BACnet Points List for Single Compressor Water to Water PROSSWWE-01

The network variables will be listed by point type instance convention. 2:1 would mean point type 2, point instance 1. All volatile (Output) type points will revert to the uncommanded values after a power interruption. These have no limit on the number of writes in a lifetime. The nonvolatile (Value) type points have their values stored in flash memory and they retain their values through a power outage. These have a limited life-time number of write cycles, about 2,000,000.

Analog Input (Type 0)

0:1	Source Frz	[Read, shows the refrigerant temp entering the source heat exchanger]
0:2	Load Frz	[Read, shows the refrigerant temp entering the Load heat exchanger]
0:3	Enter Load Temp	[Read, water temperature entering load heat exchanger]
0:4	Leave Load temp	[Read, water temperature leaving the load heat exchanger]
0:5	Enter Source Temp	[Read, water temperature entering the source heat exchanger]
0:6	Leave Source Temp	[Read, water temperature leaving the source heat exchanger]
0:7	Source Frz Setpt	[Read, low temperature limit of the source heat Exchangers to avoid freezing]
0:8	Load Frz Setpt	[Read, low temperature limit of the load heat Exchangers to avoid freezing]
0:14	Alarms Enumerated	[Read, shows the active alarm condition of the machine: 0=No alarms, 1=Load Flow Switch, 2=Compressor Low Suction Pressure, 3=Source Low Temp alarm, 4=Load Low Temp alarm,5=Source Flow Switch, 6=Hi Pressure Alarm, 7=Bad Sensor Source Low Limit, 8=Bad Sensor Load Low Limit,9=Loss of Charge, 10=High Limit Shutdown]

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Multistate Input (Type 13)

13:1	Mode of Operation	[Read, 1 means Unit in Auto, 7 means unit in Shutdown]
13:2	Comp Cmd Status	[Read, '1' means the compressor is Off ; '2' means the compressor is On]
13:3	Rev Vlv Status	[Read, '1' means heating;'2' means cooling]
13:4	LoadPmpStatus	[Read, '1' means accessory 1 is Off; '2' means accessory1 is On]
13:5	SrcPmpStatus	[Read, '1' means accessory2 is Off; '2' means accessory2 is On]
13:6	Alarm Status	[Read, '1' means the alarm is Off; '2' means the alarm is On]
13:7	Comp Status Prove	[Read, '1' means the compressor is Off; '2' means the compressor is On] ***optional field mounted***
13:8	BI9 Status	[Read, '1' means open contacts; '2' means closed contacts]
13:9	Load Flow Status	[Read, '1' means the switch is Off; '2' means the switch is On]
13:10	Src Flow Status	[Read, '1' means the switch is Off; '2' means the switch is On]
13:11	BI6 Status	[Read, '1' means open contacts; '2' means closed contacts]

Multistate Output (Type 14) *These are volatile memory and allow unlimited writes.*

14:1	Compressor Enable	[Write, Control lead compressor (Y1), 1=OFF, 2=ON.]
14:2	Valve Enable	[Write, Control reversing valve (B), 1=Cooling; 2=Heating.]
14:3	Emerg Override	[Write, 1 puts the unit in normal operation 5 puts the unit in shutdown]
14:5	Alarm Reset	[Write, Changing the value from '1' to '2' Will reset lock-out alarms]

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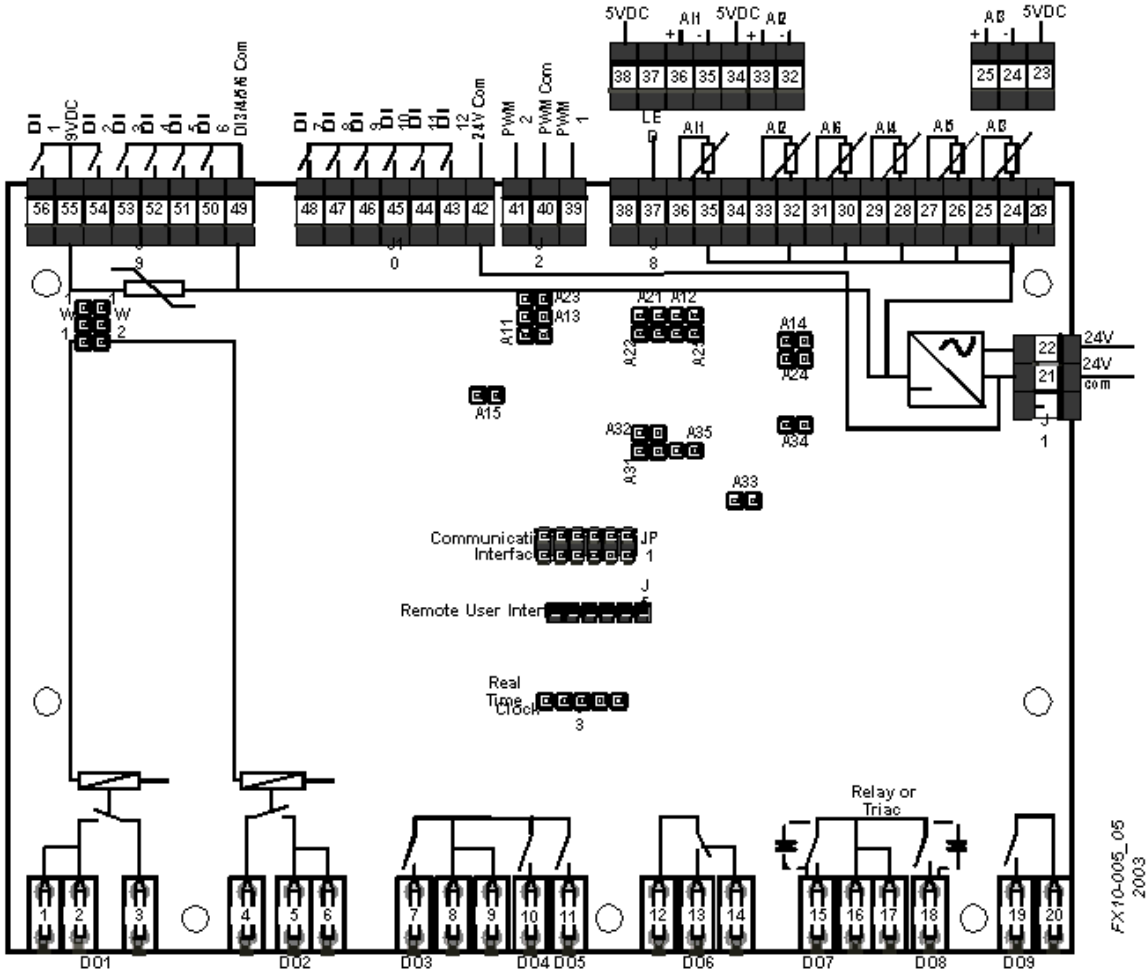
The Envision heatpump is equipped with an OEM DDC controller produced by Johnson Controls, Inc. This controller—the FX10—has 6 analog inputs, 12 digital inputs, and 9 digital outputs. The FX10 is depicted below.



Physical I/O Assignment

The asterisk * denotes a point that is integral to the heatpump control algorithms.

Channel	Name	Pin Number	Type
AI1	Small EKW Controller1-Page1-LoadEWT(AI-1)	36	A99
AI2	Small EKW Controller1-Page1-LoadLWT(AI-2)	33	A99

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AI3	Small EKW Controller1-Page1-SourceLWT(AI-3)	25	A99
AI4	Small EKW Controller1-Page2-SourceFrzProtect AI4	29	A99
AI5	Small EKW Controller1-Page2-LdFrzProtTemp(AI-5)	27	A99
AI6	Small EKW Controller1-Page1-SourceEWT(AI-6)	31	A99
DI1	Small EKW Controller1-Page2-ComprProve(BI-1)	56	Binary
DI2	Small EKW Controller1-Page2-EmergencyShutdn(BI2)	54	Binary
DI3	Small EKW Controller1-Page2-LoPrsSwitch(BI-3)	53	Binary
DI4	Small EKW Controller1-Page2-SrcFrzStptSel(BI-4)	52	Binary
DI5	Small EKW Controller1-Page2-LdFrzSetptSel(BI-5)	51	Binary
DI6	Small EKW Controller1-Page2-BI-6	50	Binary
DI7	Small EKW Controller1-Page2-Y1/SysEna(BI-7)	48	Binary
DI8	Small EKW Controller1-Page2-SourceFlowSwitchBI-8	47	Binary
DI9	Small EKW Controller1-Page2-O/Heat-Cool (BI-9)	46	Binary
DI10	Small EKW Controller1-Page1-PrimaryOvride(BI-10)	45	Binary
DI11	Small EKW Controller1-Page2-1stStgHiPrsSw(BI-11)	44	Binary

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DI12	Small EKW Controller1-Page2-LoadFlowSw(BI-12)	43	Binary
DO1	Small EKW Controller1-Page1-ReversingVlv(BO-1)	3	Binary
DO2	Small EKW Controller1-Page1-Compressor(BO-2)	4	Binary
DO3	Small EKW Controller1-Page1-2ndaryHeat/Cool BO-3	7	Binary
DO4	Small EKW Controller1-Page1-2ndaryUnitEna(BO-4)	10	Binary
DO5	Small EKW Controller1-Page1-2ndaryPrimryOvr(BO5)	11	Binary
DO6	Small EKW Controller1-Page1-AlarmOutput(BO-6)	13	Binary
DO7	Small EKW Controller1-Page1-Accy1 Output(BO-7)	15	Binary
DO8	Small EKW Controller1-Page1-Accy2 Output(BO-8)	18	Binary
DO9	Small EKW Controller1-Page1-LoadWtrVlvOut(BO-9)	19	Binary

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Sequence of Operation

When the controller is first powered up, the outputs will be disabled for a random start delay time. The delay is provided to prevent simultaneous starting of multiple heat pumps. Once the timer expires, the controller will operate normally. A restart status variable is available for indication of this occurrence. This delay will be used after every power failure, as well as the first time the compressor is started after the control exits the emergency shutdown mode. The default time period for the start delay will be random between 1 and 120 seconds.

The source flow proving switch shall be a normally open flow switch that will close when the water flow through the source side heat exchanger reaches an acceptable level. The source flow proving switch must be closed 15 seconds prior to enabling the compressor output (BO-2). If the source flow proving switch opens at any time the compressor output (BO-2) must be disabled immediately. Once the flow switch has opened the alarm output will be energized after a 5 minute delay time. If the flow switch closed at any time after it has been sensed open the fault will clear and the unit will return to normal operation.

The source side freeze protection selection input allows you to adjust the source side freeze protection temperature set point (AI-4). When the jumper is installed on BI-4 the source side freeze protection temperature set point is factory set for 30°F. When you remove the jumper on BI-9 the source side freeze protection temperature set point will be 15°F.

The load side freeze protection selection input allows you to adjust the load side freeze protection temperature set point (AI-5). When the jumper is installed on BI-5 the load side freeze protection temperature set point is factory set for 30°F. When you remove the jumper on BI-10 the load side freeze protection temperature set point will be 15°F.

Both Water-to-Water types are operated by externally generated compressor and reversing valve calls ONLY. There is no internal temperature setpoint operation mode in these units. The compressor and reversing valve calls may be issued via the terminal board connections or over the supervisory network.

When a Y1 call is issued, the X1 output will turn on. After a 90 second delay (to allow time for the isolation valve to open) the compressor will run. Cycling the reversing valve will shut down the compressor.

The Compressor Fixed On Delay Time will ensure that the compressor output (B02) is not enabled for (90) seconds after the control receives a call to start the compressor. This will allow for the isolation valve to open fully before the compressor starts.

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The compressor minimum on delay will ensure that the compressor output is enabled for a minimum of (2) minute each time the compressor output is enabled. This will apply in every instance except in the event the high pressure switch is tripped or emergency shutdown then the compressor output will be disabled immediately.

During a heating/cooling cycle, the reversing valve will be positioned for heating/cooling operation. If an aqua stat is being used, the aqua stat will command the reversing valve "On" or "Off" based on a call for heating/cooling. If the compressor short cycle time delay has been satisfied, the compressor and accessory outputs 1 and 2 will turn on after the fixed compressor start delay timer has been satisfied.
When heating/cooling is no longer required, the compressor and accessory outputs 1 and 2 will be turned off immediately after the compressor minimum on delay has been satisfied. After the compressor output is turned off, it will remain off for the time specified in the compressor short cycle time delay. The controller is allowed to operate the heat pump in the heating/cooling mode regardless of the outdoor air temperature.

The emergency shutdown mode can be activated by a command from a facility management system or a closed contact on BI-2. The default state for the emergency shutdown data point is off. When the emergency shutdown mode is activated, all outputs will be turned off immediately and will remain off until the emergency shutdown mode is de-activated. The first time the compressor starts after the emergency shutdown mode has been de-activated, there will be a random start delay present.

Lockout mode can be activated by any of the following fault signals: refrigerant system high pressure, refrigerant system low pressure, heating freeze protection, and low flow on either the source or load sides of the unit. When any valid fault signal remains continuously active for the length of its recognition delay, the controller will go into fault retry mode, which will turn off the compressor. After the Compressor short cycle delay, the compressor will attempt to operate once again. If three consecutive faults are recognized during a single heating or cooling demand, the unit will go into lockout mode, turning off the compressor and enabling the alarm output until the controller is reset. The fault count will automatically reset when the heating or cooling command becomes satisfied. The lockout condition can be reset by powering down the controller, or by a command from the facility management system.