Consumption:	12 VA, Failsafe Version: 25VA (Peak)
Control Signal:	2-10 VDC
Frequency:	50/60 HZ
Feedback:	2-10 VDC
Resolution:	1:800 (2-10V)
Turn Time:	2-1/2"-6": 190 seconds (from closed to fully open) 8"-10": 317 (from closed to fully open)

CE

UL® Listed temperature regulating equipment 41 X 9

Class 2 circuit

NOTES

[1] Studs and bolts for installation are supplied by others.

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Electrical Connection:	5 wires 18AWG halogen free cable, 3 feet Additional for BACnet versions: 3 wires 18AWG halogen free cable, 3 feet
CE Conformity:	EN 60730, class II
Humidity Rating:	5-95% RH non condensing
Housing Insulation:	IP 54 including upside down mounting
Housing Material:	UL94 V0-rated plastic
Programming:	External programming of all settings, interface buttons and display
Calibration:	Automatic calibration at start-up

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 (BACnet actuator communication)
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

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PRESSURE TRANSDUCER (P1 & P2) SPECIFICATIONS

Supply Voltage:	12 VDC
Cable Connection:	Quick Connector
Output:	4-20mA
Media Temperature	14°F to 185°F
Pressure[2]:	0-360 PSI
Connection:	1/4" NPT
Housing Material:	304 Stainless Steel
Protection:	IP65
CE Conformity:	Yes
Accuracy:	+/-1.5% Full Scale (tolerances can be software compensated in Intelligent Interface)
Stability:	0.5% Full Scale +/-0.05%
Thermal Effect on Zero:	+/-0.1% Full Scale
Thermal Effect on Span:	+/-0.05% Full Scale
Electronic Proof:	Short Circuit Protection
Response Time	<20 milliseconds (20 sec mean value calculated in Intelligent Interface)

MODEL NUMBER SELECTION

B E P ___ ___ B ___ ___

Select System Size: 3=2-1/2"–3", 4=3"–4", 5=5"–6", 6=8"-10"

Select a PSID control range for PI Valve:
1=4.5 – 116 PSID (Not Available on 8"/10")
2=5.1 – 116 PSID
3=7.3 – 116 High Flow (3"/4" only)

Select Actuator & EPIC System:
5=Non-Failsafe Actuator with BACnet EPIC
6=Failsafe Actuator with BACnet EPIC

Select EPIC System Version:
2=Valve, Sensor Kit, BlueTooth, and Delta T Control

NOTES

[2] Calibrated at factory at 24Vdc.

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DIMENSIONS & WEIGHTS FOR PI VALVE (NOMINAL)

All dimensions are for planning purposes only and may change without notice.

MODEL NO.	SIZE	LENGTH	CL TO BOTTOM	CL TO TOP	ASME B16.5 WELD NECK		ASME B16.5 SLIP ON		WEIGHT[3]
					CLASS 150	CLASS 300	CLASS 150	CLASS 300	
BEP3__	2-1/2"	8.8"	9.7"	3.74"	•	•	•	•	27.8
	3"				•	•			
BEP4__	3"	12.6"	11.4"	5.3"	•	•	•	•	75
	4"				•	•			
BEP5__	5"	16.6"	13.3"	7.1"	•	•	•	•	148
	6"				•				
BEP6__	8"	28.5"	18.6"	11.5"		•		•	547
	10"				•		•		

FLOW RATES PI VALVE

MODEL NO.	SIZE	PSID RANGE	MAXIMUM FLOW GPM[4]	TURN DOWN RATIO – MAX FLOW	LOWEST MAX SETTING GPM	TURN DOWN RATIO – LOWEST MAX FLOW
BEP31__	2-1/2" / 3"	4.5 – 116	113	228:1	40.7	38:1
BEP32__	2-1/2" / 3"	5.1 – 116	157		56.3	
BEP41__	3" / 4"	4.5 – 116	149		55.4	
BEP42__	3" / 4"	5.1 – 116	225		75.0	
BEP43__	3" / 4"	7.3 – 116	320		58.3	
BEP51__	5" / 6"	4.5 – 116	369		103	
BEP52__	5" / 6"	5.1 – 116	468		113	
BEP62__	8" / 10"	5.1 – 116	1220		146	

NOTES

[3] Weight includes valve and actuator.

[4] Maximum flowrate can be reduced during programming. Maximum flowrate reflects a 10V signal. All flowrates will have 1000 positions between the pre-set maximum flowrate and 0V if 0V is range is 0-10V. Griswold Controls recommends that the maximum flowrate is at least 50% of the rated valve capacity.

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BACNET FUNCTIONS

	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)		•

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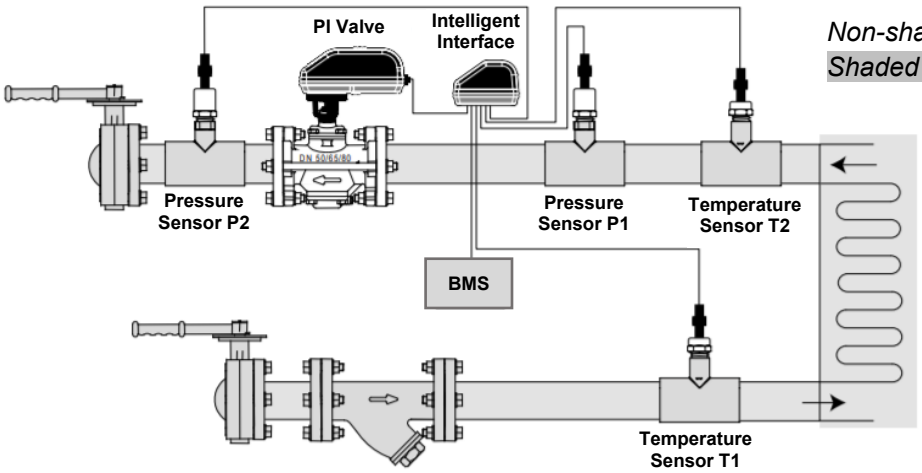
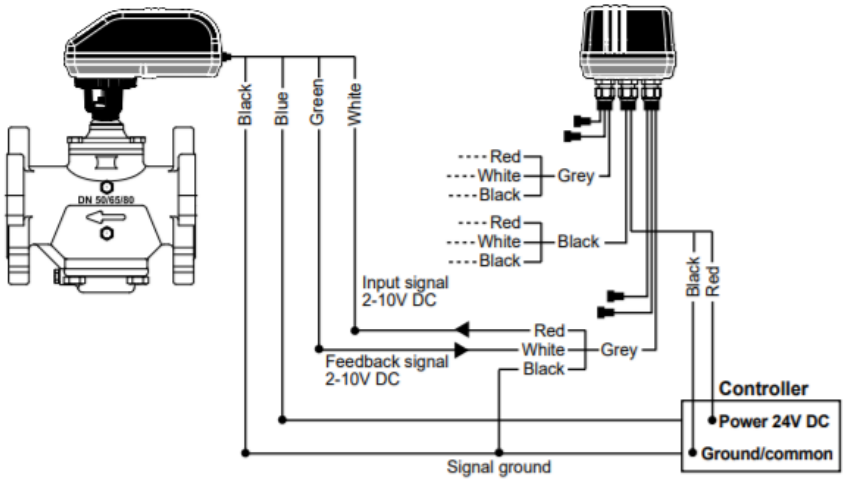


Non-shaded Components = EPIC System
Shaded Components = System Components

WIRING DIAGRAM PI VALVE & INTELLIGENT INTERFACE



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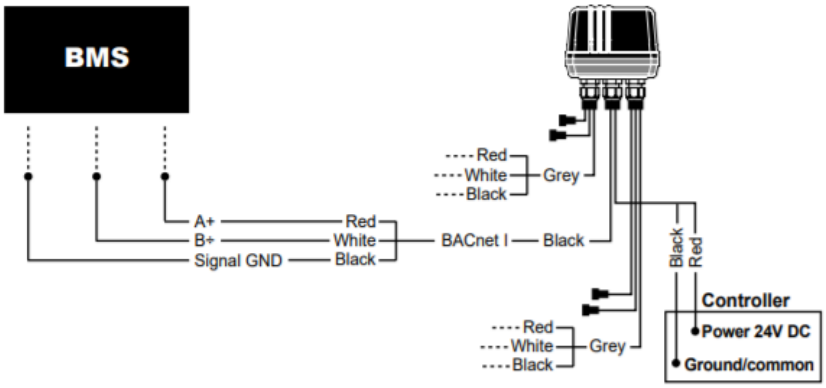
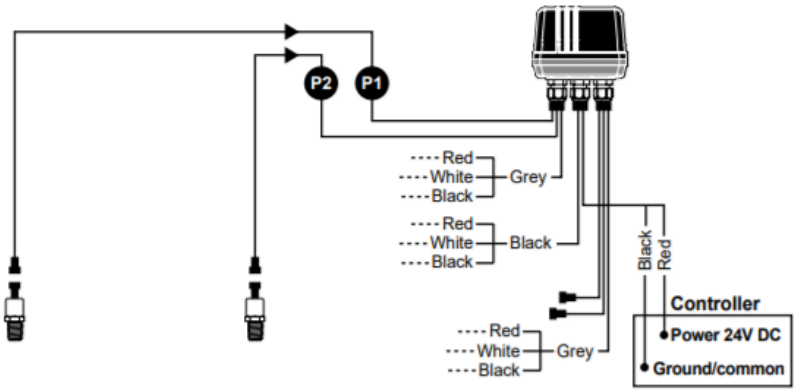
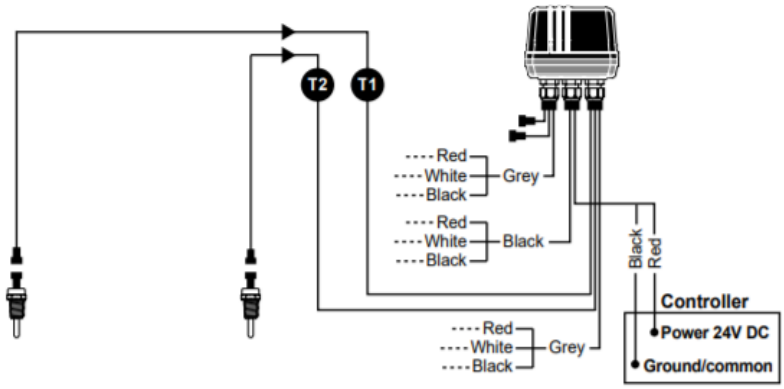
WIRING DIAGRAM BMS & INTELLIGENT INTERFACE



WIRING DIAGRAM PRESSURE TRANSDUCER (P1 & P2)



WIRING DIAGRAM TEMPERATURE SENSOR (T1 & T2)



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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 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 to 55 different settings within the range of the valve size by changing the actuator programming.
   - 2.3. Flow regulation unit shall be manufactured of stainless steel and hydrogenated acrylonitrile-butadiene rubber and shall be capable of controlling flow within ±5% of controlled flow rate or ±2% 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 ductile iron ASTM A395 Grade 60-40-18 rated at no less than 580 psi (4000 kPa) 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 be driven by a 24Vdc motor, and shall accept 2-10 Vdc, 4-20mA, 3-point floating or pulse width modulation electric signal and shall include resistor to facilitate any of these signals.
     - 2.6.3. Actuator shall be capable of providing 4-20mA or 2-10 Vdc feedback signal to the control system.
     - 2.6.4. External LED readout of current valve position and maximum valve position setting shall be standard.
     - 2.6.5. 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. 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.

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