Operation & Maintenance Manual

OM 931-7

Group: **WSHP**

Part Number: **910285961**

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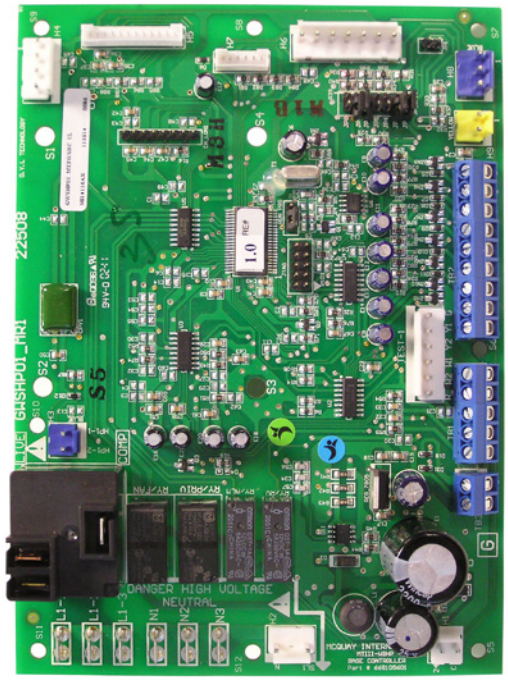
MicroTech® III Unit Controller for Water Source Heat Pump Units

Used with Enfinity Models CCH/CCW, VFC/VFW, MHC/MHW, LVC/LVW



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This installation and operation manual covers the MicroTech® III unit controller for Daikin Water Source Heat Pumps. For information on LONWORKS® or BACnet® communication modules and other ancillary components, see:

- IM 927 - MicroTech III Water Source Heat Pump LONWORKS Communication Module.
- IM 928 - MicroTech III Water Source Heat Pump Unit Controller BACnet MS/TP Communication Module.
- IM 933 - LONWORKS Plug-In Software for use with MicroTech III Unitary Controller - LONWORKS Communication Module.
- IM 952 - Multiple Unit Control Panel (MUCP) for use with MicroTech III Unit Controller and Mark IV Unit Controller.
- IM 955 - MicroTech III Water Source Heat Pump Wall-Mounted Room Temperature Sensors.
- IM 956 - Temperature Sensors for Units with MicroTech III Unit Controller and LONWORKS Communication Module.

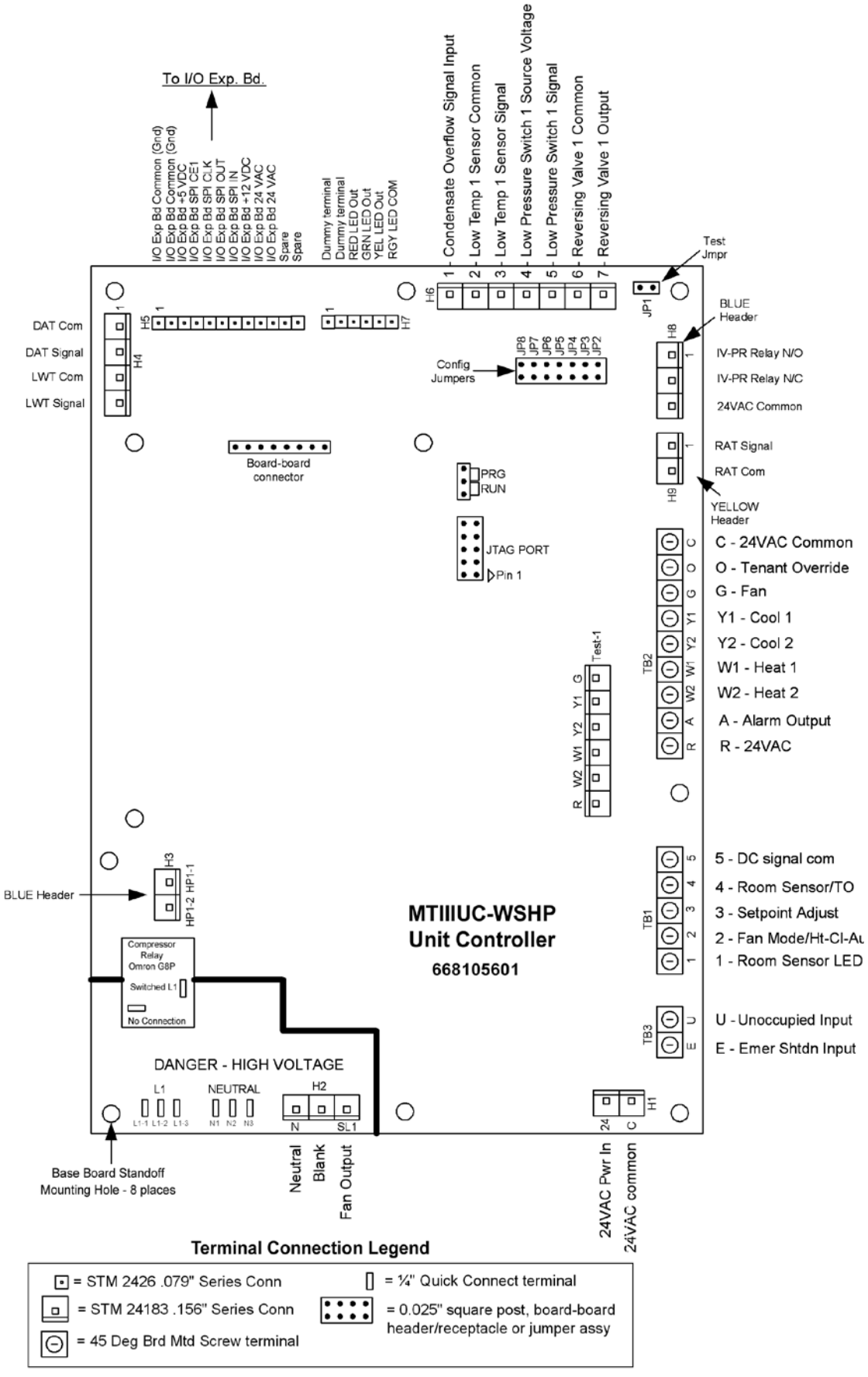
Control Boards Terminals and Connectors Descriptions

Table 1: MicroTech III Unit Controller Terminals & Descriptions

H1 – 1	24	24 VAC Power Input
H1 – 2	C	24 VAC common
H2 – 1	SL1	Fan Low Speed Output – Switched L1
H2 – 2		Blank Terminal
H2 – 3	N	Fan Low Speed Output – Neutral
H3 – 1	HP1-1	Comp High Pressure Switch (HP1) Input Terminal 1
H3 – 2	HP1-2	Comp High Pressure Switch (HP1) Input Terminal 2
H4 – 1	1	Discharge Air Temp Sensor – Common
H4 – 2		Discharge Air Temp Sensor – Signal
H4 – 3		Leaving Water Temp Sensor – Common
H4 – 4		Leaving Water Temp Sensor – Signal
H5 – 1	1	Connections to I/O Expansion Board
H5 – 2		
H5 – 3		
H5 – 4		
H5 – 5		
H5 – 6		
H5 – 7		
H5 – 8		
H5 – 9		
H5 – 10		
H5 – 11		
H5 – 12		
H6 – 1	1	Condensate Overflow Signal Input
H6 – 2		Compressor Suction Temp Sensor (LT1) – Common
H6 – 3		Compressor Suction Temp Sensor (LT1) – Signal
H6 – 4		Compressor Low Pressure Switch (LP1) – Source Voltage
H6 – 5		Compressor Low Pressure Switch (LP1) – Signal
H6 – 6		Reversing Valve – Common
H6 – 7		Reversing Valve – Output
H7 – 1	1	No Connection
H7 – 2		No Connection
H7 – 3		Red LED Output
H7 – 4		Green LED Output
H7 – 5		Yellow LED Output
H7 – 6		Red-Green-Yellow LED Common
H8 – 1	1	Isolation Valve/Pump Request Relay N/O
H8 – 2		Isolation Valve/Pump Request Relay N/C
H8 – 3		24 VAC Common
H9 – 1	1	Room Temp Sensor & Tenant Override – Signal
H9 – 2		Room Temp Sensor & Tenant Override – Common
TB1 – 1	1	Room Sensor – Status LED Output
TB1 – 2	2	Room Sensor – Fan Mode & Unit Mode Switches
TB1 – 3	3	Room Sensor – Setpoint Adjust Potentiometer
TB1 – 4	4	Room Sensor – Room Temp Sensor & Tenant Override
TB1 – 5	5	Room Sensor – DC Signal Common
TB2 – 1	R	24 VAC
TB2 – 2	A	Alarm Output
TB2 – 3	W2	Thermostat – Heat Stage #2 (W2) Input
TB2 – 4	W1	Thermostat – Heat Stage #1 (W1) Input
TB2 – 5	Y2	Thermostat – Cool Stage #2 (Y2) Input
TB2 – 6	Y1	Thermostat – Cool Stage #1 (Y1) Input
TB2 – 7	G	Thermostat – Fan Input
TB2 – 8	O	Thermostat – Tenant Override Input
TB2 – 9	C	24 VAC Common
TB3 – 1	E	Emergency Shutdown Input
TB3 – 2	U	Unoccupied/Occupied Input
L1 – 1	L1 - 1	Line Voltage Terminal 1
L1 – 2	L1 - 2	Line Voltage Terminal 2
L1 – 3	L1 - 3	Line Voltage Terminal 3
N1	N1	Neutral Terminal 1
N2	N2	Neutral Terminal 2
N3	N3	Neutral Terminal 3
COMP Relay	SWL1	Switch – L1 Voltage
	L1	No Connection

MicroTech III Unit Controller Connections

Figure 1: MicroTech III Unit Controller Terminal Locations



⚠ CAUTION

The MicroTech III circuit board incorporates static sensitive devices. A static charge from touching the device can damage the electronic components. To help prevent damage during service, use static discharge wrist straps. Static discharge wrist straps are grounded to the heat pump chassis through a 1 Mohm resistor.

Replacing A MicroTech III Circuit Board:

1. Connect wrist strap to unit.
2. Remove faulty board and place on static protected surface.
3. Remove replacement board from static protected bag.

Do not touch circuit board; hold by edges.

4. Holding board in grounded hand, install board in unit.
5. Insert faulty board in empty static bag for return.

Initial Power-Up

Pre start check list:

A random start delay time between 300 and 360 seconds is generated at power up.

Figure 2: Location of Configuration Jumpers on the Base Board Controller

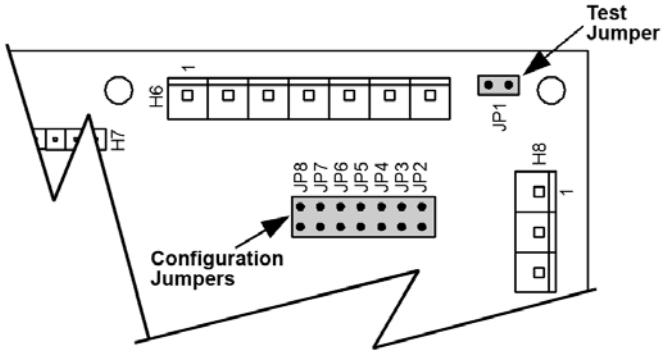


Table 2: Configuration Jumper Settings

Baseboard Description	Jumper(s)	Jumper Setting	Function
Normal / Test Mode	JP1	Open	Normal Operation
		Shorted	Service / Test Mode
Fan Operation	JP2	Open	Continuous Fan Operation (On), when not operating in the unoccupied mode.
		Shorted	Cycling Fan Operation (Auto)
Loop Fluid	JP3 (see warning)	Open	Water Loop Fluid (water freeze protection - factory default setting)
		Shorted	Glycol Loop Fluid (Systems with anti-freeze protection)
Alarm "A" Terminal Output Polarity	JP4	Open	Fault de-energizes alarm output to 0VAC.
		Shorted	Fault energizes alarm output to 24VAC.
Room Sensor Setpoint Potentiometer Range	JP5	Open	Short Range: -3 to +3 ºF (-1.67 to +1.67 ºC)
		Shorted	Long Range: 55 to 95 ºF (12.78 to 35 ºC)
Thermostat / Room Sensor	JP6	Open	Thermostat Control
		Shorted	Room Sensor Control
Not Used	JP7	Open	–
Not Used	JP8	Open	–

⚠ WARNING

Proper antifreeze/water solution is required to minimize the potential of fluid freeze-up. Jumper JP3 is factory set for water freeze protection with the jumper open. Operation with anti-freeze protection requires JP3 to be field configured for the jumper closed. If unit is employing a fresh water system (no anti-freeze protection), it is extremely important that JP3 jumper setting remains in the open position (factory default setting) in order to shut down the unit at the appropriate water temperature to protect your heat pump from freezing. Failure to do so can result in unit damage and fluid leaks."

General Use and Information

The Microtech III unit controller is a water source heat pump control platform used to control the heat pump in all modes of operation, including fans, compressors, loop pumps, motorized valves, reversing valves, and all components used to control conditioned space temperature and humidity. By adding communications cards, (LONWORKS or BACnet) network integration is possible. The controller can be used with thermostat control or wall sensor control. All MicroTech III unit controller inputs must be operated by dry contacts powered by the control board's power terminals. No solid state devices (Triacs) may be used to operate MicroTech III unit controller inputs. No outside power sources may be used to operate MicroTech III. All units must be properly grounded per local code requirements. See the Installation and Maintenance bulletin specific to your Water Source Heat Pump.

Occupied Operation

Board LED Status – Occupied		
Yellow	Green	Red
Off	On	Off

The board will be in occupied mode if the unoccupied terminal (U) is open.

Thermostat Inputs (G, Y1, Y2, W1 and W2)

Thermostat inputs used during occupied operation are G, Y1, and W1, which when energized will activate the Fan Only, Cooling Mode, and Heating Mode respectively. Input W2 and Y2 work the same as W1 and Y1 respectively for single circuit units in occupied mode. For information on W2 and Y2 for dual circuit units, refer to "Dual Circuit Units" on page 17.

The MicroTech III unit controller is configured so that when either the Y1 or W1 input is energized the unit fan is also activated with Cooling or Heating Modes. In other words, energizing Y1 and G together will have the same effect as energizing just Y1. The W1 input has priority over the Y1 input. In situations when both inputs W1 and Y1 become energized (unlikely) in any order the unit will go into the Heating Mode as described below:

1. If the unit is in Cooling Mode, Y1 is energized. If W1 becomes energized and remains energized, the following will occur:
   - The compressor de-energizes.
   - The compressor restarts at 360 seconds (compressor minimum off timer).
   - The reversing valve output energizes within 5 seconds of the compressor being energized (Heating Mode position).
2. If the unit is in Cooling Mode, Y1 is energized. If W1 becomes energized momentarily, the controller de-energizes the compressor for 360 seconds (compressor minimum off timer) and then returns to the cooling mode.
3. However, if the unit is in Heating Mode, W1 is energized. If Y1 becomes energized the unit remains in Heating Mode.
4. Y2 is the second stage cooling, and applies to dual compressor units.

Control Inputs (HP, LP, SLTS, COF, U, E, O)

The control inputs are High Pressure (HP), Low Pressure (LP), Suction Line Temperature Sensor (SLTS), Condensate Overflow (COF), Unoccupied (U), and Remote Shutdown (E). The control inputs are in normal states during occupied mode. The state of each control in occupied mode during normal operation is as follows:

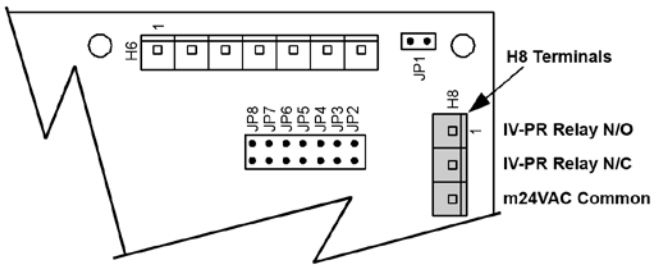
- High / Low Pressure (HP, LP): energizes, switch is closed (no fault).
- Suction Line Temperature Sensor (SLTS): temperature sensor on the suction line which provides low temperature protection.
- Condensate Overflow(COF):sensing no condensate water in the condensate drain pan (no fault).
- Unoccupied (U): open (no signal).
- Remote Shutdown (E): open (no signal).
- Tenant Override (O): has no effect in occupied mode.

Control Outputs [A and IV/PR (H8)]

The control outputs are Alarm Fault (A) and Isolation Valve / Pump Request [IV/PR (H8)]. The operation of the control outputs during occupied mode is as follows:

- When JP4 is open the (A) terminal will be energized, when there is no fault.
- When JP4 is shorted the (A) terminal is de-energized, when there is no fault.
- Isolation Valve / Pump Request [IV/PR (H8)]: is selectable to be energized when the compressor is off (normally closed), or when the compressor is on (normally open), by moving the wire lead to the appropriate terminal.

Figure 3: H8 Terminals on MicroTech III Board



Fan Operation

The G terminal controls continuous fan operation. The fan runs continuously when the G terminal is energized, when not in unoccupied mode. When the G terminal is de-energized, the fan cycles with the compressor.

Cooling Mode

The Y1 terminal controls the Cooling Mode of operation. When the Y1 terminal is energized (24VAC), the following occurs:

1. The fan energizes.
2. The IV/PR (H8) control output de-energizes or energizes depending on the H8 terminal wiring (refer to Figure 3).
3. The compressor energizes after 45 seconds.
4. If the reversing valve output is energized, the reversing valve output will be de-energized 5 seconds after the compressor has been energized.

When the Y1 terminal is de-energized, the following occurs:

1. The compressor de-energizes.
2. The fan de-energizes, unless the G terminal is energized (24VAC), or JP2 is open.
3. The IV/PR (H8) control output energizes or de-energizes depending on the H8 terminal wiring (refer to Figure 3).
4. The reversing valve output remains de-energized.

Note: *To prevent compressor cycling, the default minimum on time default is 180 seconds and the minimum off time is 360 seconds. This may cause the compressor time delay to be longer than indicated above.*

Heating Mode

The W1 terminal controls the occupied Heating Mode of operation. When the W1 terminal is energized, the following occurs:

1. The fan energizes
2. The IV/PR (H8) control output de-energizes or energizes depending on the H8 terminal wiring (refer to Figure 3).
3. The compressor energizes after 45 seconds.
4. If the reversing valve output is de-energized, the reversing valve output will be energized 5 seconds after the compressor has been energized.

When the W1 terminal is de-energized, the following occurs:

1. The compressor de-energizes.
2. The fan de-energizes, unless the G terminal is energized, or JP2 is open.
3. The IV/PR (H8) control output energizes or de-energizes depending on H8 terminal wiring (refer to Figure 3).
4. The reversing valve output remains energized.

Note: *To prevent compressor cycling, the default minimum on time default is 180 seconds and the minimum off time is 360 seconds. This may cause the compressor time delay to be longer than indicated above.*

Unoccupied Operation – Stand Alone Thermostat Control

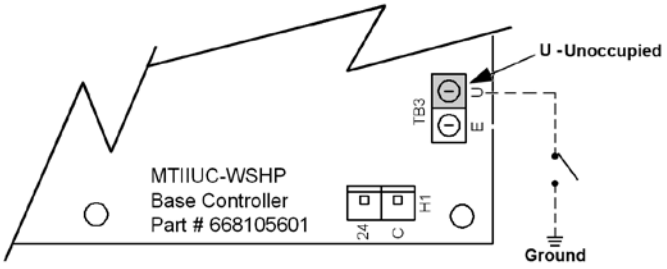
The board will be in unoccupied mode if the unoccupied terminal (U) is grounded.

Board LED Status – Unoccupied		
Yellow	**Green**	**Red**
On	On	Off

Thermostat Inputs (G, Y1, Y2, W1, and W2)

The only thermostat input recognized is W2, which when energized will activate heating mode. Inputs G, Y1, Y2 and W1 have no effect during unoccupied mode.

Figure 4: Terminal "U" - Grounded for Unoccupied



Note: *In unoccupied mode the control sequence is the same as occupied when W2 (heating) is energized. Note that the G input has no effect in unoccupied mode.*

Additional Operating Modes

Brownout Fault

Board LED Status – Brownout		
Yellow	**Green**	**Red**
Off	Flash	Off

Brownout condition is provided to protect the water source heat pump's motor electrical damage due to low voltage conditions.

The MicroTech III unit controller is designed to monitor the 24VAC power supply to the board. If the line voltage supplied to the water source heat pump drops, the 24VAC supply to the control board will also drop. When the line voltage supplied to the unit drops below approximately 80% of the unit nameplate rated value, the controller goes into brownout condition. The controller remains in brownout condition until line voltage returns to approximately 90% of the unit nameplate value.

When in brownout condition, thermostat and control inputs have no affect upon unit operation. No faults or modes have higher priority than a brownout fault condition. Remote shutdown and brownout conditions have the same level of priority. See "Priority of Faults and Modes" on page 12 and Table 4 on page 12.

When the unit is in brownout condition the following occurs:

1. The compressor de-energizes.
2. The pump de-energizes.
3. The fan de-energizes.
4. When JP4 is open the (A) terminal will be de-energized, when there is a fault. A to C will be used to indicate an alarm signal.

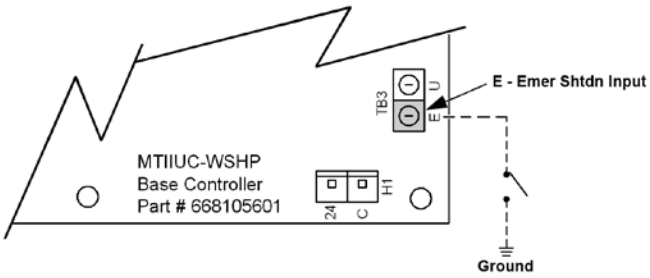
When the line voltage supplied to the unit returns to acceptable levels (~90% of nameplate) the controller returns to normal operation.

Remote Shutdown Mode

Board LED Status – Remote Shutdown		
Yellow	**Green**	**Red**
Off	Flash	Off

When the E terminal is grounded, the MicroTech III unit controller enters remote shutdown mode. Remote shutdown is provided so that when properly connected to a building automation system, remote switch, etc., the E terminal can be used to shut down the water source heat pump.

Figure 5: Terminal "E" - Grounded for Remote Shutdown



When in remote shutdown (E terminal grounded), thermostat and control inputs have no affect upon unit operation. No faults or modes have higher priority than remote shutdown. Remote shutdown and brownout condition have the same level of priority. See "Priority of Faults and Modes" on page 12 and Table 4 on page 12.

When the unit is in remote shutdown mode, the following occurs:

1. The compressor de-energizes.
2. The pump de-energizes.
3. The fan de-energizes.
4. When JP4 is open the (A) terminal will be energized, when there is no fault. A to C will be used to indicate an alarm signal.

When the E terminal is no longer grounded the unit will automatically return to normal operation.

Note: *The remote shutdown input (E) will suspend unit operation. Disconnect power when servicing the unit/controller.*

Important Alarm Interaction Note:

Note: *If a "compressor low suction temperature" or "freeze fault" alarm is active prior to receiving the emergency shutdown input, the fixed 60 second defrost process will continue until its completion. When the defrost process is complete, the unit shall be shutdown.*

High / Low Pressure Faults (HP/LP)

Normally closed high and low refrigerant pressure switches help protect the water source heat pump from excessively high or low refrigerant pressures. The MicroTech III unit controller monitors these switches individually. If the compressor is running and the HP circuit is open, the controller enters a pressure fault mode. If the LP circuit is open after a time delay (default of 30 seconds, adjustable if a communication module is present) the controller enters a low pressure fault mode. The fan operates normally during a pressure fault condition.

Board LED Status – High/Low Pressure Faults			
Pressure	**Yellow**	**Green**	**Red**
HP	Off	Off	Flash
LP	Off	Off	Solid

Only brownout and remote shutdown modes have higher priority than the pressure fault mode. See "Priority of Faults and Modes" on page 12 and Table 4 on page 12.

When the unit is in high or low pressure fault mode the following occurs:

1. When JP4 is open the (A) terminal will be de-energized, when there is a fault. A to C will be used to indicate an alarm signal.
2. The compressor de-energizes.
3. The fan de-energizes.
4. After the shutdown is complete the IV/PR(H8) output will change state. (On to Off / Off to On).

High or Low Pressure Reset

After the HP or LP circuit is closed, the unit does not return to normal operation until the control board is reset. The unit is locked out in this manner until the unit can be serviced.

The control board is reset by a short interruption of unit power, by holding down the tenant override button for more than 10 seconds, or via the Building Automation System (BAS).

Low Suction Line Temperature Fault

Board LED Status – Low Suction Line Temperature Fault		
Yellow	**Green**	**Red**
Flash	Off	Off

Heating Mode

When the suction line temperature falls below 28°F on standard equipment (6.5°F on Geothermal) the low temperature fault generates the following:

- The reversing valve de-energizes. The compressor and fan continue to operate in cooling mode for 60 seconds, which results in a defrost mode. This defrosts any ice that may have accumulated in the water-to-refrigerant coil, because of a lack of condenser water flow in heat mode.
- In heat mode the low temperature fault is subject to Intelligent Reset.
- The fault terminal "A" changes state based on JP4 jumper in defrost mode. Terminal "A" will return to a normal "no fault" state when the temperature recovers to 36°F for standard loop water temperature (14.5°F for glycol protected loop temperature).

Cooling & Dehumid Mode

When the suction line temperature falls below 28°F in cool mode the:

- Compressor de-energizes.
- The fan continues to run for 60 seconds.
- Alarm output de-energizes, with JP4 = open.
- When the suction line temperature recovers to 36°F in cool mode the low temperature fault is subject to Intelligent Reset. Fault automatically clears when operating in the dehumidification mode.

Fan Only Mode

When the suction line temperature falls below the alarm temperature based on the previous control mode.

- Fan de-energizes.
- Alarm output de-energizes, when JP4 = open.
- In Fan Only mode, the low temperature fault is subject to Intelligent Reset if the previous operating mode was heating or cooling. If the previous operating mode was dehumid the alarm will auto clear.

Condensate Overflow

Board LED Status – Condensate Overflow		
Yellow	Green	Red
On	Off	Off

The MicroTech III unit controller's condensate sensor is designed to detect excessively high condensate water levels in the drain pan. When high condensate water level is detected during cooling mode, the controller enters into condensate overflow fault mode. The fan operates normally during the condensate overflow fault mode.

Some faults and modes have higher priority than condensate overflow fault mode. See "Priority of Faults and Modes" on page 12 and Table 4 on page 12.

When the unit senses a condensate overflow fault while in dehumidification or cooling mode the following occurs:

1. The compressor de-energizes.
2. When JP4 is open the (A) terminal will be de-energized, when there is a fault. A to C will be used to indicate an alarm signal.

When condensate levels return to normal, the controller will automatically return to normal operation.

Remote Reset of Automatic Lockouts

The Remote Reset feature provides the means to remotely reset some lockouts generated by high-pressure and/or low-temperature faults. When the MicroTech III unit controller is locked out due to one of these faults, and the cause of the fault condition has been cleared, energizing the O-terminal for 11 seconds or more forces the MicroTech III unit controller to clear the lockout. Cycling unit power also clears a lockout if the conditions causing the fault have been alleviated.

Intelligent Alarm Reset

The Intelligent Reset feature helps to minimize nuisance trips of automatic lockouts caused by low-temperature faults. This feature clears faults the first two times they occur within a 24-hour period and triggers an automatic lockout on the 3rd fault. The retry count is reset to zero every 24 hours. Refer to "Table 3: Faults"

Tenant Override

Note: *It is recommended that the "Occupied Operation" on page 7 and "Unoccupied Operation – Stand Alone Thermostat Control" on page 9 sections be reviewed prior to this section.*

The MicroTech III unit controller enters tenant override mode when the O terminal is energized for 4 to 10 seconds during a period when the Water Source Heat Pump is in unoccupied mode.

Tenant override allows a tenant, returning to the controlled space after the unit has been placed in unoccupied mode, to activate the tenant override input (O) and place the unit into occupied mode.

Any remote button or switch with momentary dry contacts can be used for this purpose. During the 2-hour tenant override period all the thermostat inputs will be used (see "Occupied Operation" on page 7) for unit operation. If the U terminal is still grounded after the 2-hour time limit, the unit will return to unoccupied mode. Refer to "Unoccupied Operation – Stand Alone Thermostat Control" on page 9.

Table 3: Faults

Note: *Faults will clear as defined in the table.*

Fault Description	Auto Recovery	Tenant Override Button Reset	Network Reset
Low Voltage Brownout	Yes	No	Yes
Compressor High Pressure	No	Yes	Yes
Compressor Low Pressure	No	Yes	Yes
Compressor Low Suction Temperature (Heating & Cooling Modes)	Yes [1]	Yes	Yes
Compressor Low Suction Temperature (Dehumidification Mode)	Yes	Yes	Yes
All Sensor Failures	No	No	Yes
Condensate Overflow	Yes	No	Yes
Low Entering Water Temperature	Yes	No	No
Serial EEPROM Corrupted	No	No	No
Invalid Jumper Configuration	No	No	No

Notes [1] *Indicates auto recover is subject to intelligent alarm reset. Alarm auto recovers on the first two occurrences, locked out on the third occurrence within 24 hour period. See "Intelligent Alarm Reset" above for further details.*

2. Cycling unit power will always reset any type of fault.

Fan Operation during most Modes, Faults and Shutdowns

The MicroTech III unit controller allows fan operation during most modes, faults and shutdowns to facilitate maximum space comfort and control. However, the fan does not operate during emergency shutdown or brownout condition. During most modes, faults, or shutdowns the fan will operate under the following conditions:

1. In occupied modes, the thermostat inputs G, Y1, or W1 are energized.
2. In unoccupied mode, the thermostat input W2 is energized.

Operation with the High Speed Jumper

- The MicroTech III unit controller includes a high-speed jumper terminal labeled JP1 to speed system check out and trouble-shooting. See Figure 2 on page 6 for JP1 location.

Note: *This jumper is intended for Daikin factory unit testing and should only be used by trained service technicians as several timing functions are reduced to speed system check out.*

- Disconnect power to the unit when installing or removing the high-speed jumper.
- The high speed jumper should only be used for a short period of time for testing of the unit's operation by a trained service technician. The jumper must be removed for normal unit operation.
- If the jumper is left on after system check out, the unit may be damaged.

Priority of Faults and Modes

The MicroTech III unit controller is configured with mode and fault priorities. Table 4 illustrates that the lower the priority level number, the higher the priority of the fault or mode. There are some exceptions to this priority list. For example, tenant override has no affect on occupied modes.

Table 4: Priority Level of Faults and Modes

Priority Level	Mode or Fault
1	Emergency Shutdown Mode
2	Brownout
3	Compressor High Pressure
4	Compressor Low Pressure
5	Compressor Suction Temp Sensor Fail
6	Compressor Low Suction Temp
7	Room Temp Sensor Fail
8	EWT Sensor Fail
9	Condensate Overflow
10	Serial EEPROM Corrupted
11	Invalid Jumper Configuration
12	Low Entering Water Temp
13	Service Test Mode
14	Unoccupied Mode
15	Occupied, Bypass, Standby or Tenant Override

Table 5: MicroTech III Unit Controller Status LED's

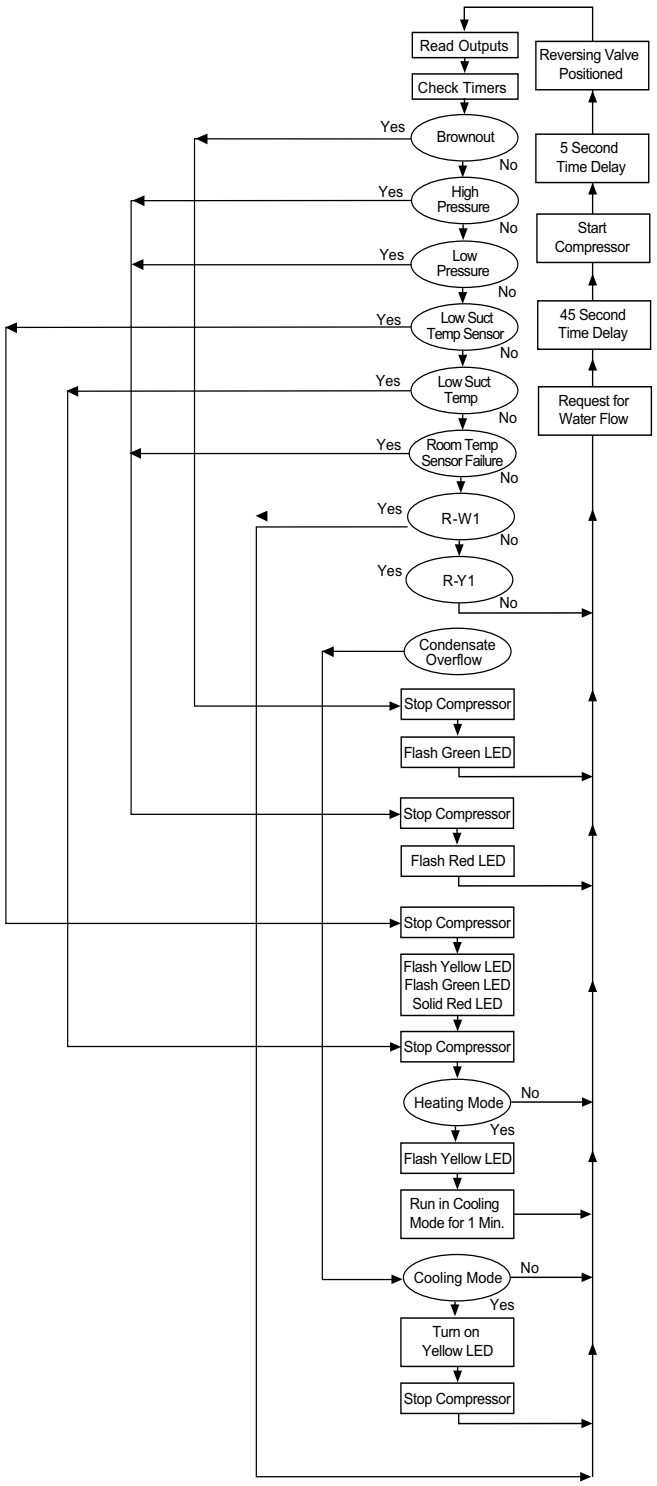
Description	Type	Yellow	Green	Red
Emergency Shutdown	Mode	OFF	Flash	OFF
Low Voltage Brownout	Fault	OFF	Flash	OFF
Compressor #1 High Pressure (HP1)	Fault	OFF	OFF	Flash
Compressor #1 Low Pressure (LP1)	Fault	OFF	OFF	ON
Compressor #1 Low Suction Temp (LT1) Sensor Fail	Fault	Flash	Flash	ON
Compressor #1 Low Suction Temp (LT1)	Fault	Flash	OFF	OFF
Room Temp Sensor Fail (with Room Sensor Control Only)	Fault	Flash	Flash	ON
Condensate Overflow (Cooling & Dehumidification Modes Only)	Fault	ON	OFF	OFF
Low Entering Water Temp (Heating Compressor Inhibit; No Display with Boilerless EH)	Fault	Flash	OFF	Flash
Serial EEPROM Corrupted	Fault	ON	ON	ON
Service Test Mode Enabled	Mode	Flash	Flash	Flash
Unoccupied Mode	Mode	ON	ON	OFF
Occupied, Bypass, Standby, or Tenant Override Modes	Mode	OFF	ON	OFF

Troubleshooting the MicroTech III Unit Controller

⚠ DANGER

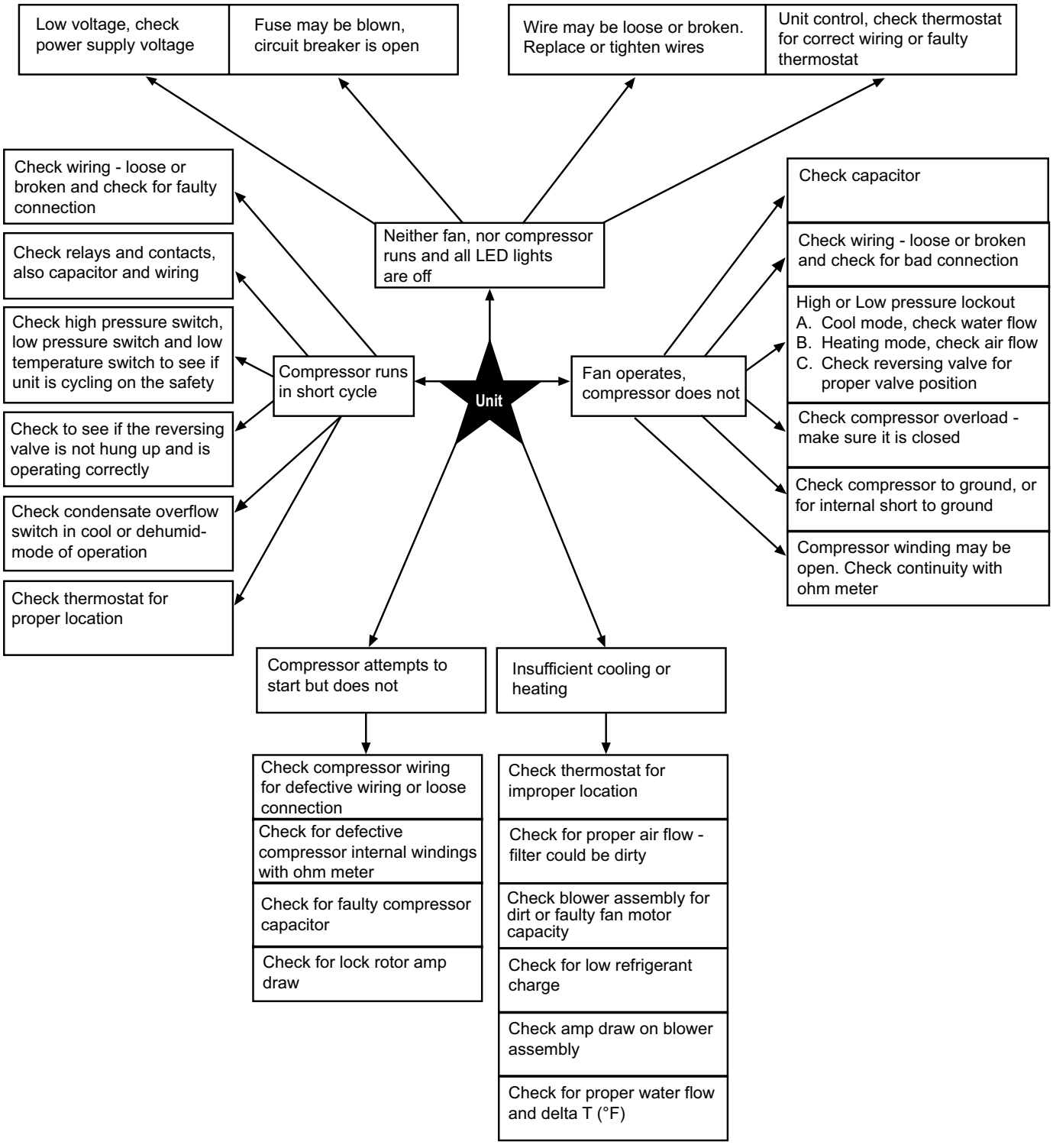
To avoid electrical shock, personal injury or death, be sure that field wiring complies with local and national fire, safety, and electrical codes, and voltage to the system is within the limits shown in the job-specific drawings and unit electrical data plate(s).Power supply to unit must be disconnected when making field connections. To avoid electrical shock, personal injury or death, be sure to rigorously adhere to field wiring procedures regarding proper lockout and tagout of components.

Figure 6: MicroTech III Unit Controller LED Status and Faults Troubleshooting Reference



Troubleshooting the Water Source Heat Pump Unit

Figure 7: Troubleshooting Guide - Unit Operation



Microtech® III Unit Controller Interface to External Equipment

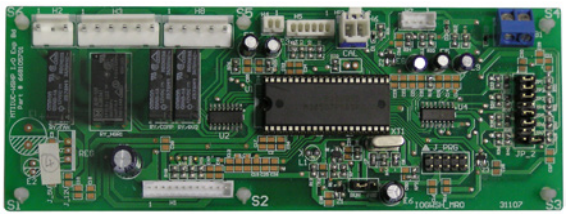
- The MicroTech III unit controller's thermostat input terminals may be directly interfaced with any standard or night setback thermostat that uses mechanical dry contacts. Power cannot be supplied from the water source heat pump for electronic thermostats that require a separate power supply for their internal operation except hose provided by Daikin. Only thermostats offered by Daikin are proven to operate properly with the MicroTech III unit controller. Daikin makes no guarantees about any other thermostat or control device interfaced by the end user with the MicroTech III unit controller.
- Care must be used to isolate all external power sources from the MicroTech III unit controller to prevent ground loops and other unpredictable electrical problems. Only dry mechanical contacts should be used to operate or interface with the MicroTech III unit controller's thermostat and or control inputs. Use mechanical relays to isolate two power systems when external equipment with its own power supply is used to interface with or control the MicroTech III unit controller's thermostat and or control inputs. For example, if you have a Building Automation System (BAS), controller, etc., and you wish to use a digital output from the building automation system or controller that is internally powered, then you must use an additional mechanical relay (not supplied by Daikin) to isolate the MicroTech III unit controller.
- Due to the nature of triacs and other solid state devices, triacs cannot be directly used to operate the MicroTech III's unit controller's thermostat or control inputs. To interface triacs or other solid state switching devices to the MicroTech III unit controller inputs, separate them from the board using mechanical relays. To do this, use the triac or solid state device to drive a mechanical relay (not supplied by Daikin), then use the mechanical relay's dry contacts to drive the desired MicroTech III unit controller input.
- The MicroTech III unit controller's valve or pump request terminal {IV/PR (H8)} is an output signal to external devices to allow water flow as required by the heat pump. The IV/PR (H8) terminal follows compressor operation inversely if connected to the normally open terminal and simultaneously when connected to the normally closed terminal. The IV/PR (H8) terminal can be used as a signal to an external pump or valve to enable flow to the unit. The compressor start is delayed for 45 seconds after the IV/PR (H8) output is energized.

Table 6: IV/PR(H8) Terminal and Compressor Operation

IV/PR(H8)	Compressor On	Compressor Off
Normally Open	24 VAC	0 VAC
Normally Closed	0 VAC	24 VAC

Appendix A

Operation and Maintenance of I/O Expansion Module



Introduction

The I/O Expansion Module is a field-installed option. It is an extension of the main board and provides extra functionality to the MicroTech III control system.

The I/O Expansion Module has 4 main purposes:

- The MicroTech III unit controller in combination with the I/O Expansion Module will be the standard control system for two stage Water Source Heat Pump equipment.
- The I/O Expansion Module has outputs to control boilerless electric or supplemental electric secondary heating options on a standard Water Source Heat Pump.
- The I/O Expansion Module has outputs for multi-speed fans on a standard Water Source Heat Pump.
- The I/O Expansion Module has an independent LED annunciator to identify operational fault conditions on second stage equipment.

Adding an I/O Expansion Module (with an interconnect cable) to the main controller allows two stage operation of the water source heat pump.

Features

Standard Heat Pumps / Single Circuit Units

- Monitors entering water temperature for boilerless electric heat control
- Outputs for medium and high speed fan controls

Second Circuit

- High pressure switch
- Low pressure switch
- Low suction line temperature sensor
- Compressor output
- Reversing valve

Initial Power up

Figure 8: I/O Expansion Board Configuration Jumper Terminals

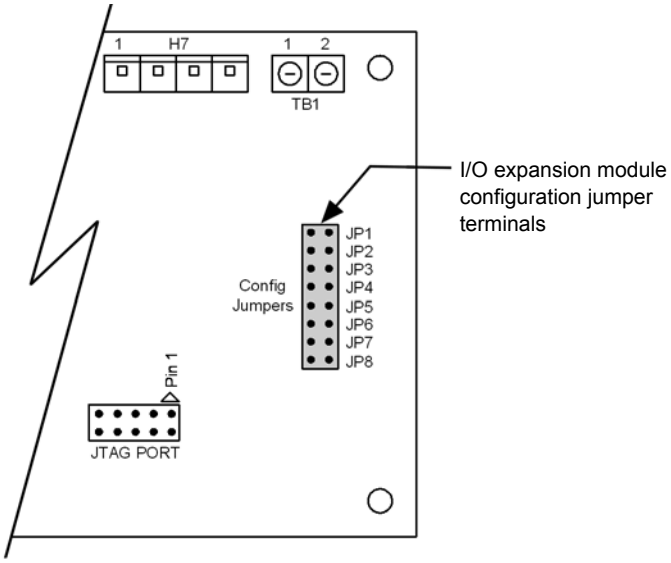


Table 7: I/O Expansion Board Configuration Jumper Settings

I/O Expansion Description	Jumper(s)	Jumper Setting		Model
Compressor Options	JP1	JP1	Open	Single Compressor Model (factory default setting)
		JP1	Shorted	Dual Compressor Model
Hot Gas/Water Reheat (HGR) Dehumidification	JP2	JP2	Open	None (default)
		JP2	Shorted	Hot Gas / Water Reheat (HGR)
Secondary Heating Options*	JP3 & JP4	JP3	Open	None
		JP4	Open	
		JP3	Shorted	Supplemental Electric Heat
		JP4	Open	
		JP3	Open	Boilerless Electric Heat
		JP4	Shorted	
Fan Speed Selection	JP5 & JP6	JP5	Open	Single Speed Fan (PSC motor)
		JP6	Open	
		JP5	Shorted	Two-Speed Fan (ECM motor)*
		JP6	Open	
		JP5	Open	Three-Speed Fan*
		JP6	Shorted	
Not Used	JP7	JP7	Open	–
Lead Compressor Option	JP8	JP8	Open	Compressor #1 is Lead
		JP8	Shorted	Compressor #2 is Lead (Valid for Dual Compressor Models Only)

** I/O Expansion module supplied with Secondary Heating Options (Boilerless or Supplemental Electric Heat Options) and EC motor.*

Dual Circuit Units

- Provides standard lead / lag operation for two compressors in dual circuit units
- The lag circuit will be enabled after the interstage timer has expired. The interstage timer defaults to 300 seconds
- HP, LP, SLTS fault for either circuit one or circuit two, will lockout the individual compressor.

Thermostat Inputs (Y2, W2)

- The Y2 terminal which is cooling mode stage two, energizes the lag compressor
- If Y1 and Y2 thermostat inputs are active at the same time, interstage timers will be used to stage the compressor up and down
- The W2 terminal which is heating mode stage two, energizes the lag compressor.
- If W1 and W2 thermostat inputs are active at the same time, interstage timers will be used to stage the compressors up and down

Electric Heat Controls

Boilerless Heat Coil Control

- Turns on the factory installed heater when the water loop fluid entering water temperature is less than 55°F. The fixed 55°F is used when jumper JP3 setting is open
- For geothermal applications (glycol loop fluid), the factory installed electric heater turns on when the entering water temperature is less than 28°F. The fixed 28°F is used when jumper JP3 setting is shorted

Note: *In both cases the compressor is shut down.*

Multiple Speed Fan Control

- When the Water Source Heat Pump is equipped with an I/O Expansion Module and factory installed electric heat, three speed fan control is possible.
- If the thermostat is calling for continuous fan operation and the compressor is not running the fan motor will run in low speed.
- If there is a call for heating or cooling (compressor is running) the fan motor will run in medium speed.
- If the electric heater is enabled the fan motor will run in high speed.

Note: *On units with an I/O Expansion Module and no electric heat, it is possible to configure the I/O Expansion Module for a two speed fan. If there is a call for continuous fan (compressor off) the fan motor runs in low speed. If there is a call for heating or cooling (compressor on) the fan motor runs at high speed.*

Three-Speed Fan Operations

Table 8: Three-Speed Fan

	Continuous Fan	Compressor On	Electric Heat
Space Temp Satisfied	Low Speed	Off	Off
Compressor Heating/Cooling	Off	Med. Speed	Off
Electric Heat Enabled	Off	Off	High Speed

Two-Speed Fan Operations

Table 9: Two-Speed Fan

	Continuous Fan	Compressor On	Electric Heat
Space Temp Satisfied	Low Speed	Off	Off
Compressor Heating/Cooling	Off	High Speed	Off
Electric Heat Enabled	Off	Off	High Speed

Circuit Two, Additional Operating Modes

The I/O Expansion Module controls the second circuit high pressure, low pressure, and low suction line temperature operating conditions in the same manner as the main board controls the first circuit.

Table 10: I/O Expansion Module LED & Fault Outputs

Mode / Fault	Status LED's			Thermostat Output Terminal "A"
	Yellow	Green	Red	
Invalid Configuration Jumper Setting	Flash	Flash	Off	De-energized
Base Board Communication Failure	Off	Flash	Flash	N/A
High Pressure #2 Fault	Off	Off	Flash	De-energized
Low Pressure #2 Fault	Off	Off	On	De-energized
Low Suction Temp #2 Fault	Flash	Off	Off	De-energized
Sensor Failures Low Suction Low Suction Temp #2, [1] EWT (w/ Boilerless EH only)	Flash	Flash	On	De-energized
[2] Service Test Mode Enabled	Flash	Flash	Flash	Energized
Unoccupied Mode	On	On	Off	Energized
Occupied, Bypass, Standby, or Tenant Override Modes	Off	On	Off	Energized

Note: *All conditions in table 10 are with configuration jumper JP4 open on the main control board. Mode / Faults are listed in order of priority.*

1 *Boilerless electric heat only*

2 *Alarm/fault LED indications take precedence over service test mode LED indication. The controller shall use service test mode if the service test mode jumper is installed, even if the LED's indicate an alarm/fault.*

Second Circuit Faults

With the addition of the second circuit the fault recovery and reset table has new faults for the second circuit. Refer to "Table 3: Faults" on page 11.

Table 11: I/O Expansion Module Connections & Descriptions

H2	Description
Pin 1	Fan high speed normally open output
Pin 2	No connection
Pin 3	24 VAC Common
H3	
Pin 1	For future development
Pin 2	
Pin 3	
Pin 4	
Pin 5	
Pin 6	
H8	
Pin 1	Dual compressor: compressor 2 normally open output, all others fan medium speed normally open
Pin 2	24 VAC common
Pin 3	No connection
Pin 4	Dual compressor: reversing valve for circuit 2, all others electric heat
Pin 5	24 VAC common
H4	
Pin 1	Entering water temperature sensor signal
Pin 2	Entering water temperature sensor common
HP6	
HP2-1	High pressure switch for circuit 2
HP2-2	High pressure switch for circuit 2
H7	
Pin 1	Suction line temperature sensor circuit 2 signal
Pin 2	Suction line temperature sensor circuit 2 common
Pin 3	Low pressure switch circuit 2 signal
Pin 4	Low pressure switch circuit 2 source
H5	LED Annunciator
TB1	For future use

MicroTech III Unit Controller with LONWORKS® Communication Module

For installation and operation information on LONWORKS Communication Module and other ancillary control components, see:

- IM 927 - MicroTech III Water Source Heat Pump LONWORKS Communication Module.
- IM 933 - LonMaker Integration Plug-in Tool: For use with the MicroTech III Unit Controller.
- IM 955 - MicroTech III Wall Sensor for use with Microtech III Unit Controller

Each Daikin water source heat pump can be equipped with a LONWORKS communication module that is LONMARK 3.4 certified to meet the LONMARK Space Comfort Control (SCC) profile for heat pumps. The controller is microprocessor-based and is designed to communicate over a LONWORKS communications network. It can be factory or field-installed.

The unit controller is programmed and tested with all the logic required to monitor and control the unit. An optional wall sensor may be used with the communication module to provide limited local control of the Water Source Heat Pump. The unit controller monitors water and air temperatures and passes information to the communication module. The module communicates with the BAS, to provide network control of the Water Source Heat Pump.

Figure 9: LONWORKS Communication Module

The MicroTech III unit controller with communication module includes a unit-mounted return air, discharge air and leaving water temperature sensor. Wall mounted temperature sensors include setpoint adjustment and tenant override. The user has the capability of substituting the wall sensor with a duct-mounted return air sensor.

MicroTech III Unit Controller with LONWORKS Communication Module orchestrates the following unit operations:

- Enable heating and cooling to maintain setpoint based on a room sensor
- Enable fan and compressor operation
- Monitors all equipment protection controls
- Monitors room and discharge air temperatures
- Monitors leaving water temperature
- Relays status of all vital unit functions

The MicroTech III unit controller with communication module includes:

- Return Air Temperature sensor (RAT)(field-installed)
- Discharge Air Temperature sensor (DAT)(field-installed)
- Leaving Water Temperature sensor (LWT) (factory installed option)

Note: *Refer to IM 956-X for details to install (RAT) & (DAT) sensors.*

⚠ CAUTION

When an optional wall-mounted room temperature sensor is connected to the unit controller, the Return Air Temperature (RAT) sensor must not be installed. A wall-mounted room temperature sensor and the return air temperature sensor must not be connected simultaneously or the unit will not operate properly.

The communication module provides access to setpoints for operational control

Available wall sensors include:

- Room sensor with LED status and tenant override button
- Room sensor with LED status, tenant override button, and ±3°F setpoint adjustment
- Room sensor with LED status, tenant override button, 55° to 95°F setpoint adjustment

MicroTech III Controller with BACnet® Communication Module

For installation and operation information on MicroTech III unit controller and other ancillary components, see:

- IM 928 - MicroTech III Water Source Heat Pump BACnet Communication Module
- IM 955 - MicroTech III Wall Sensor For use with Microtech III Unit Controller

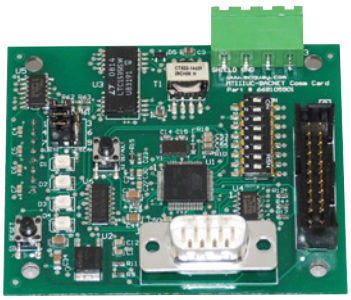
Daikin water source heat pumps are available with Daikin BACnet MS/TP communication module that is designed to communicate over a BACnet MS/TP communications network to a building automation system (BAS). It can be factory or field-installed.

The unit controller is programmed and tested with all the logic required to monitor and control the unit. An optional wall sensor may be used with the communication module to provide limited local control of the water source heat pump. The unit controller monitors water and air temperatures and passes information to the communication module. The module communicates with the BAS, to provide network control of the water source heat pump.

The module makes operational data and commands available on a communications network using BACnet objects and properties:

- The network cable is a shielded twisted-pair cable
- Network communications run up to 76.8 Kbps
- DIP switches on the controller enable the MS/TP MAC address to be set in the range 0-127
- Four green status LEDs on the communication module indicate communication activity on the MS/TP communication network and with the unit controller

Figure 10: MicroTech III BACnet MS/TP Snap-in Communication Module



MicroTech III Unit Controller with BACnet MS/TP Communication Module orchestrates the following unit operations:

- Enable heating and cooling to maintain setpoint based on a room sensor
- Enable fan and compressor operation
- Monitors all equipment protection controls
- Monitors room and discharge air temperatures
- Monitors leaving water temperature
- Relays status of all vital unit functions

The MicroTech III unit controller with communication module includes:

- Return Air Temperature sensor (RAT)(field-installed)
- Discharge Air Temperature sensor (DAT)(field-installed)
- Leaving Water Temperature sensor (LWT) (factory installed option)

Note: *Refer to IM 956-X for details to install (RAT) & (DAT) sensors.*

⚠ CAUTION

When an optional wall-mounted room temperature sensor is connected to the unit controller, the Return Air Temperature (RAT) sensor must not be installed. A wall-mounted room temperature sensor and the return air temperature sensor must not be connected simultaneously or the unit will not operate properly.

The communication module provides access to setpoints for operational control

Available wall sensors include:

- Room sensor with LED status and tenant override button
- Room sensor with LED status, tenant override button, and ±3°F setpoint adjustment
- Room sensor with LED status, tenant override button, 55° to 95°F setpoint adjustment

MicroTech III Unit Controller (Standalone) – 208/230/460/575/60Hz/3-Phase

Drawing No. 668991201

Shown with optional desuperheater pump wiring.
Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.

Legend

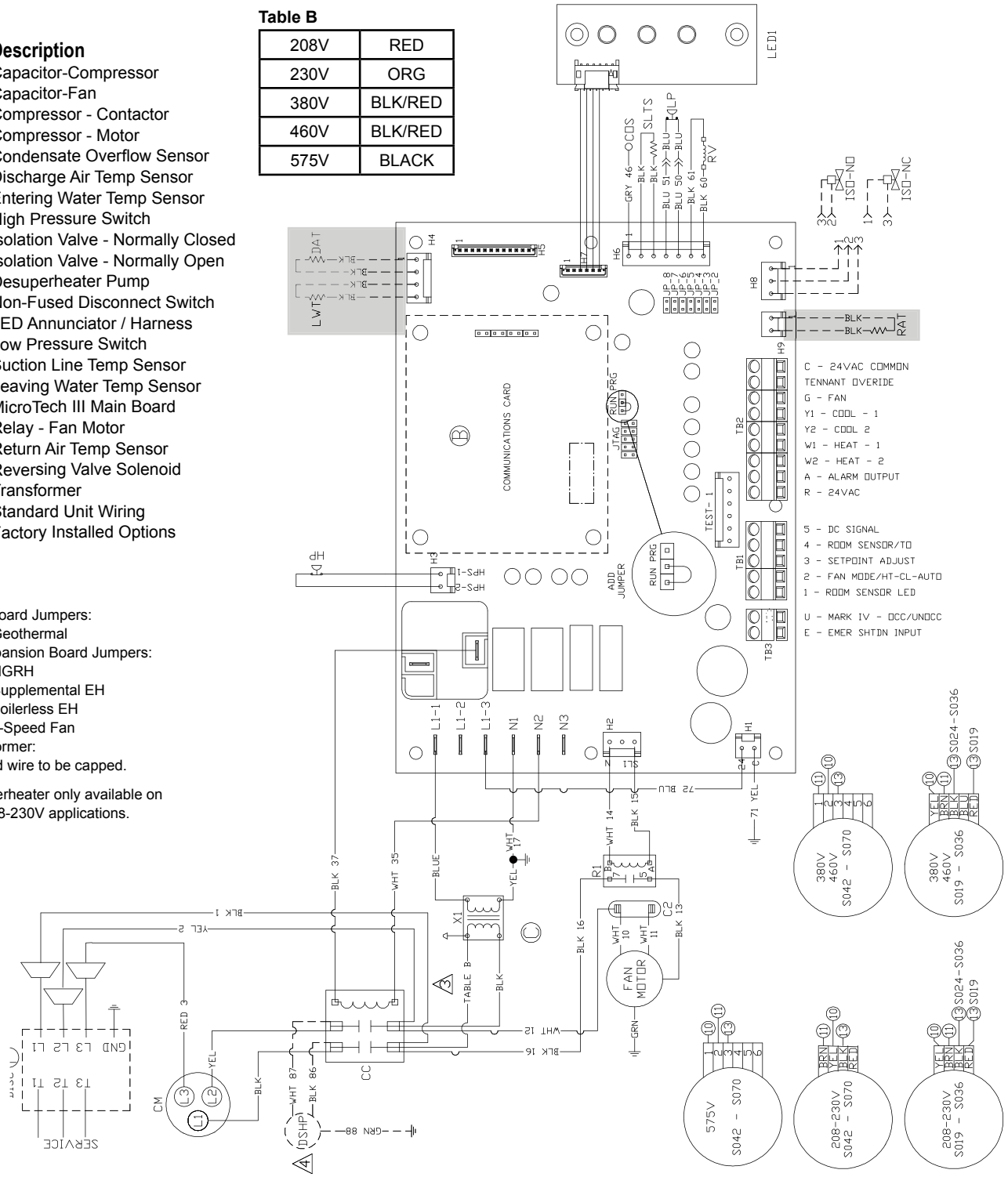
Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Compressor - Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
EWT	Entering Water Temp Sensor
HP	High Pressure Switch
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
DSHP	Desuperheater Pump
DISC	Non-Fused Disconnect Switch
LED1	LED Annunciator / Harness
LP	Low Pressure Switch
SLTS	Suction Line Temp Sensor
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
R1	Relay - Fan Motor
RAT	Return Air Temp Sensor
RV	Reversing Valve Solenoid
X1	Transformer
———	Standard Unit Wiring
– – – –	Factory Installed Options

Table B

208V	RED
230V	ORG
380V	BLK/RED
460V	BLK/RED
575V	BLACK

Notes:

1. Main Board Jumpers:
   JP3 - Geothermal
2. I/O Expansion Board Jumpers:
   JP2 - HGRH
   JP3 - Supplemental EH
   JP4 Boilerless EH
   JP5 2-Speed Fan
3. Transformer:
   Unused wire to be capped.
4. Desuperheater only available on 115-208-230V applications.



Note: *Gray tinted areas in the wiring diagram: Units with factory installed communication module include Discharge Air Temperature (DAT) and Return Air Temperature (RAT) sensors shipped loose and are field installed. The Leaving Water Temperature (LWT) sensor is factory installed. Entering Water Temperature (EWT) sensor is factory installed on units with Electric Heat.*

MicroTech III Unit Controller with Optional ECM Motor, Desuperheater and I/O Expansion Module – 208/230/60 Hz/1-Phase

Drawing No. 668991501
Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.

Legend

Item	Description
C1	Capacitor-Compressor
CC	Compressor - Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
DISC	Non-Fused Disconnect Switch
DSHP	Desuperheater Pump
HP	High Pressure Switch
IOEXP	IO Expansion Board / Harness
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
LED1	LED Annunciator / Harness
LED2	LED Annunciator / Harness
LP	Low Pressure Switch
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
P1	24VAC Supply IO Expansion Board
RAT	Return Air Temp Sensor
RV	Reversing Valve Solenoid
SLTS	Suction Line Temp Sensor
X1	Transformer
———	Standard Unit Wiring
– – – –	Factory Installed Options

Notes:

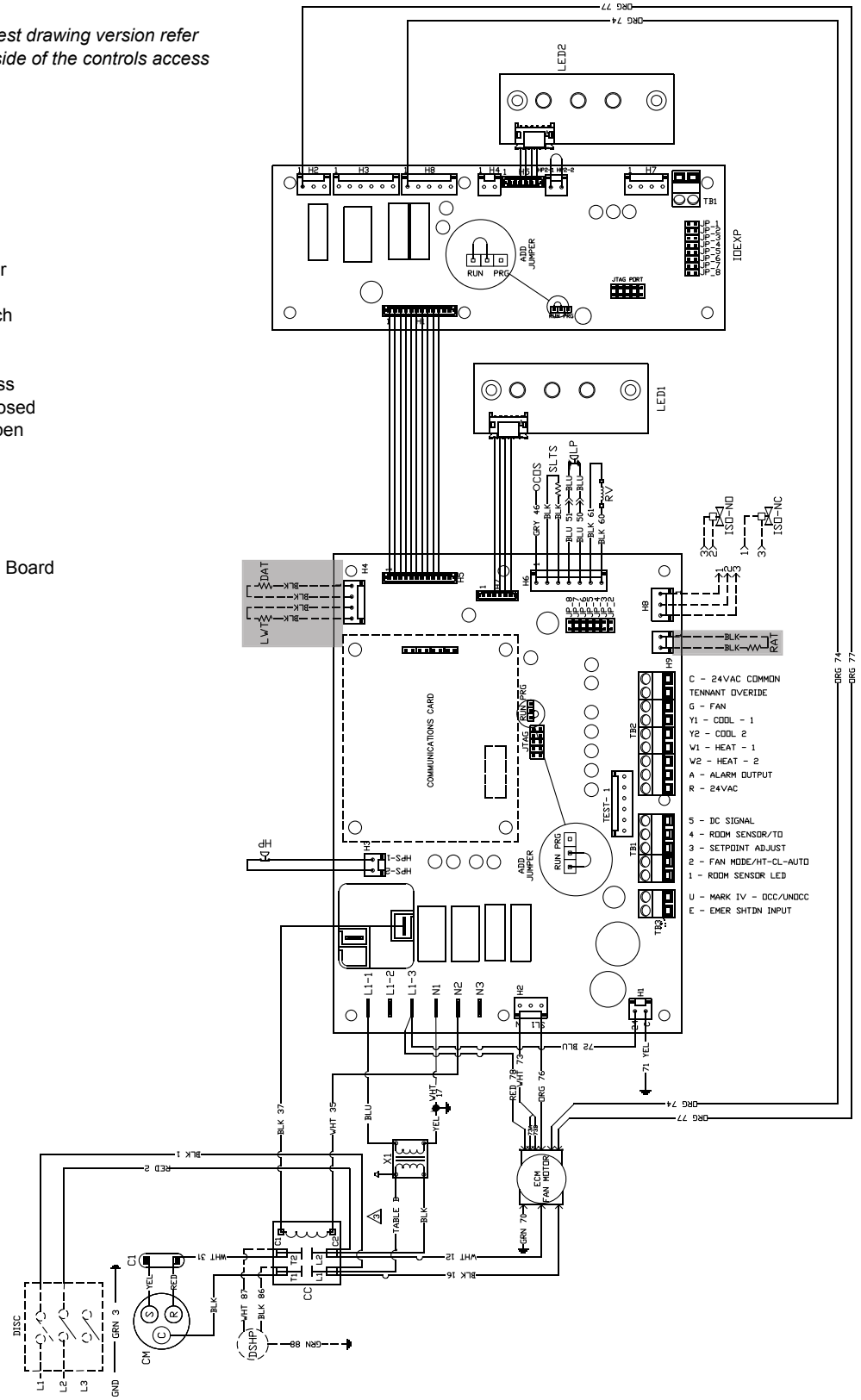
1. Main Board Jumpers:
   JP3 - Geothermal
2. I/O Expansion Board Jumpers:
   JP2 - HGRH
   JP3 - Supplemental EH
   JP4 Boilerless EH
   JP5 2-Speed Fan

⚠3 Transformer:
Unused wire to be capped.

⚠4 Desuperheater only available on 115-208-230V applications.

Table B

208V	RED
230V	ORG



Note: *Gray tinted areas in the wiring diagram: Units with factory installed communication module include Discharge Air Temperature (DAT) and Return Air Temperature (RAT) sensors shipped loose and are field installed. The Leaving Water Temperature (LWT) sensor is factory installed. Entering Water Temperature (EWT) sensor is factory installed on units with Electric Heat.*

MicroTech III Unit Controller with Optional ECM Motor, Desuperheater, Electric Heat Coil and I/O Expansion Module – 208/230/60 Hz/3-Phase

Drawing No. 668991301

Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.

Legend

Item	Description
CC	Compressor - Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
EWT	Entering Water Temp Sensor
HP	High Pressure Switch
HTR	Electric Heater Cartridge
IOEXP	IO Expansion Board / Harness
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
DSHP	Desuperheater Pump
LED1	LED Annunciator / Harness
LED2	LED Annunciator / Harness
LP	Low Pressure Switch
SLTS	Suction Line Temp Sensor
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
RAT	Return Air Temp Sensor
RV	Reversing Valve Solenoid
TB1	Power Terminal Block
X1	Primary 24VAC Transformer
———	Standard Unit Wiring
– – – –	Factory Installed Options

Notes:

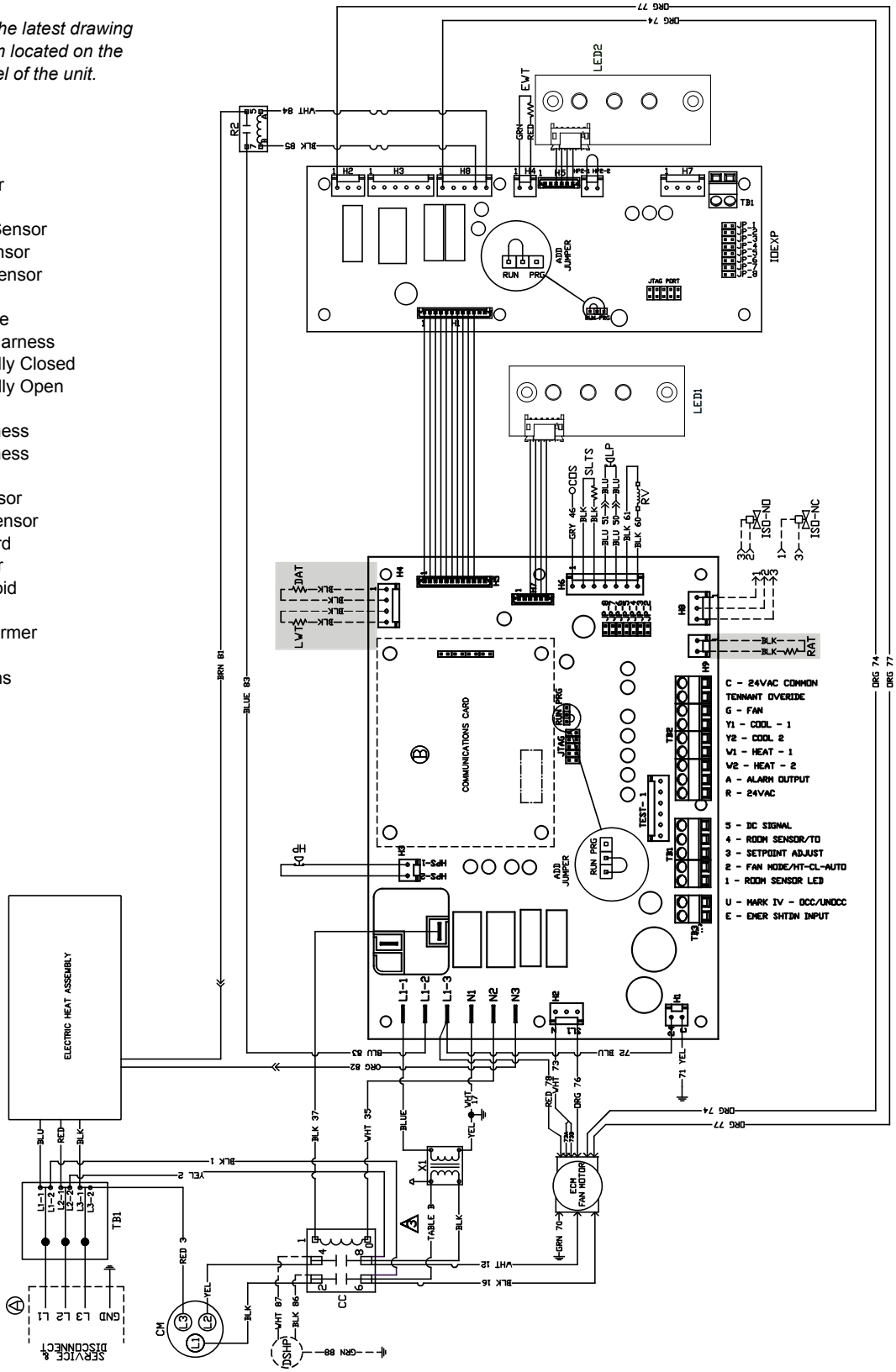
1. Main Board Jumpers:
   JP3 - Geothermal
2. I/O Expansion Board Jumpers:
   JP2 - HGRH
   JP3 - Supplemental EH
   JP4 Boilerless EH
   JP5 2-Speed Fan

⚠3 Transformer:
Unused wire to be capped.

⚠4 Desuperheater only available on 115-208-230V applications.

Table B

208V	RED
230V	ORG



Note: *Gray tinted areas in the wiring diagram: Units with factory installed communication module include Discharge Air Temperature (DAT) and Return Air Temperature (RAT) sensors shipped loose and are field installed. The Leaving Water Temperature (LWT) sensor is factory installed. Entering Water Temperature (EWT) sensor is factory installed on units with Electric Heat..*

MicroTech III Unit Controller with Optional ECM Motor, Desuperheater, and I/O Expansion Module 208/230/60/3-Phase

Drawing No. 668991401
Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.

Legend

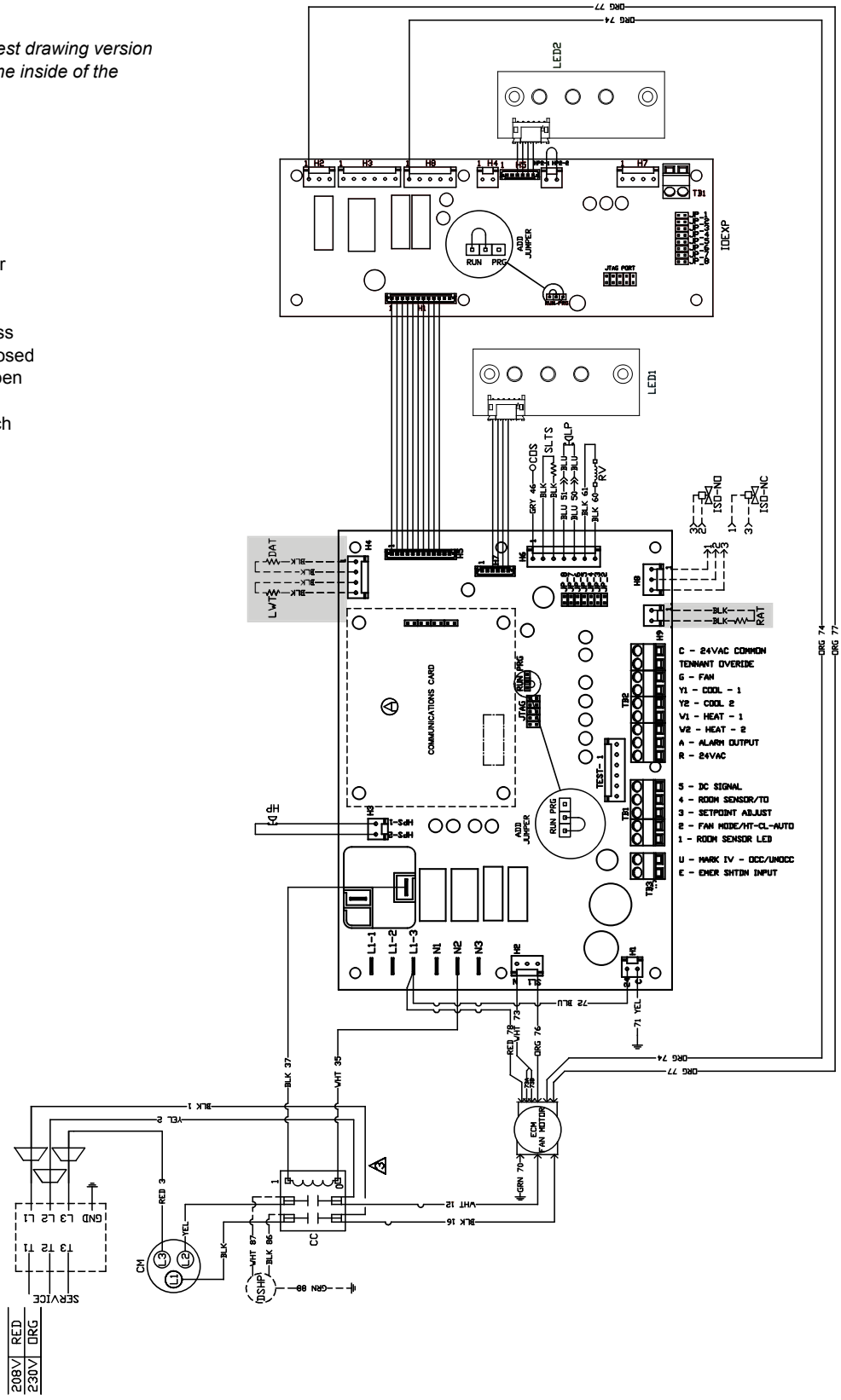
Item	Description
CC	Compressor - Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
HP	High Pressure Switch
HTR	Electric Heater Cartridge
IOEXP	IO Expansion Board / Harness
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
DSHP	Desuperheater Pump
DISC	Non-Fused Disconnect Switch
LED1	LED Annunciator / Harness
LED2	LED Annunciator / Harness
LP	Low Pressure Switch
SLTS	Suction Line Temp Sensor
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
RAT	Return Air Temp Sensor
RV	Reversing Valve Solenoid
X1	Primary 24VAC Transformer
———	Standard Unit Wiring
– – – –	Factory Installed Options

Notes:

1. Main Board Jumpers:
   JP3 - Geothermal
2. I/O Expansion Board Jumpers:
   JP2 - HGRH
   JP3 - Supplemental EH
   JP4 Boilerless EH
   JP5 2-Speed Fan
3. Transformer:
   Unused wire to be capped.
4. Desuperheater only available on 115-208-230V applications.

Table B

208V	RED
230V	ORG



Note: *Gray tinted areas in the wiring diagram: Units with factory installed communication module include Discharge Air Temperature (DAT) and Return Air Temperature (RAT) sensors shipped loose and are field installed. The Leaving Water Temperature (LWT) sensor is factory installed.*

MicroTech III Unit Controller with PSC Motor, Desuperheater and I/O Expansion Module for Hot Gas Reheat Control (Unit Sizes 019-070) 208/230/60/1-Phase

Drawing No. 669007101A

Wiring diagrams are typical. For the latest drawing version refer to the wiring diagram located on the inside of the controls access panel of the unit.

Legend

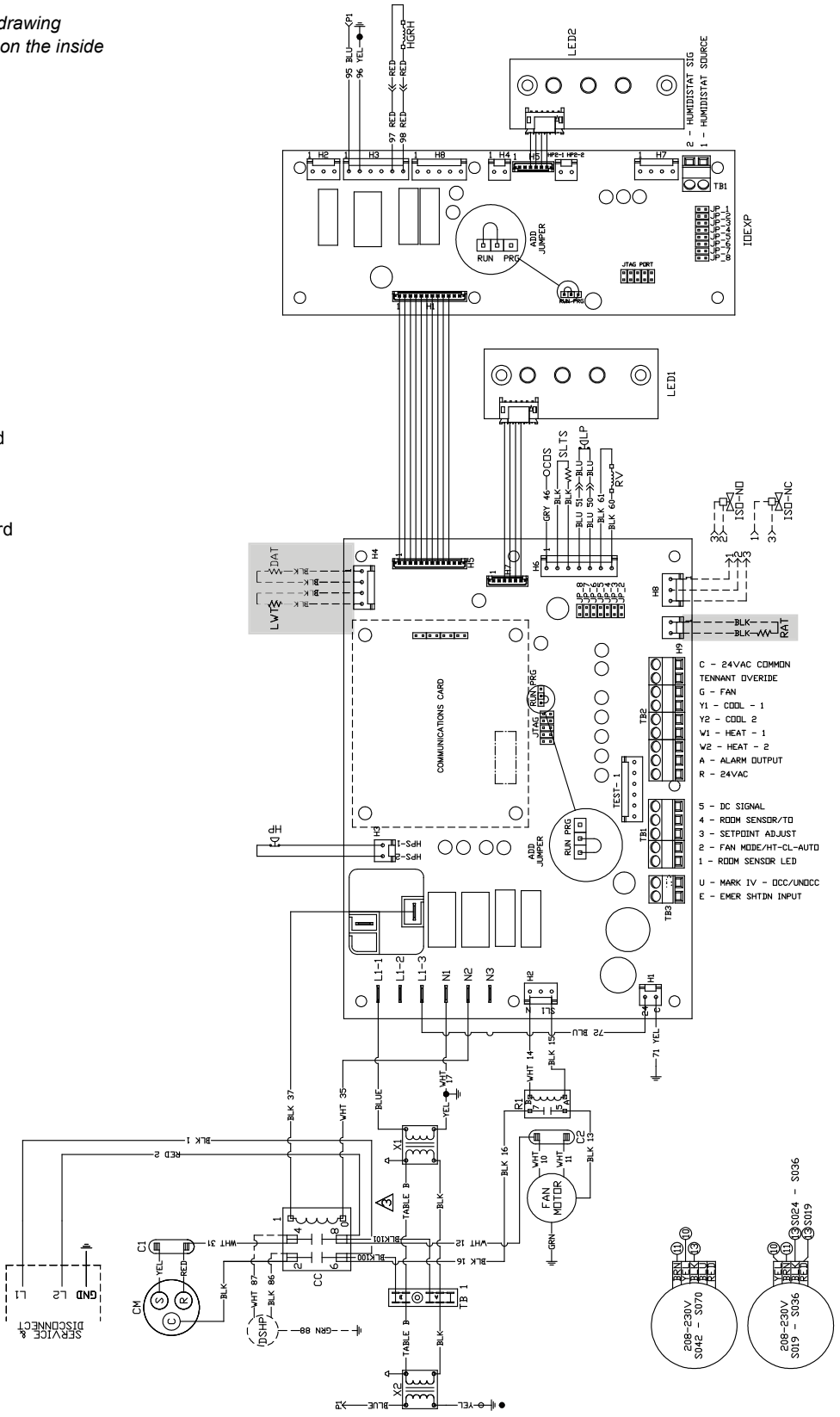
Item	Description
C1	Capacitor-Compressor
C2	Capacitor-Fan
CC	Compressor - Contactor
CM	Compressor - Motor
COS	Condensate Overflow Sensor
DAT	Discharge Air Temp Sensor
EWT	Entering Water Temp Sensor
HP	High Pressure Switch
HTR	Electric Heater Cartridge
IOEXP	IO Expansion Board / Harness
ISO-NC	Isolation Valve - Normally Closed
ISO-NO	Isolation Valve - Normally Open
DSHP	Desuperheater Pump
HGRH	3-Way Valve Solenoid
P1	24 VAC Supply I/O Expansion Brd
LED1	LED Annunciator / Harness
LED2	LED Annunciator / Harness
LP	Low Pressure Switch
SLTS	Suction Line Temp Sensor
LWT	Leaving Water Temp Sensor
MIII	MicroTech III Main Board
R1	Relay - Fan Motor
RAT	Return Air Temp Sensor
RV	Reversing Valve Solenoid
X1	Transformer
———	Standard Unit Wiring
– – – –	Optional Wiring (by others)

Notes:

1. Main Board Jumpers:
   JP3 - Geothermal
2. I/O Expansion Board Jumpers:
   JP2 - HGRH
   JP3 - Supplemental EH
   JP4 Boilerless EH
   JP5 2-Speed Fan
3. Transformer:
   Unused wire to be capped.
4. Desuperheater only available on 115-208-230V applications.

Table B

208V	RED
230V	ORG

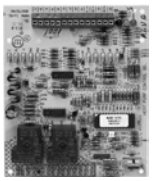
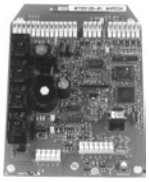


Note: *Gray tinted areas in the wiring diagram: Units with factory installed communication module include Discharge Air Temperature (DAT) and Return Air Temperature (RAT) sensors shipped loose and are field installed. The Leaving Water Temperature (LWT) sensor is factory installed. Entering Water Temperature (EWT) sensor is factory installed on units with Electric Heat.*

Controller Comparison Table

Note: *The Mark IV, MicroTech 2000, Alerton and MicroTech III boards are NOT interchangeable.*

Table 12: Control Boards and Features

Features	Mark IV 	MicroTech 2000 	Alerton 	MicroTech III 
DC Power	●	–	–	–
AC Power	●	●	●	●
Terminal Connection 1/4" Push-on	●	–	–	–
IDC Connection	–	●	●	●
Fault Indicators	●	●	–	●
Thermostatic Controls	●	–	–	●
Room Sensor	–	●	●	●
LONMARK Capable	–	●	–	●
LONWORKS Capable	–	●	–	–
BACnet Capable [1]	–	–	●	●
Motorized Valve Capability	–	●	●	●
Short Cycle Protection & Random Start	●	●	●	●
Unoccupied Mode	●	●	●	●
Override Mode	●	●	●	●
Pump Restart	●	●	●	●
Loadshed	●	●	●	–
Brownout Protection	●	●	●	●
Unit Shutdown	●	●	●	●
Condensate Overflow Protection	●	●	●	●
Remote Reset [1]	●	–	–	●
Intelligent Reset [1]	–	–	–	●
Dual Circuit Capability	●	●	●	●
Adjustable Set Points Through Software	–	●	●	●
Adjustable Fan Speed	–	–	–	●
Electric Heat Availability	–	–	–	●
Service Tools Needed at Start up	–	●	●	●
Dipswitch Settings	–	–	●	–
Programmable Front-end Settings	–	●	–	●
Switching Line Voltage	●	–	–	●

Notes: *● = Applies – = Does not apply*

[1] Alerton BACnet requires Alerton service tools for commissioning

[1] Alerton dipswitch settings must be configured during commissioning

[1] See Remote Reset and Intelligent Reset information under section: Additional Operating Modes

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