

Facility Dynamics

ENGINEERING

Inputs and Outputs – The Field Perspective

BACnet vs. Hardwired Integration to Machinery

Presented By:

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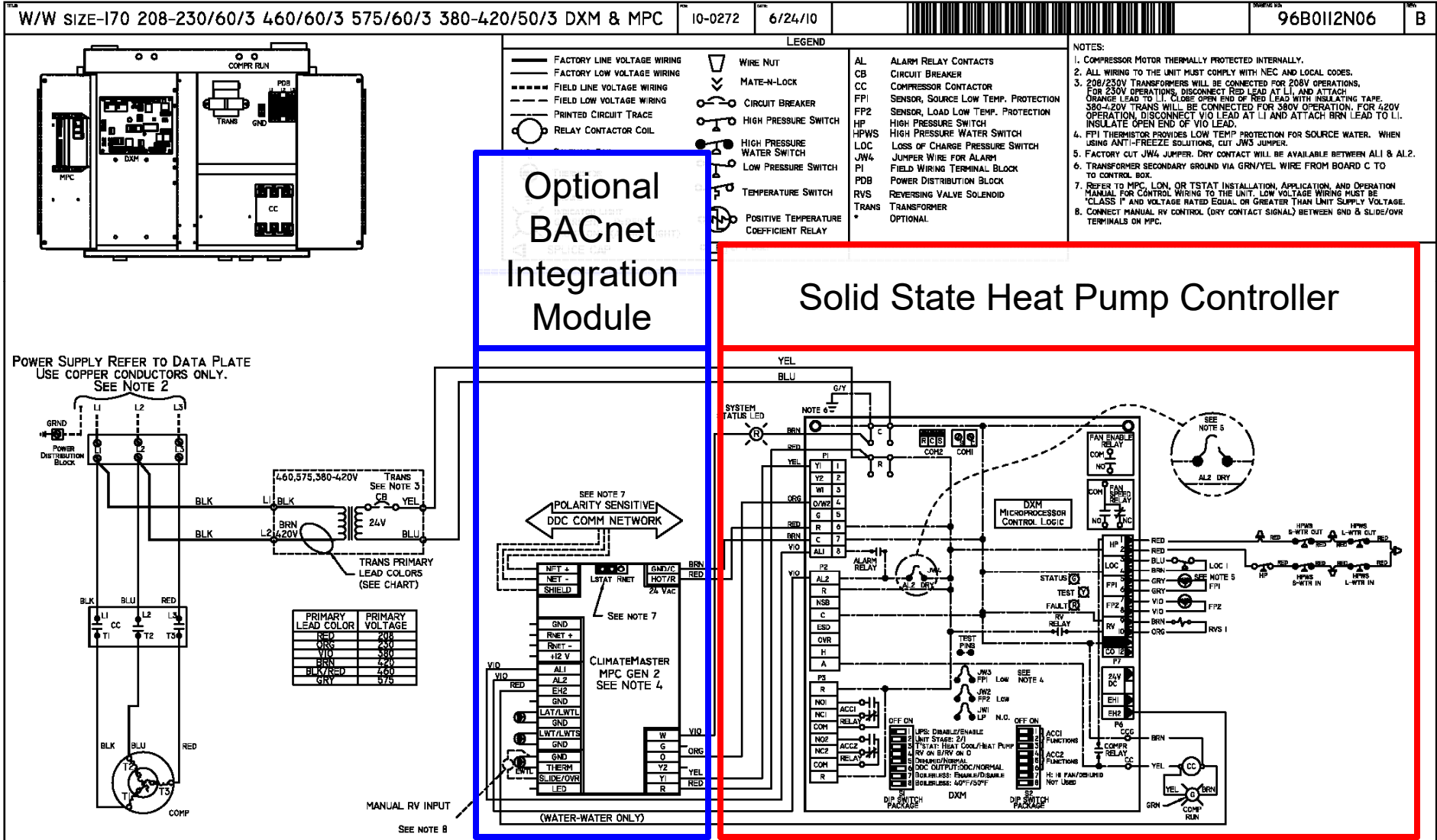
Senior Engineer

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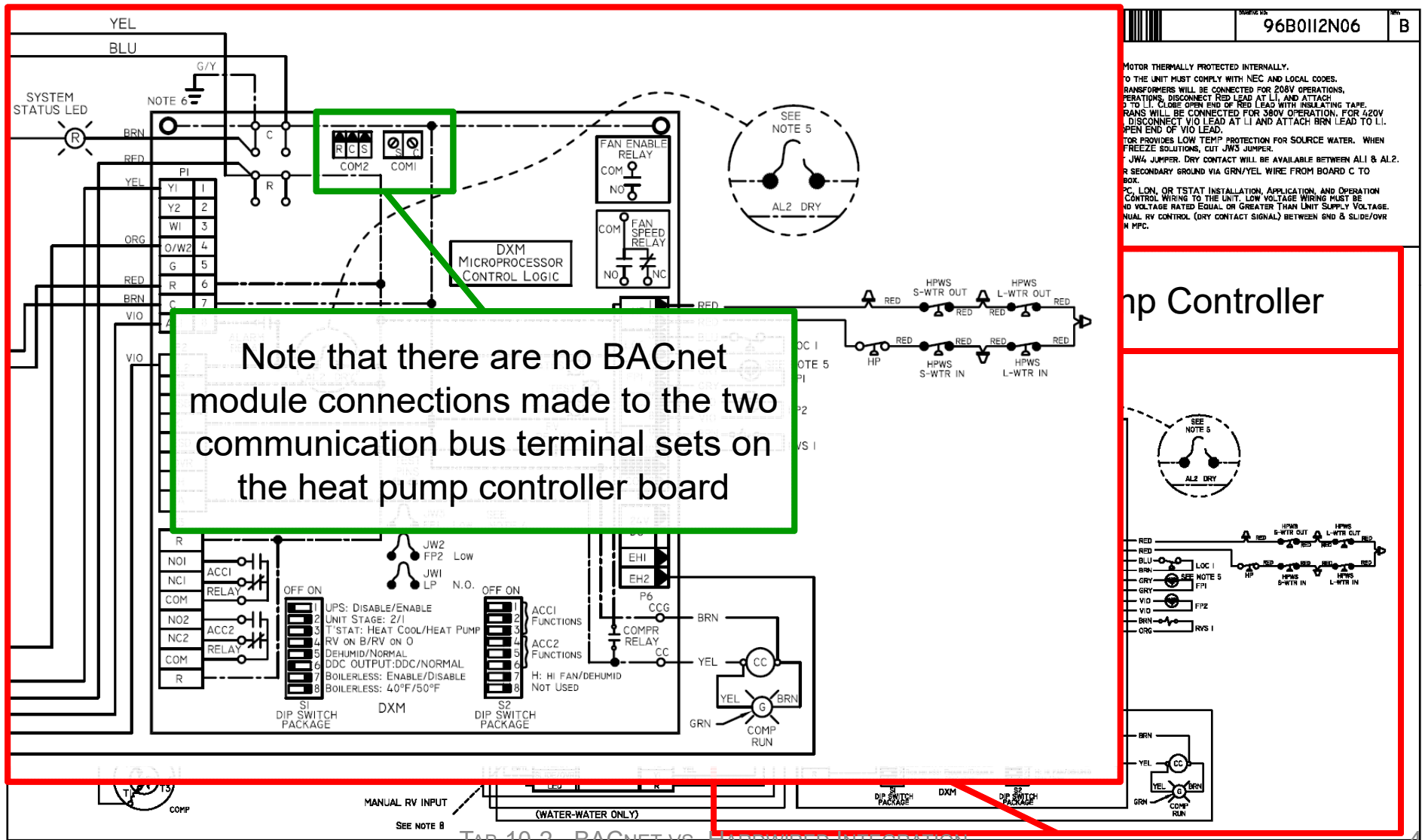
The General Idea is to Make it Easier, not Harder



BACnet to Water Source Heat Pump Integration



BACnet to Water Source Heat Pump Integration

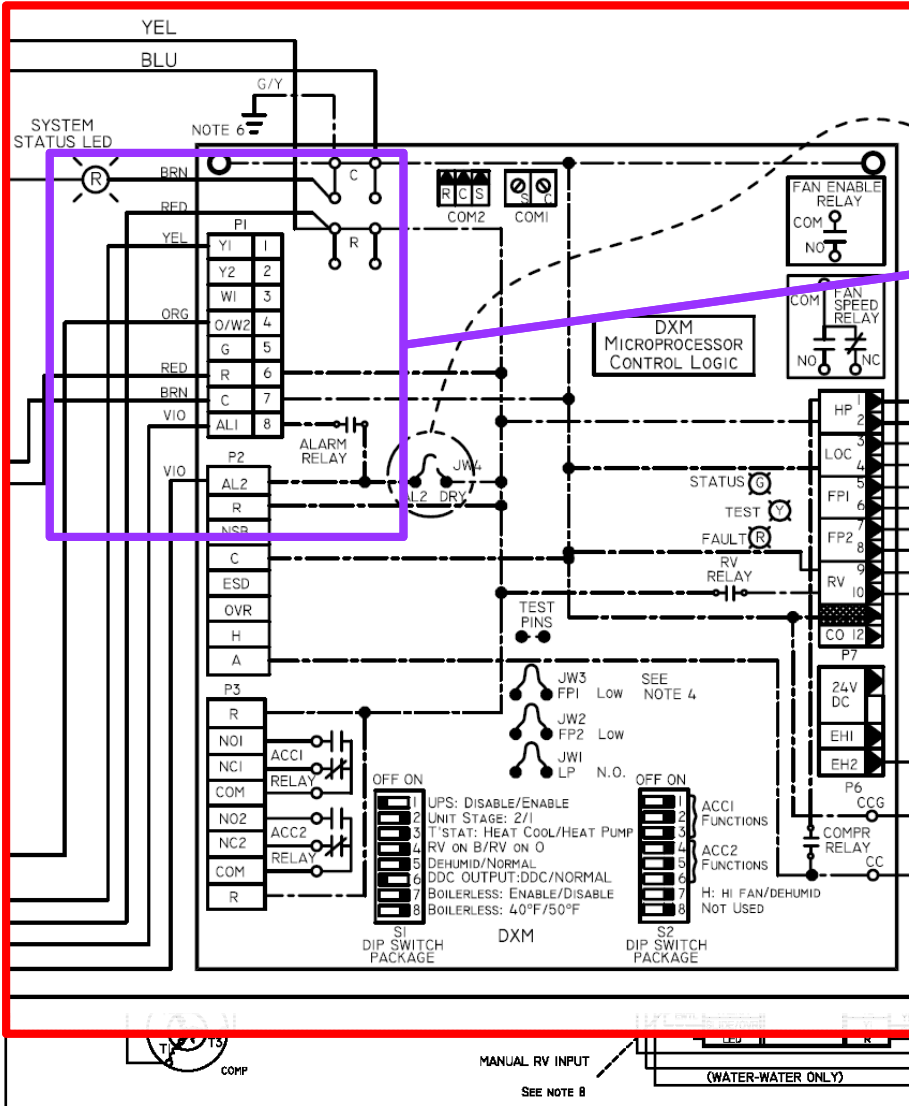


BACnet to Water Source Heat Pump Integration

Table 10: DXM Input/Output Reference Table

Connection	Input or Output	Description
R	-	24 VAC
C	-	24 VAC (grounded common)
Y1	I	Connect to thermostat - Y1 output call for compressor stage 1
Y2	I	Connect to thermostat - Y2 output call for compressor stage 2
W1	I	Connect to thermostat - W1 output call for Htg 3 or Emerg Ht
O/W2	I	Connect to thermostat - O output call for reversing valve with cooling
G	I	Connect to thermostat - G output call for fan
AL1	O	Connect to thermostat fault light - 24VAC or dry alarm
AL2	O	Alarm Relay 24VAC or dry
A	O	Output for water solenoid valve - paralleled with compressor contactor coil
Fan Enable	O	Fan enable relay
Fan Speed	O	Fan speed relay
CC	O	Connection for compressor contactor
CCG	O	Compressor contactor common connection
HP	I	High Pressure Switch input terminals
LP	I	Low Pressure Switch input terminals
FP1	I	Water Coil Low Temperature Thermistor Input
FP2	I	Air Coil Low Temperature Thermistor Input
RV	O	Reversing Valve Output Terminals - direct connect from "O"
CO	I	Condensate overflow input terminals
24VDC	O	24 VDC supply to electric heat module
EH1	O	Output terminal for stage 1 electric heat
EH2	O	Output terminal for stage 2 electric heat
NSB	I	Night Setback input
OVR	I	Night Setback Over Ride Input
ESD	I	Emergency Shutdown Input
H	I	Dehumidification or High Speed Fan input (dip 2.7)

For a non-BACnet application, the terminals that wire to the BACnet module would wire to 24 vac power, contacts in a thermostat, and annunciation relays or lights



BACnet to Water Source Heat Pump Integration

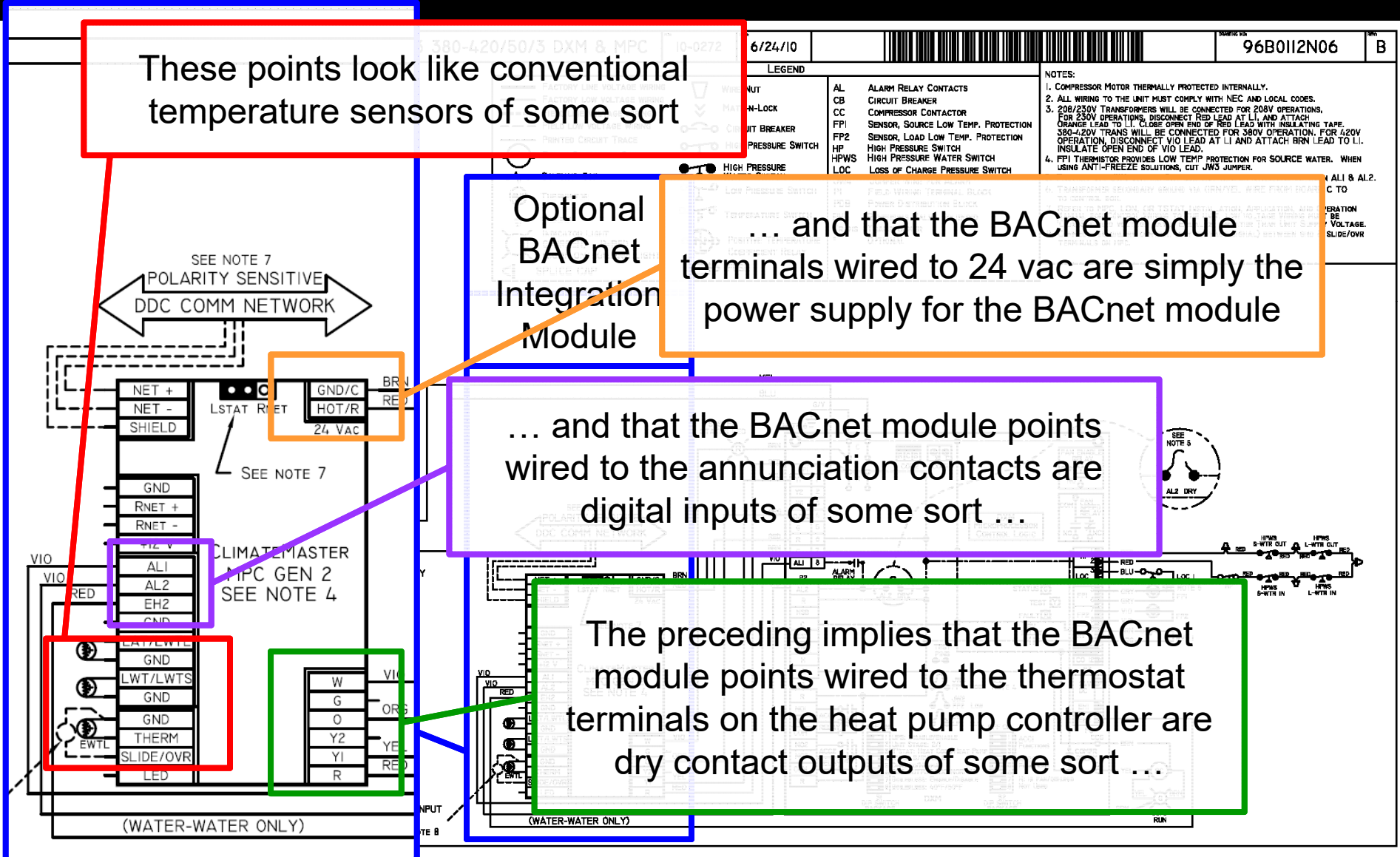
These points look like conventional temperature sensors of some sort

Optional BACnet Integration Module

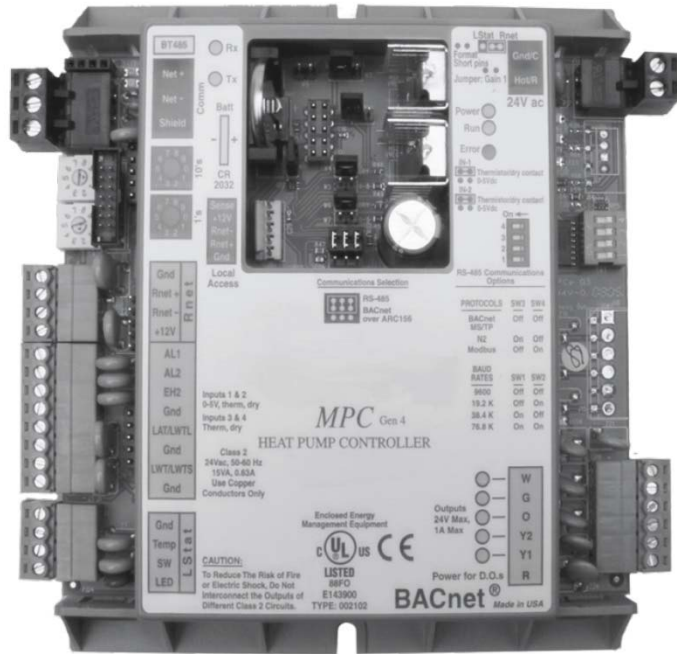
... and that the BACnet module terminals wired to 24 vac are simply the power supply for the BACnet module

... and that the BACnet module points wired to the annunciation contacts are digital inputs of some sort ...

The preceding implies that the BACnet module points wired to the thermostat terminals on the heat pump controller are dry contact outputs of some sort ...

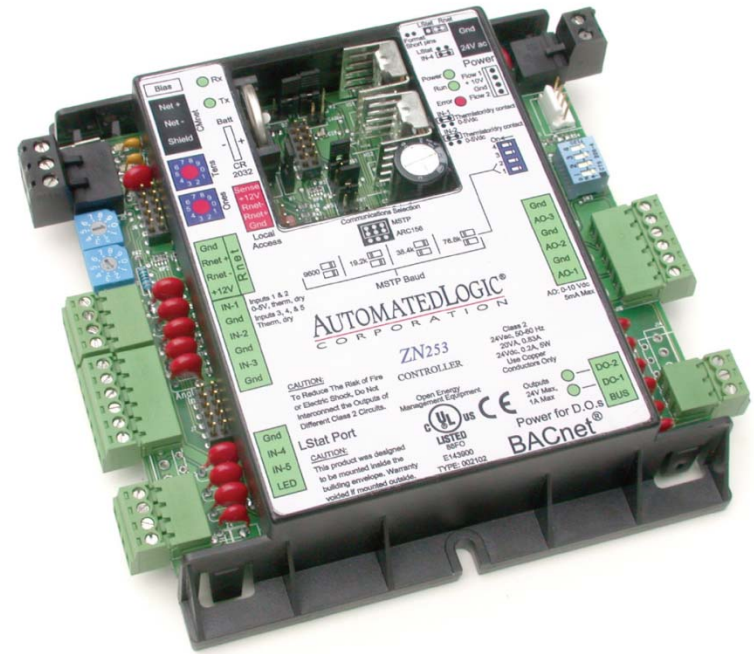


BACnet to Water Source Heat Pump Integration



DXM & MPC 10-0272

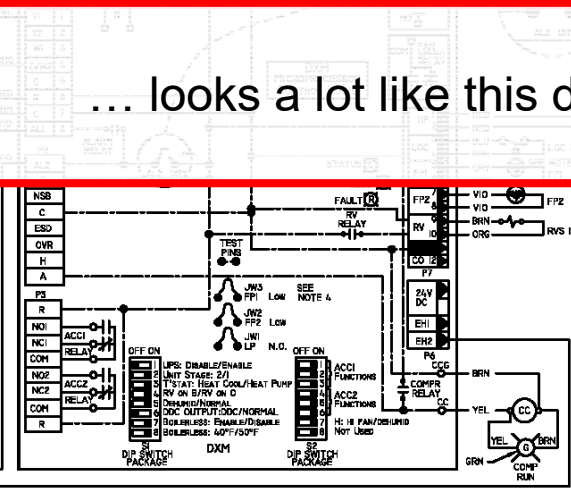
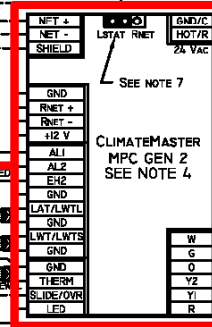
FACTORY LINE VOLTAGE WIRING
FACTORY LOW VOLTAGE WIRING
FIELD LINE VOLTAGE WIRING
FIELD LOW VOLTAGE WIRING
CONTROL CIRCUIT TRACE
RELAY CONTACTOR COIL
HEAT PUMP COIL
THERMISTOR
INDICATOR LIGHT
GREEN, R-RED
COMP ON (ALARM LIGHT)
FUSE CAP



... looks a lot like this device

Physically, this device ...

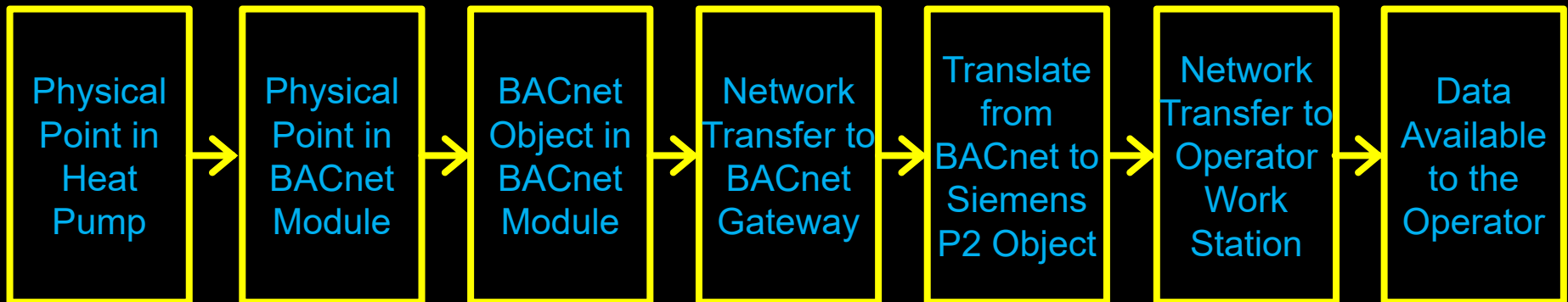
PRIMARY LEAD COLOR	PRIMARY VOLTAGE
RED	208
ORG	230
VIO	330
BRN	440
BLK/RED	480



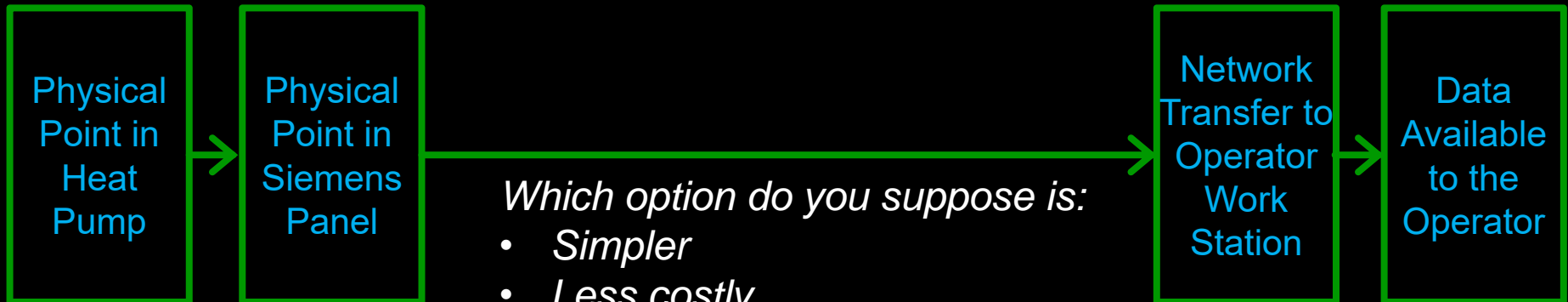
TAB 10-2 - BACNET VS. HARDWIRED INTEGRATION

BACnet to Water Source Heat Pump Integration

Option 1



Option 2



Which option do you suppose is:

- *Simpler*
- *Less costly*
- *Faster*
- *Easier to understand and maintain*

To B or Not to B, that is the Question

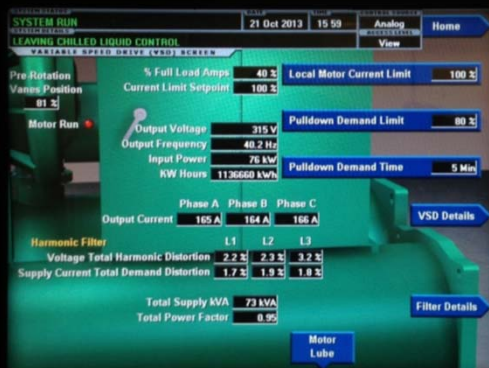
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To B or Not to B

A BACnet Interface to a Machine May be Desirable if:

- The information you need is already available at a network level from the equipment
- Caveat
 - Think twice if you want to use this data for control vs. monitoring
 - Control loops over networks = not good



TAB 10-2 - BACNET VS. HARDWIRED INTEGRATION

To B or Not to B

A BACnet Interface to a Machine
May be Desirable if:

- You need to interface to complex equipment with proprietary control processes, especially if a failure to control properly could cause a warranty problem



Mitsubishi Variable Flow Refrigeration
System Branch Controller

To B or Not to B

A BACnet Interface to a Machine May NOT be Desirable if:

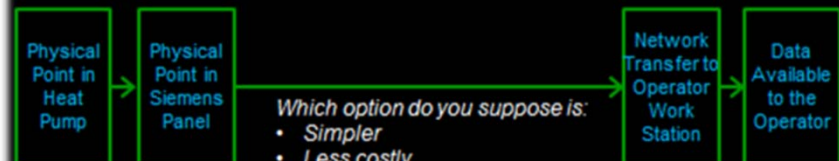
- It makes things more complex not less complex
- It doesn't provide the information you need or want

BACnet to Water Source Heat Pump Integration

Option 1



Option 2



Which option do you suppose is:

- *Simpler*
- *Less costly*
- *Faster*
- *Easier to understand and maintain*

To B or Not to B

A BACnet Interface to a Machine
May NOT be Desirable if:

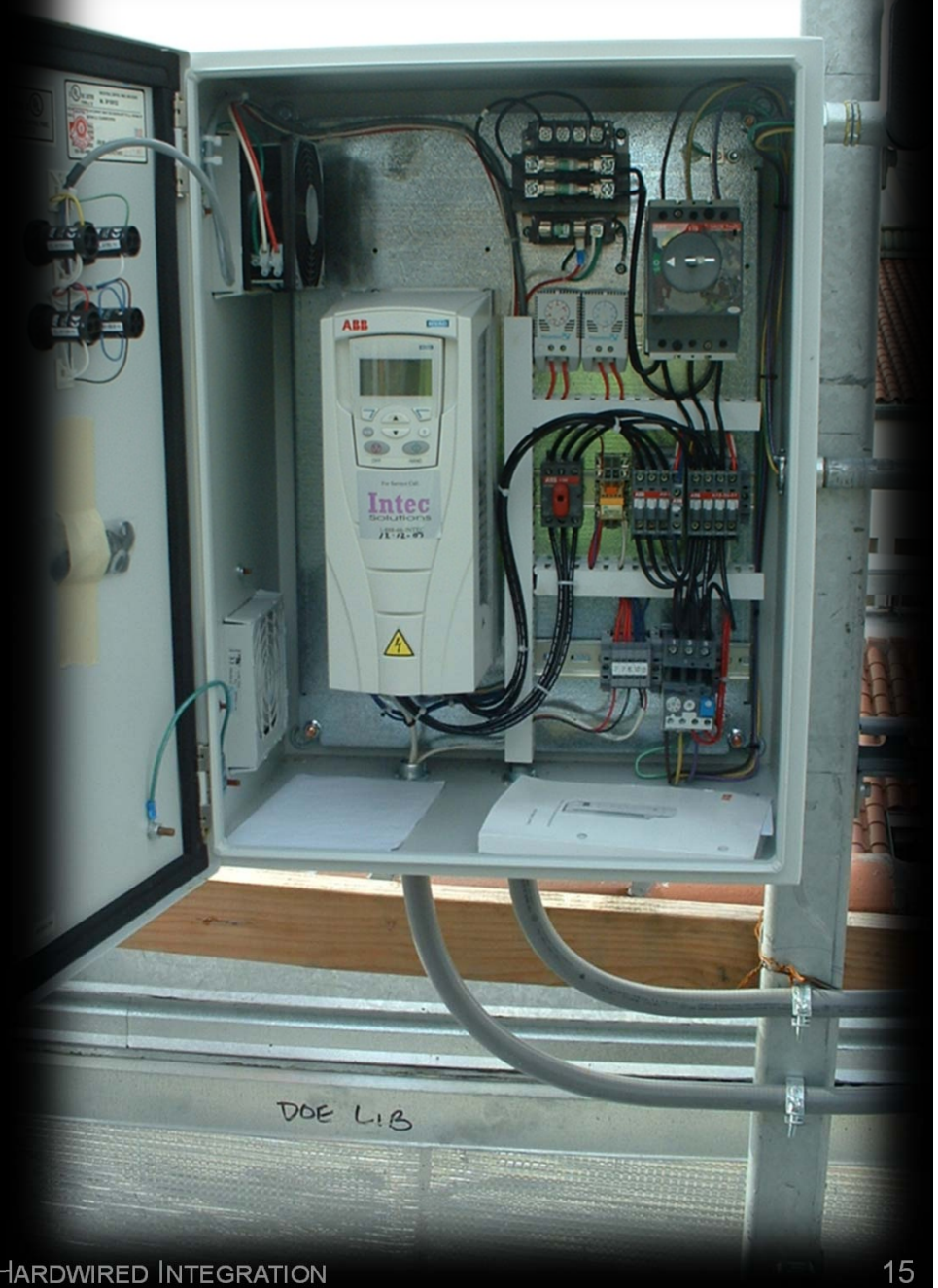
- It makes things more complex not less complex
- It doesn't provide the information you need or want
- It provides more information than you need or want



To B or Not to B

Sometimes, you need both:

- Variable Speed Drives
 - Hardwire control points
 - Use the network to pick up power and diagnostic information



To B or Not to B

Sometimes, you need both:

- Variable Speed Drives
 - Hardwire control points
 - Use the network to pick up power and diagnostic information
- Variable Flow Refrigeration Systems
 - Supplement the BACnet points to flag emerging problems and the need to log into the proprietary control system for deep diagnostics

