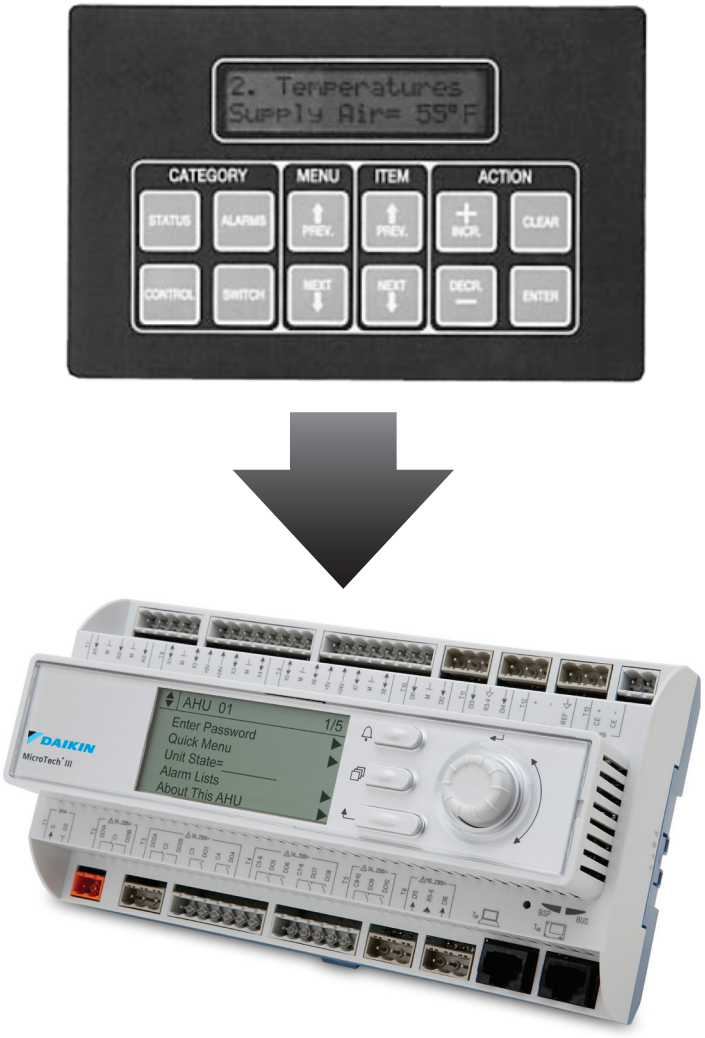
Installation and Maintenance

IM 1285-5

Group: **Applied Air Systems**
Part Number: **IM1285-5**
Date: **September 2023**

Self-Contained Systems

MicroTech® I to MicroTech® III Unit Controller Conversion



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Introduction

Warnings and Disclaimers

The following compiles a list of warnings and notes associated with the installation and operation of this kit. Make sure to follow these warnings, as well as always having properly trained technicians and electricians, or Daikin Applied-authorized technicians perform work.

Hazardous Information Messages

⚠ CAUTION

Cautions indicate potentially hazardous situations, which can result in personal injury or equipment damage if not avoided.

⚠ WARNING

Warnings indicate potentially hazardous situations, which can result in property damage, severe personal injury, or death if not avoided.

⚠ DANGER

Dangers indicate a hazardous situation which will result in death or serious injury if not avoided.

NOTICE

Notices give important information concerning a process, procedure, special handling or equipment attributes.

Approximate Labor Hours

The MicroTech I to MicroTech III conversion will require 32-48 hours of labor. This time can be increased or decreased depending on the experience and skill of the technician(s).

Table 1: Parts Kit (300062260) Components

Description	Daikin Applied Part Number	Quantity
Main Control Board - MTIII (MCB)	193407301	1
Expansion Module (EXP A,B, and C)	193407501	3
HMI Display	350147416	1
Controller Terminal Block – 2 pole	193410302	4
Controller Terminal Block – 3 pole	193410303	8
Controller Terminal Block – 5 pole	193410305	1
Controller Terminal Block – 6 pole	193410306	1
Controller Terminal Block – 7 pole	193410307	3
Controller Terminal Block – 8 pole	193410308	6
Terminal 2 × 2 spring Grey 2-row Jumper Ports	349930641	75
Terminal 2 × 2 Spring Green 2-row Jumper Ports (Ground)	349930647	5
Terminal Block End Stop Gray	874-144	12
Terminal Block End Plate Gray	349930741	12
Terminal Block Jumper – 2 Pole	349930942	2
Terminal Block Jumper – 3 Pole	349930943	1
Terminal Block Jumper – 4 Pole	349930944	2
Terminal Block Jumper – 5 Pole	349930945	15
Labeling Strips for Terminal 2 × 2 Spring Grey	N/A	N/A
Discharge Air Temperature Sensor (DAT)	193414602	1
Return Air Temperature Sensor (RAT)	332519704	1
Mixed Air Temperature Sensor (MAT)	193414602	1
Entering Water Temperature Sensor (EWT)	193414602	1
Sensor Plate	Q910115696	2
Sensor Support	497596010	2
Duct Static Pressure Sensor (SPS1)	910117462	1
Freezestat (FS1)	72502001	1
24 VAC, 0-10VDC Actuators (ACT 3 and ACT 4)	113149601 (Schneider)	2
Relay Subbase	193413701	5
24 VAC Relays (HP1-4 and R63)	193413601	5
DIN Rails (1 Meter)	349901938	2
White Wire Organizers 2" Depth	300044174	16
White Wire Organizers 2" Depth Cover	300044173	16
1 k ohm resistor for freezestat	44690110	2
1.5k ohm resistor for frost protection	44690151	1
T1 Transformer (480VAC >> 115VAC) 50VA	45684900	1
Connector Extension	193409701	3
Separator	193414802-03-04	4
Wire Connector Split Bolt 8-2 AWG	65812404	6

Table 2: Additional Parts Necessary

Description	
Label Maker	
20 AWG 600 V wire	
Spade Connectors	
Network Communication Card	
Communication Card Type • Choose a Network Communication Card from the list below if necessary. A 10 pin connector will also be necessary with a Communication Card. • The communication card is not included in the kit and must be ordered separately	**Part Number**
BACnet MSTP	90016710
BACnet Lon CAV	90016711
BACnet IP	90016709
BAC LonVAV	90016712
10 pin connector	300047027
BACnet MSTP	90016710
BACnet Lon CAV	90016711
BACnet IP	90016709
BAC LonVAV	90016712
10 pin connector	300047027

The purpose of this instruction manual is to guide a technician through the process of converting a MicroTech I Controller (MT I) to a MicroTech III Controller (MT III) on a Self-Contained unit. The MT III controller has an advanced navigation structure, improved metrics, trending data capability and network compatibility. Each Self-Contained unit will have small differences, such as the number of compressors or a VFD for the supply fan. Recognizing these differences and following the instructions throughout the manual will ensure a successful conversion.

NOTICE

Follow all Lock-Out Tag-Out procedures to minimize risks of injury during this procedure. Always use proper rigging and lifting procedures! Always wear appropriate levels of PPE governed by the hazards which are present.

Labeling Wires

Figure 1 shows a typical control panel layout before the conversion begins. Look for three electrical control boards mounted to the control panel: Main Control Board (MCB), Output Board, and Input Board (See Figure 2, Figure 3, and Figure 4). Before removing the three boards, each of the wires connected to the boards must be labeled with a label maker. Labeling the wires will allow the technician to be more organized and rewire the control panel correctly once the MicroTech III is installed.

Figure 1: Typical Control Panel Layout

Figure 2: Main Control Board (MCB)

Figure 3: Output Board

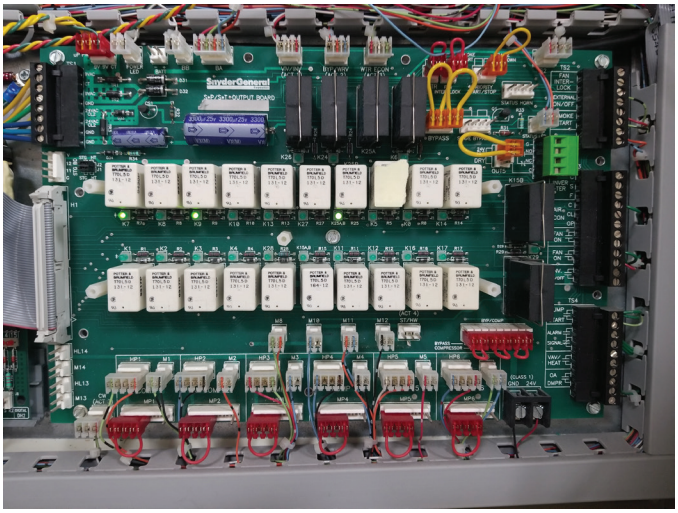
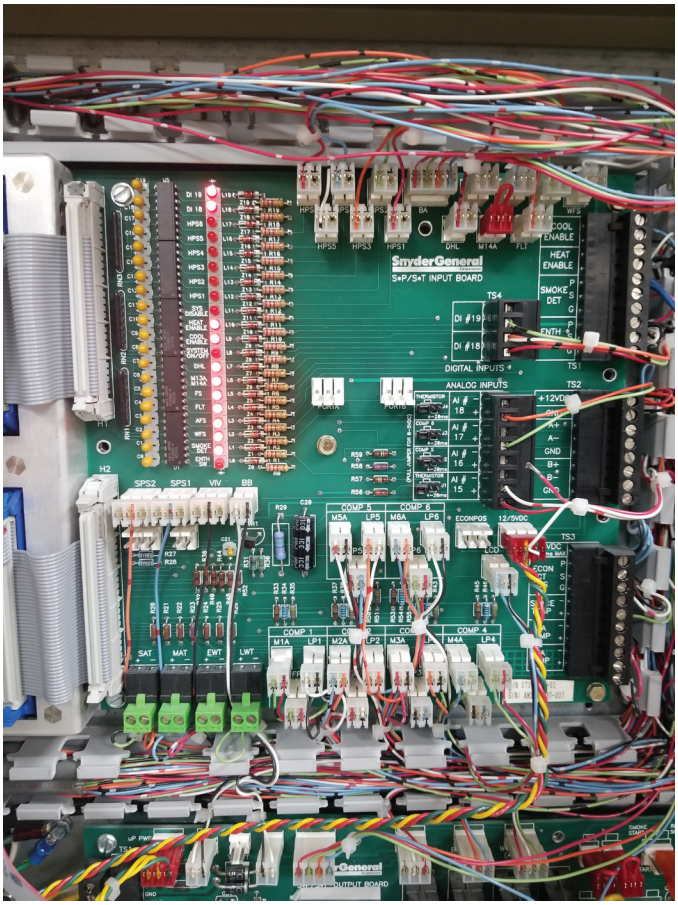


Figure 4: Input Board



Installation

MicroTech I Display and Board Removal

Once each of the wires is labeled, unplug all wires from MCB, Output Board, and Input Board. Leave all paired wires in their respective plugs to keep them organized. Unscrew each of the boards from the control panel. Remove the wires from the back of the MT I Display. Unscrew the display and remove from control panel. Figure 5 below shows the control panel with all wiring labeled and boards removed.

Figure 5: Control Panel without Components

Removing Temperature Sensors, Pressure Sensors and Pressure Switches

The following temperature sensors will need to be removed from the unit: DAT, RAT, MAT, EWT. Be aware and take note of the mounting location for each of these sensors because new sensors will be remounted and wired to the MT III MCB later on in this manual.

If the PC5, PC7 and DHL tubing does not need replacing, then save existing tubing. Be aware and take note of the high and low side of pressure designations to avoid erroneous readings after install.

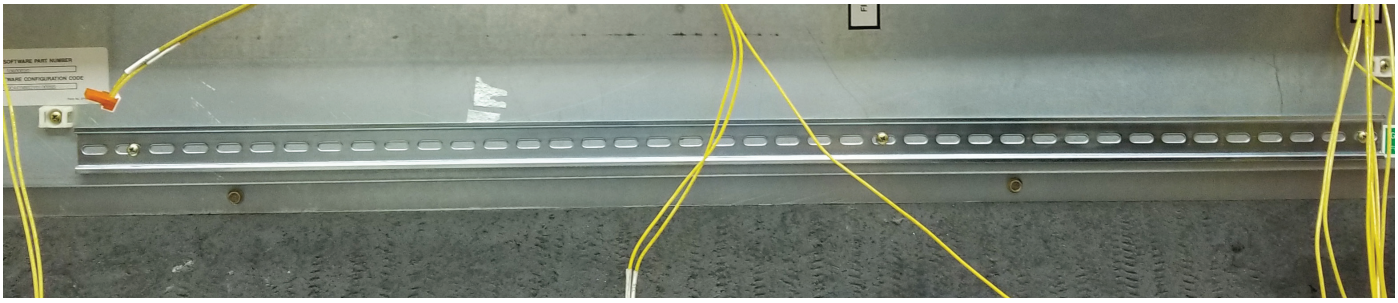
Installing DIN Rails, MicroTech III MCB, Expansion Modules, Relays, Terminal Blocks, and Wire Raceways

DIN Rails

Two separate DIN rails are required to mount the MT III, expansion modules, relays, and terminal blocks in the control panel. Position each 1 meter DIN rail in the control panel as shown in Figure 6 below. Use a level to ensure the components will mount properly to each DIN Rail. Screw through the DIN rail holes and into the control panel sheet metal backing. Adjust DIN rails as needed as space is limited within the control panel.

NOTE: Use the image in Appendix H on page 42 as a guide when laying out the components in the control panel.

Figure 6: DIN Rails

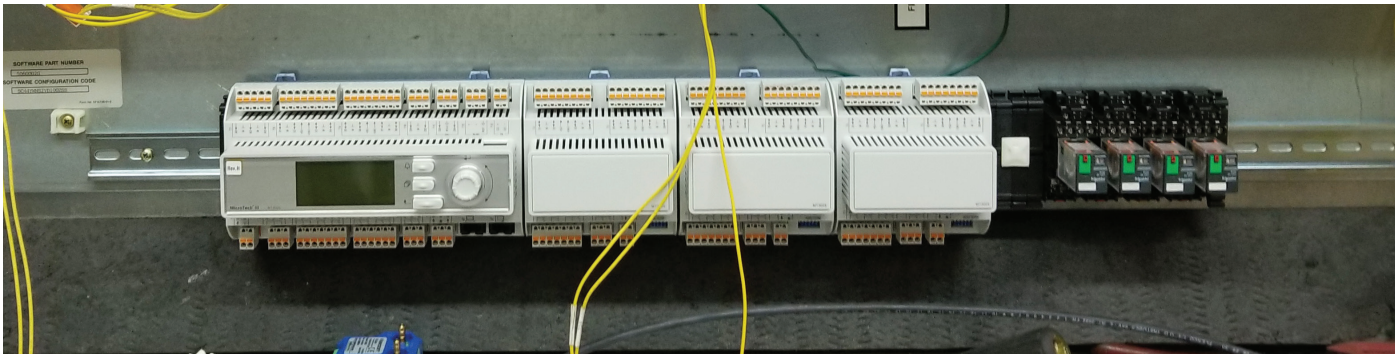


MicroTech III and Expansion Modules

Slide the MT III MCB onto the DIN rail and engage the tabs to secure it in place. Depending on the application, one or more Expansion Modules may be needed to be connected to the MT III MCB. To install an Expansion Module, slide the 8-pin connector into the left side of the Module and then slide the other end into the right side of the MT III MCB. Multiple Expansion Modules can be mounted to the right of the prior module as shown in Figure 7. Once each of the Expansion Modules is installed, they must be addressed by setting the dip switches. In the lower right corner of an Expansion Module, there are six white switches with blue backing. Appendix A shows how these dip switches should be set, depending on the type of Expansion Board.

NOTE: The last Expansion Module must have the sixth dip switch in the “up” position. The sixth switch acts as an end-of-line resistor and stops the MT III from looking for more Expansion Modules. See Appendix A on page 19 for details.

Figure 7: Expansion Modules



Relays

High Pressure Switch 1 (HP1), High Pressure Switch 2 (HP2), High Pressure Switch 3 (HP3), and High Pressure Switch 4 (HP4) each require a relay to indicate a high pressure alarm on the MT III. If any of the High Pressure Switches open, their respective relay will de-energize and the set of dry contacts will open. This will open the circuit to generate a high pressure alarm on the MT III. The R63 relay is necessary to indicate when the DHL switch is open. The R11 relay is required as part of the Water Flow Switch function. Slide the six 24 VAC relays onto the DIN rail. Spacers can be used to separate the MT III Expansion Modules from the relays. See Figure 7 for an example how the four relays are mounted on the DIN rail

NOTE: If the unit does not have a Water Flow Switch or one is not required, relay R11 is not necessary.

The number of High Pressure Switch relays required depends upon the number of compressors/circuits in the unit. Add or remove relays from the installation as necessary. See the wiring section of this manual for more information on where to wire additional relays for more than four compressors.

Terminal Blocks

In order to ensure organization and accuracy when wiring, five terminal blocks are required to be installed in the control panel of the unit. Each terminal block needs to be mounted on a DIN rail and is assembled by sliding each of the singular pieces together to form a block. Use the end plates to hold the terminal block pieces in place. The table below designates how many pieces are needed for each terminal block assembly. The white strip that designates the terminal numbers snaps into place in the center of each terminal block. See Figure 8 and Figure 9 for an example of the singular terminal block pieces and an assembled terminal block.

NOTE: Mechanical jumpers need to be installed across the bottom of each of terminal blocks, except TB3, in order to create an equal potential through the block. See Figure 15.

Table 3: Terminal Block Quantities

Terminal Block Name	Purpose	Number of Pieces
TB1A	115 VAC +	2
TB1B	115 VAC Common	2
TB2A	24 VAC +	8
TB2B	24 VAC Common	8
TBG	Ground	5
TB3	General	50

Figure 8: Single Terminal Block Pieces

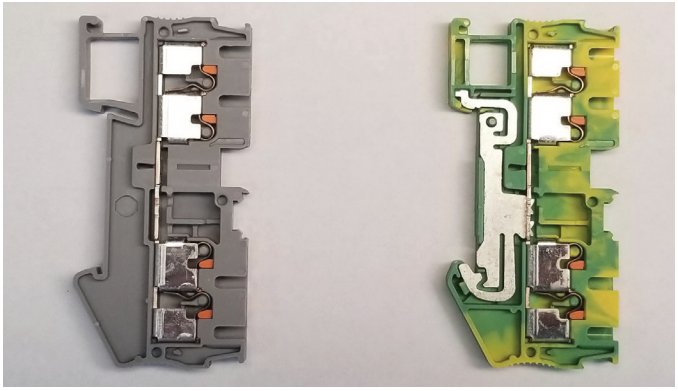
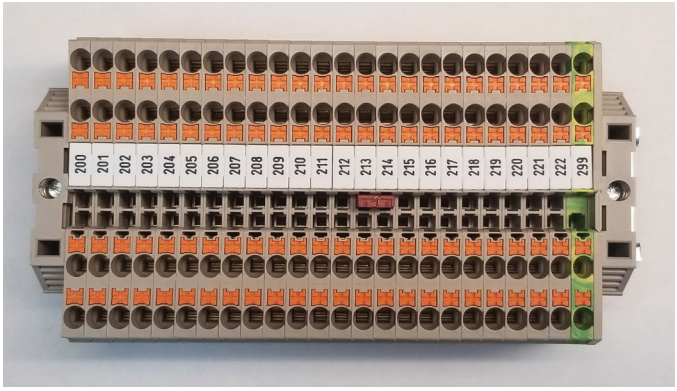


Figure 9: Assembled Terminal Block



Wire Raceways

The white wire raceways are designed to ensure an organized control panel. Mount the wire raceways as shown in the diagram in Appendix H on page 42. Fasten wire raceways to the control panel with screws.

Installing Remote HMI Display

Install the Remote HMI Display above the control panel in place of the old MT I display. Mount the Remote HMI Display by using the magnets found on the back of the display. See IM 1005 for details on wiring.

Installing the T1 Transformer

The MT III control panel requires two different transformers. T1 transforms 480V to 115V and T2 transforms 480V to 24V. The T2 transformer already exists within the self-contained unit's control panel. Mount the T1 transformer below the T2 transformer by screwing it into the control panel.

Installing PC5, PC7, DHL Tubing and DSP Transducer

Install new tubing for the pressure switches, if necessary, and confirm that it matches the diagram in Figure 10. If the unit requires a VFD, a Duct Static Pressure transducer (DSP) will need to be installed. The DSP is installed by mounting it on the top DIN rail. See Figure 11.

Figure 10: New DSP Tubing Diagram

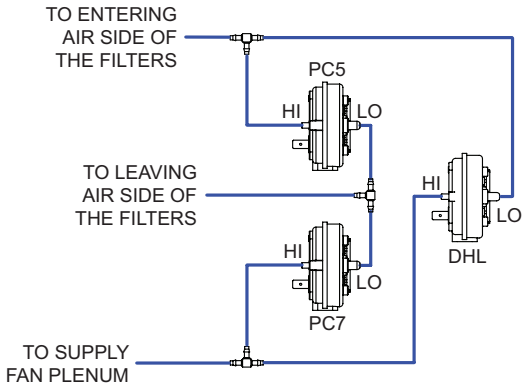
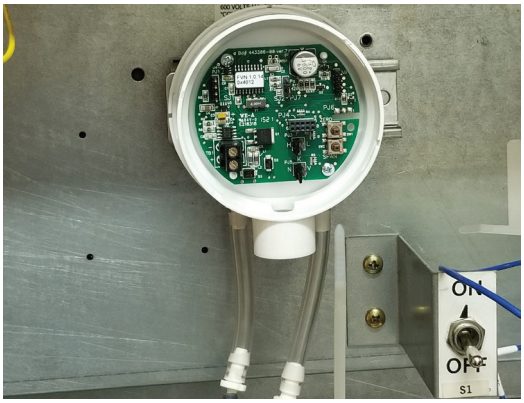


Figure 11: Duct Static Pressure (DSP) Transducer



Installing Freezestat

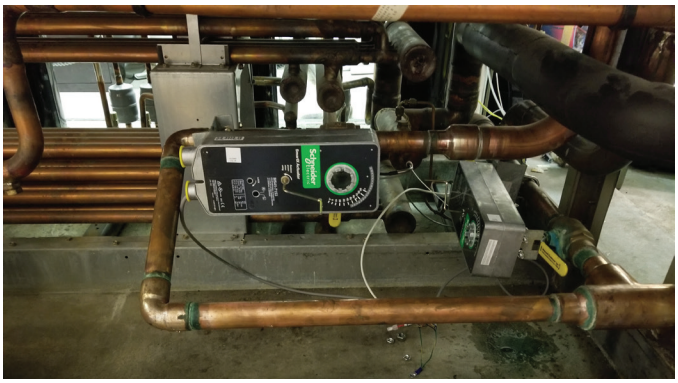
A non-averaging type freezestat (FS1) is used to protect hydronic coils from subfreezing temperatures. The control is mounted on the entering face of the economizer coil. Upon sensing a temperature above specification, the unit shuts down, opens the hydronic control valves, and sends an alarm indication via the MicroTech III controller. The freezestat has a field-adjustable set point range of 35°F to 45°F. To change the set point, turn the adjustment screw until the pointer is opposite the desired cutout point. The adjustment screw is accessible at the bottom of the freezestat switch or at the top when the cover is removed.

Installing Actuators for Waterside Economizer

A unit with Waterside Economizer Application requires two valves controlled by separate actuators. One valve is for the economizer and the other valve is the water regulator/bypass. Each of these valves has their own actuator, but function oppositely from each other. When the economizer valve opens, the water regulator/bypass valve will close and vice versa. Each actuator will need to be mounted with its polarity wired for direct or reverse acting function. A 0 VDC signal will fully close the economizer valve and the water regulator/bypass valve will be fully open. A 10 VDC signal will fully open the economizer valve and the water regulator/bypass valve will be fully closed. See Figure 12.

NOTE: There may be several different types of valves depending on the age of the unit. Field modification may be required before installing the actuator.

Figure 12: Actuators for Waterside Economizer



Installing Water Flow Sensor

If the unit contains a water flow sensor, it does not need to be replaced. Relay R11 is wired to the output of this switch to close a set of dry contact, which will complete a circuit on the MTIII indicating water flow. If there is not a Water Flow Sensor, a jumper will need to be wired to the MCB to avoid nuisance alarms on the MT III. The wiring is described later on in this manual.

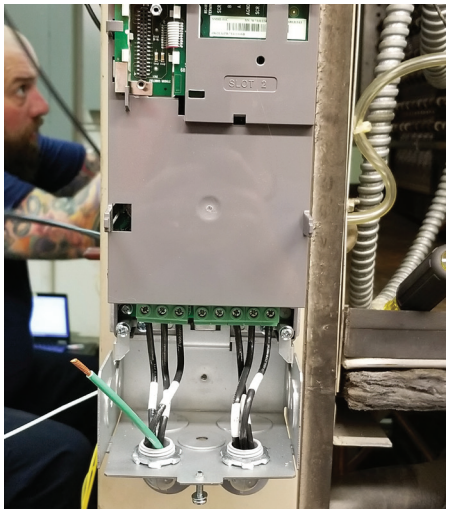
Installing the VFD

A unit designed for a Variable Air Volume Application will need a VFD installed for desired operation. The VFD can be mounted using screws on the outer frame of the unit to the left or right of control panel. Two holes need to be drilled below the VFD and into the control panel for power and signal wiring conduit. See Figure 13 and Figure 14.

NOTE: Daikin Applied only supports installing ABB (ACS320, ACH550, and ACH580), Schneider (ATV212) or Danfoss (FC102) VFDs. The installation location of the VFD is dependent on the technician. They must choose a location with proper ventilation to avoid overheating. An example of an ABB VFD mounting is shown in Figure 13 and Figure 14.

Figure 13: Mounting VFD

Figure 14: VFD Installed



Wiring

Wiring to the MicroTech III

NOTICE

Power must NOT be applied to the MT III or other devices when wiring to the controller.

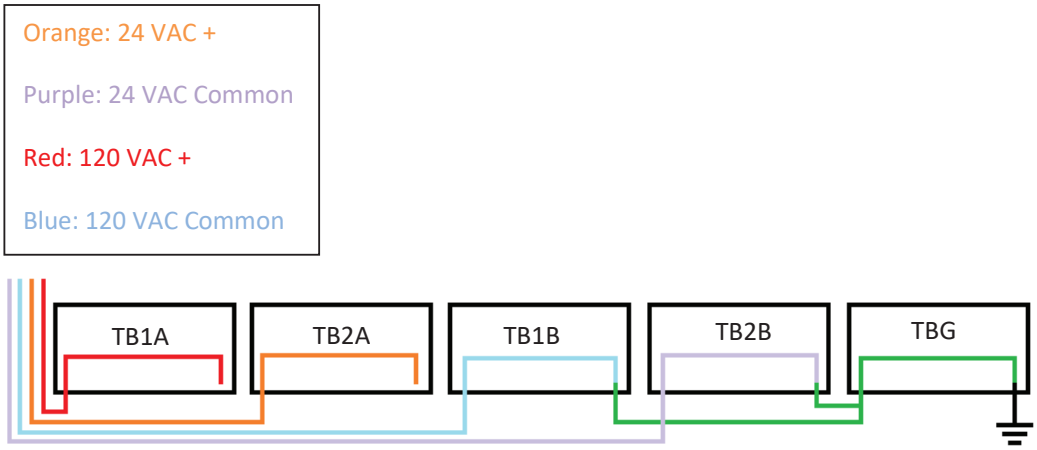
After all of the sensors, switches, relays, actuators, controllers and modules are installed, the wiring to the MicroTech III can begin. A full wiring diagram can be found in Appendix B on page 20. 20 AWG 600 V rated wire is recommended. Use the wire raceways around the edges of the control panel to ensure neatness and terminate wires on the MicroTech III correctly. Landing a voltage wire on the wrong controller could blow the internal MT III fuse.

Wiring the Terminal Blocks and Transformers

Terminal Blocks

Table 3 on page 9 shows, terminal blocks TB1A, TB1B, TB2A, TB2B and TBG are each designated for a specific voltage potential. Mechanical jumpers must be installed across each of the terminal blocks in order to create an equal potential through the block. The individual TBG terminal block pieces will be grounded to the unit's case through the DIN rail. TB1B and TB2B need to receive their potential from TBG and then jump across the terminal blocks. See diagram in Figure 15.

Figure 15: Typical Transformer Schematic



Note: Each of the separate terminal blocks shown above need to have an equal voltage across all of the terminals. The colored lines show what voltage should exist on each block. TB1A should have 120 VAC + on each terminal on the block and TB1B should have 24 VAC + on each terminal on the block. TB1B and TB2B are "common" and share the voltage from the TBG (ground); this voltage is then jumped through the blocks. The TBG block is grounded through the DIN rail to the case. TB3 (not shown here) will not have the same voltage across all the terminals and jumpers are not needed.

Transformers

The secondary's of the T1 and T2 transformers each consist of a positive (+) and a common potential. Table 3 shows each terminal block is designated for a specific potential. Follow the diagram below in Figure 15 and the schematic in Appendix B when wiring the transformers

Wiring Power to the MicroTech III MCB

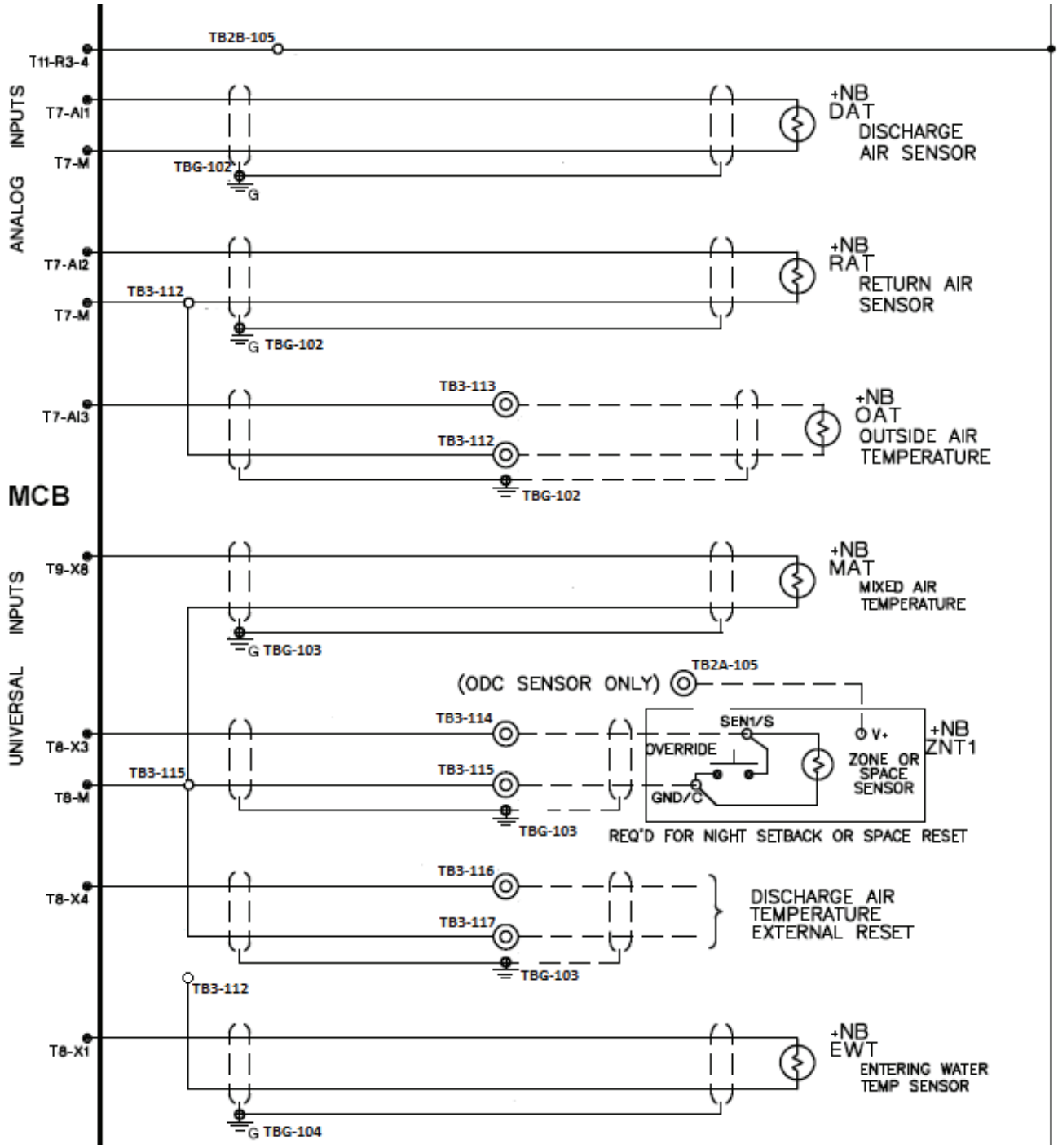
The MT III MCB is powered by 24 VAC from T2. On the MCB, wire T1-G to TB2A-101 and T1-G0 to TB2B-101.

Wiring Temperature Sensors

Mount the DAT, RAT, MAT, and EWT temperature sensors in the correct location. Guide the wires for each sensor into the control panel. Use the sensor plate and plastic sensor support when installing the DAT and RAT sensors. Follow the wiring diagram in Figure 16.

NOTE: The RAT sensor needs to be mounted far enough down the duct to avoid being influenced by the outside air temperature.

Figure 16: Sensor Wiring Diagram



Wiring Pressure Switches (PC5, PC7 and DHL) and R63 Relay

The PC5 pressure switch wires directly to the MT III as shown below in Figure 17. PC5 is a normally closed switch that completes a circuit between DI2 and M. If the switch opens, the circuit breaks and generates a dirty filter alarm.

The PC7 pressure switch is wired in series with the R63 NO contact and MT III shown in Figure 17. PC7 is a normally closed switch that completes a circuit between DI1 and M. If the switch opens, the circuit breaks and an Airflow Fault alarm will occur after three attempts.

The DHL switch is wired in series with the R63 relay shown in Figure 18. The R63 relay is energized with 24VAC from TB2A104 as long as the DHL switch is closed. Two sets of NO dry contacts from the R63 relay are wired to the MT III: DI4 (line 220) and DI2 (line 868) on the VFD.

NOTE: If the unit was selected for constant volume, then no DHL would be installed.

Figure 17: PC7 Pressure Switch

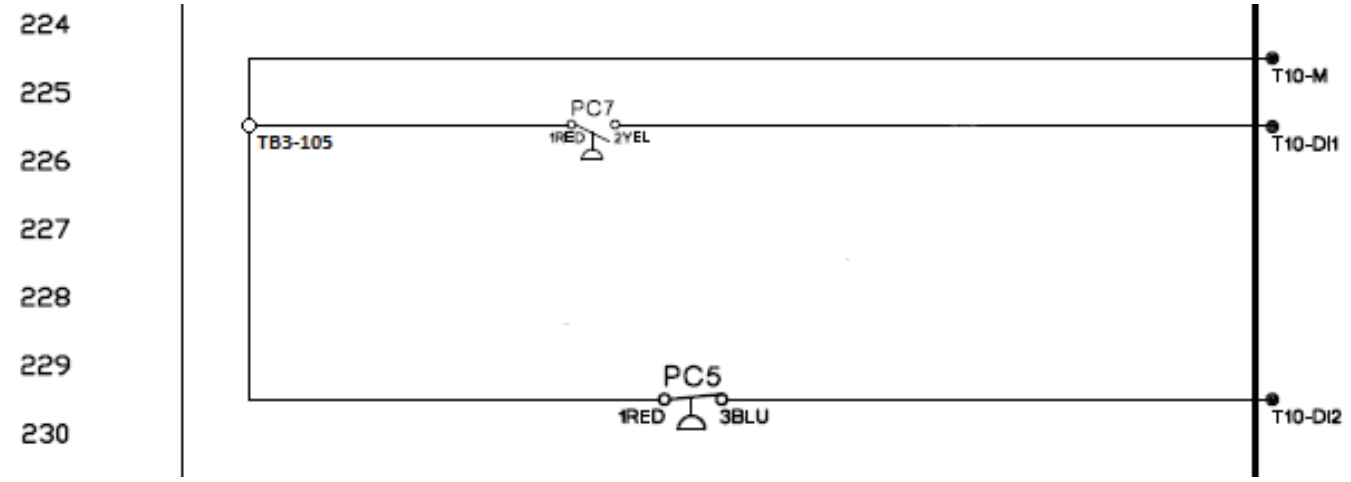


Figure 18: R63 Relay

Wiring High Pressure Switches 1/2 and HP1/HP2 Relays

HP1 and HP2 relays are wired in parallel to the HP1 and HP2 switches. When either of the high pressure switches open, the HP1/HP2 relays are de-energized and the 115 VAC circuit opens at DI5/DI6 on the MT III MCB. Figure 19 shows the wiring for High Pressure Switch 1 (HP1) and High Pressure Switch 2 (HP2).

Wiring High Pressure Switches 3/4 and HP3/HP4 Relays

The HP3 and HP4 relays are wired in parallel to the HP1 and HP2 switches. When either of the high pressure switches open, the HP3/HP4 relays are de-energized and 24 VAC is removed from X3/X4 on the MT III MCB. Figure 20 shows the wiring for High Pressure Switch 3 (HP3) and High Pressure Switch 4 (HP4).

NOTE: See schematic in Appendix B for information on wiring High Pressure Switches and relays for units with more than four compressors. Reference the I/O charts found in IM 919 for wiring terminal information.

Wiring Low Pressure Switches 1/2, Frost Protection Switches 1/2, and Resistors

For compressor number one, the LP1 and FP1 switches are wired in series with a 1.5kΩ resistor. For compressor number two, the LP2 and FP2 switches are wired in series with a 1kΩ resistor. The X2 input on the MT III MCB will read a resistance value input depending on which switch opens. Figure 19 shows the wiring for Low Pressure Switch 1 (LP1), Low Pressure Switch 2 (LP2), Frost Protection Switch 1 (FP1) and Frost Protection Switch 2 (FP2).

Wiring Low Pressure Switches 3/4 Frost Protection Switches 3/4

For compressor number three, the LP3 and FP3 are wired in series and into X1 on Expansion Module C. For compressor four, the LP4 and FP4 are wired in series into X2 on Expansion Module C. Figure 20 shows the wiring for the Low Pressure Switch 3 (LP3), Low Pressure Switch 4 (LP4), Frost Protection Switch 3 (FS3), and Frost Protection Switch 4 (FS4).

NOTE: See schematic in Appendix B for information on wiring High Pressure Switches and relays for units with more than four compressors. Reference the I/O charts found in IM 919 for wiring terminal information.

Figure 19: High Pressure Switch 1 (HP1)

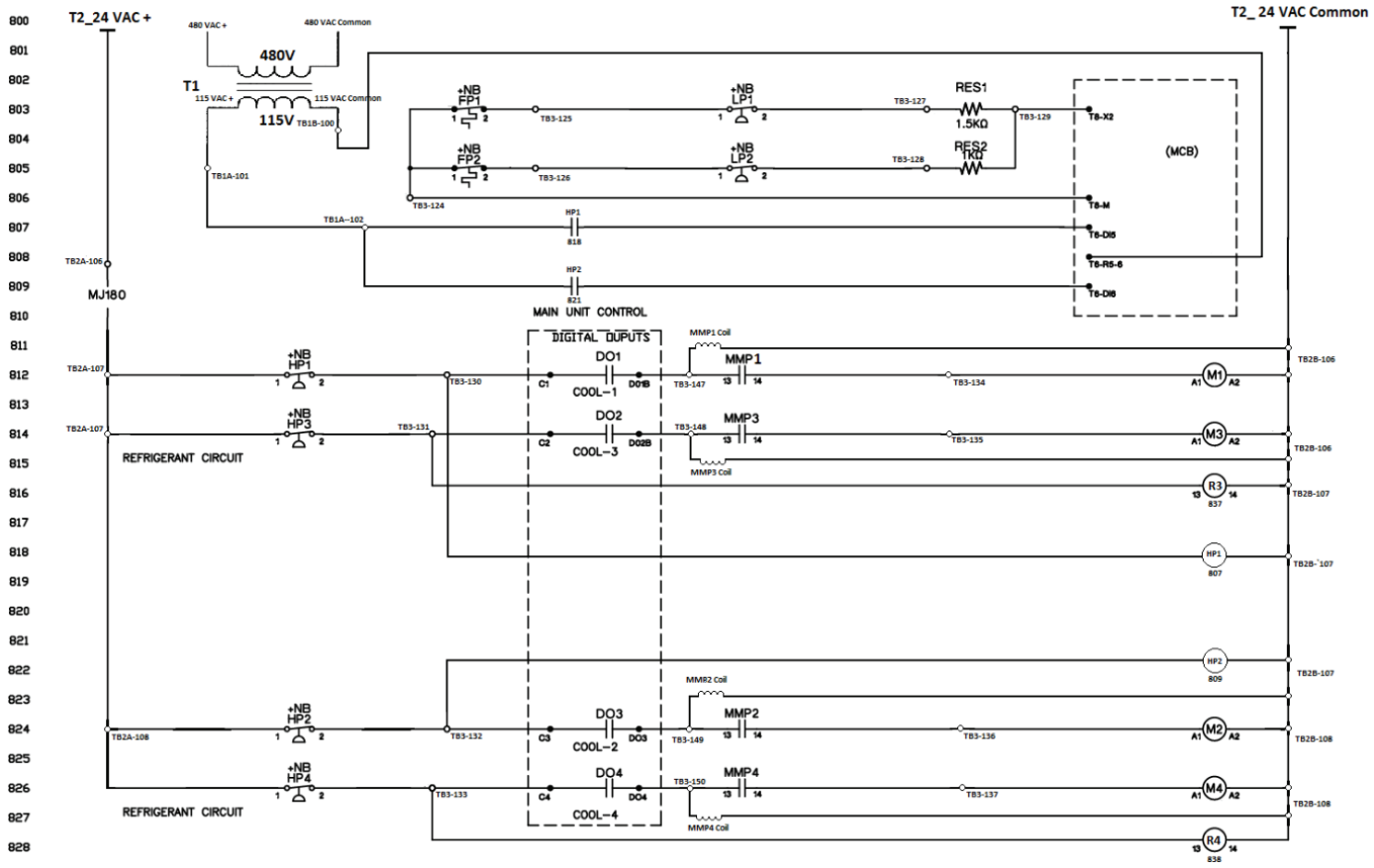
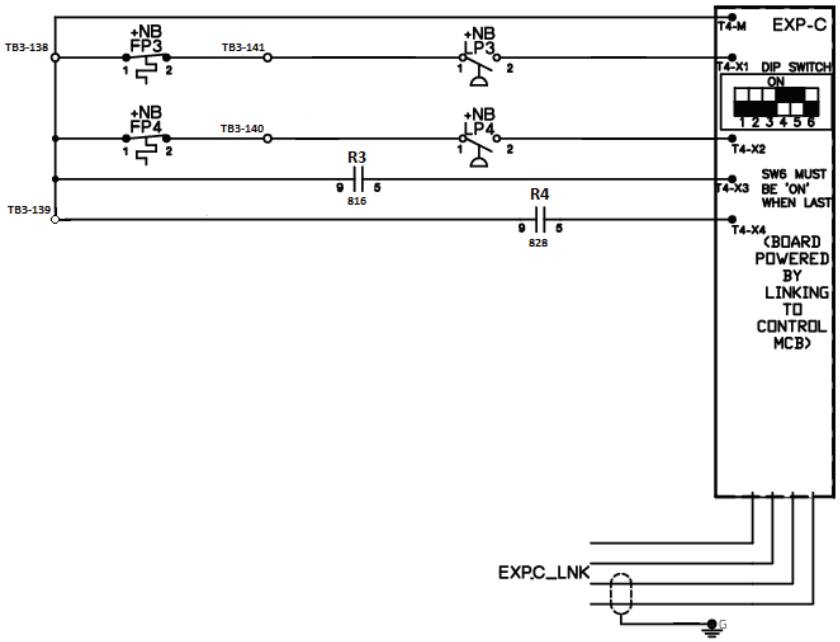


Figure 20: Low Pressure Switch 1 (LP1)



Wire Freezestat

The Freezestat (FS1) is a temperature-based switch that is designed to open at low temperatures in order to protect the coil. The Freezestat should be wired in series with a 1 kΩ resistor. When the Freezestat opens the circuit between X5 and M on the MT III MCB, the unit will read an open signal and alarm. See Figure 21.

Wiring Water Flow Sensor

The water flow sensor is powered by 24 VAC from transformer T2. Relay R11 closes a set of NO contacts on X5 on Expansion Module C when the water flow sensor detects water flow. See Figure 21.

NOTE: If there is no Water Flow Sensor on the unit, a jumper needs to be wired between X5 and M on the EXP-A to avoid nuisance alarms.

Wiring Waterside Economizer and Water Regulator/Bypass Valves

The Waterside Economizer valve actuator (ACT3) and Water Regulator/Bypass valve actuator (ACT4) will be supplied 24+ VAC and 24 VAC Common from the respective terminal blocks. Land the 2-10 VDC input signal T9-X7 on the MT III and to terminal 3 on the actuators. These will also need to be grounded. See Figure 22 for proper wiring.

Figure 21: Expansion Module C

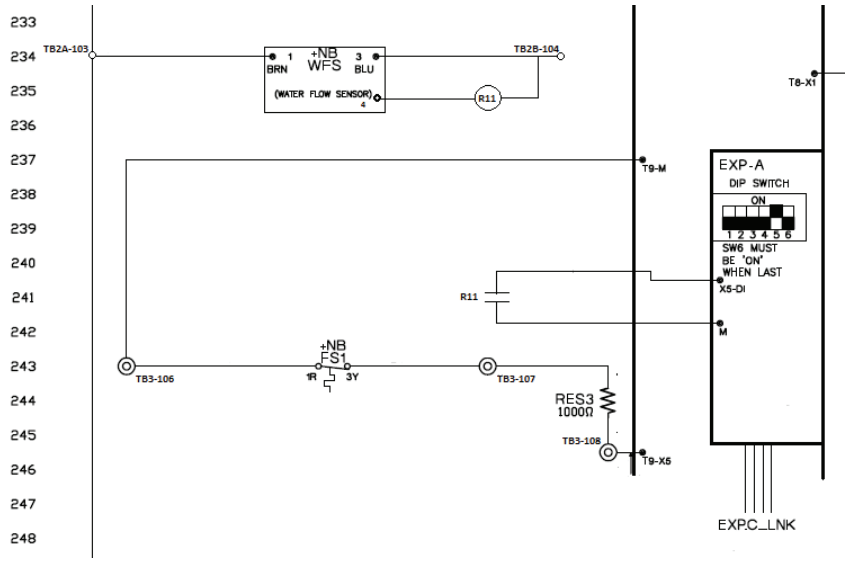
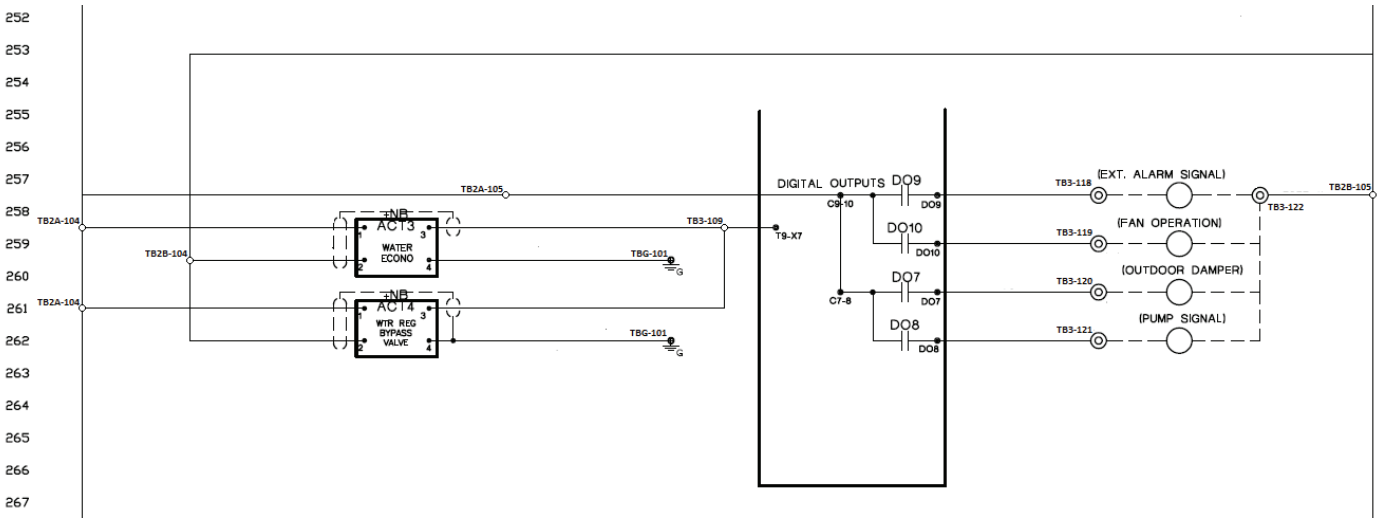


Figure 22: Water Regulator and Bypass Valves

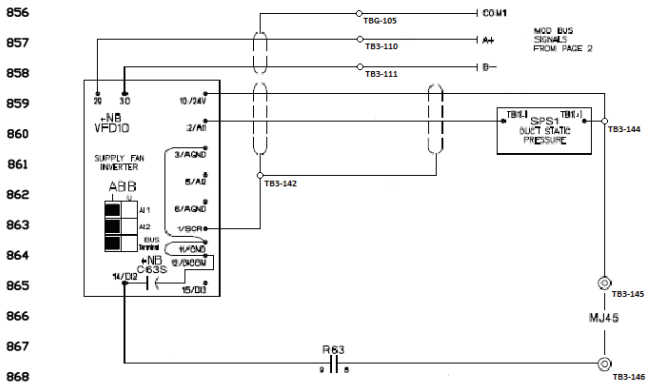


Wiring the VFD

A VFD on the Supply Fan motor is required if the unit is designed for a Variable Air Volume application. The MT III and VFD communicate drive status and speed through Modbus. The jumpers shown on VFD are necessary. See an example of the ABB VFD wiring diagram in Figure 23. Wiring for Schneider and Danfoss VFDs can be found in Appendix G. Refer to manual OM 844 and OM 1190 for information on Schneider and ABB VFDs, respectively.

NOTE: Once the VFD is installed and wired correctly, the parameters for the VFD must be set. See “Programming the VFD” on page 18 in this manual for instructions.

Figure 23: VFD Wiring Diagram



Wiring the Duct Static Pressure Sensor

If there is an ABB, Schneider or Danfoss VFD installed, the Duct Static Pressure sensor wires directly to the VFD. The 4-20mA output signal from the DSP sensor is wired to the AI1 terminal on the ABB VFD. The MT III reads in the DSP sensor signal through Modbus and sends a speed signal to the VFD in order to maintain the DSP set point. See Figure 23. See Appendix G on page 41 for DSP wiring on Schenider and Danfoss VFDs.

Programming the MicroTech III and VFD

Programming the MicroTech III

Once the MT III and all of the auxiliary electrical devices are installed and wired, the controller will need to be programmed. There are three tasks when programming the MT III controller: Verify and Update Software Code, Set Unit Configuration, and Set Parameters.

Verify and Update Software Code

The unit’s software code must be updated to the newest code. See the SIL in Appendix C on page 24 for instructions on how to upload code to the MT III controller.

Set Unit Configuration

Each MT III has a unique Unit Configuration that must be set according to the unit’s features and capabilities. See IM 919 for instructions and unit configuration options.

Set Parameters

After the software code is updated and the unit configuration is set, the parameters on the MT III will need to be set.

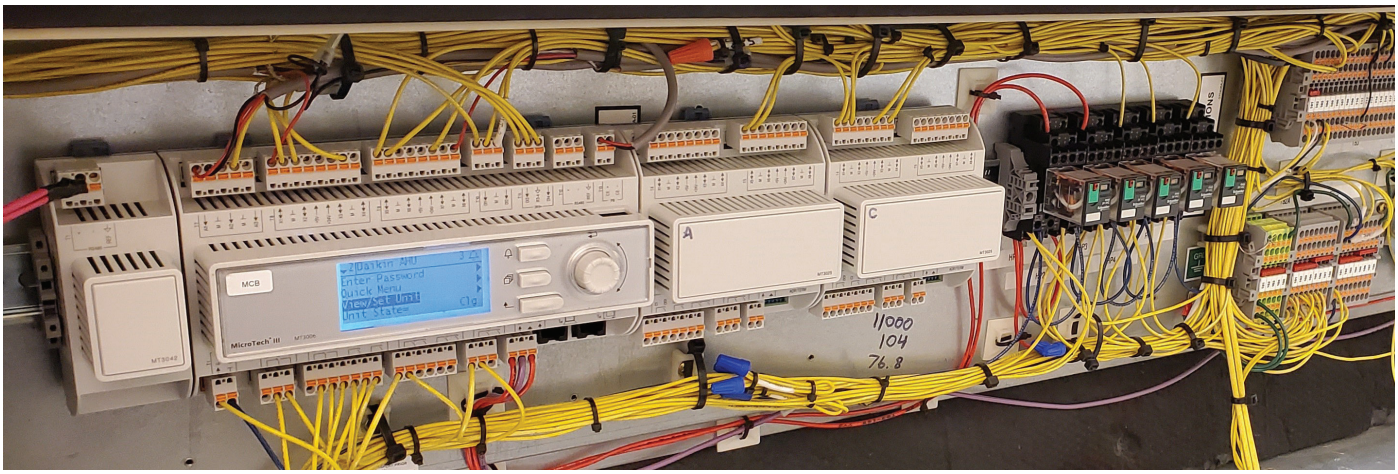
Programming the VFD

After the VFD is installed and wired, the parameters need to be set. See charts in Appendix D through Appendix F and set the parameters depending on the type of drive.

Completed Conversion

Figure 24 shows a sample control panel after the conversion is complete. Be aware that the image below does not include the white wire organizers or standard terminal blocks used in this manual. The image should be used as a reference. The final product will vary slightly depending on the technician and job site.

Figure 24: Completed Conversion



Appendices

Appendix A

Figure 25: Dip Switch Settings

Expansion Board A	Switch #5 in the up position (all others down)	
Expansion Board B	Switch #4 in the up position (all others down)	
Expansion Board C	Switch #4 and #5 in the up position (all others down)	
Expansion Board D	Switch #3 in the up position (all others down)	
Expansion Board E	Switch #3 and #5 in the up position (all others down)	
Dipswitch #6	Switch #6 **must** be in the up position on the last expansion board in the string regardless whether it is A, B, C, D, or E.	

Appendix B

Figure 26: 200s Wiring Diagram

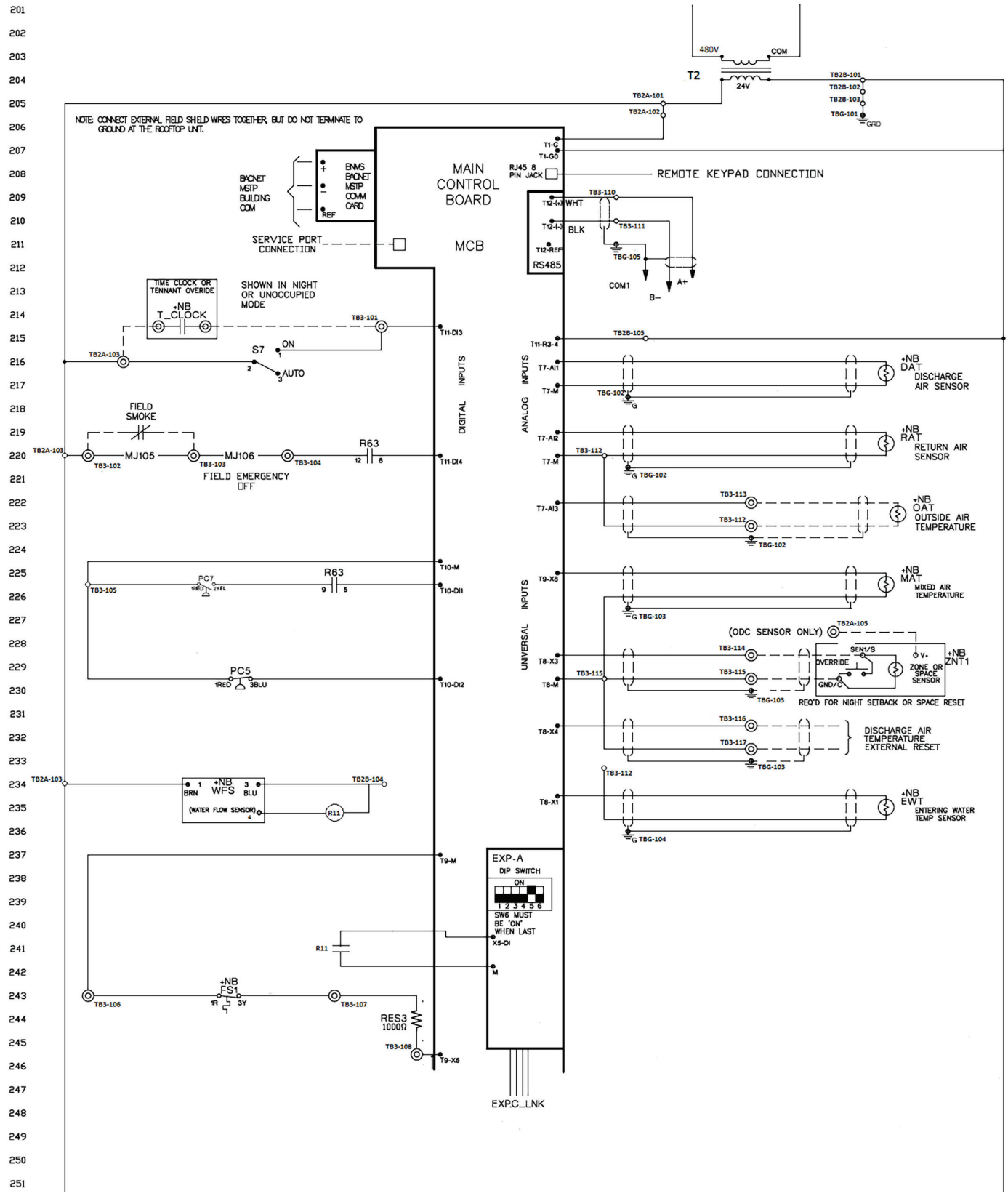


Figure 26 continued: 200s Wiring Diagram

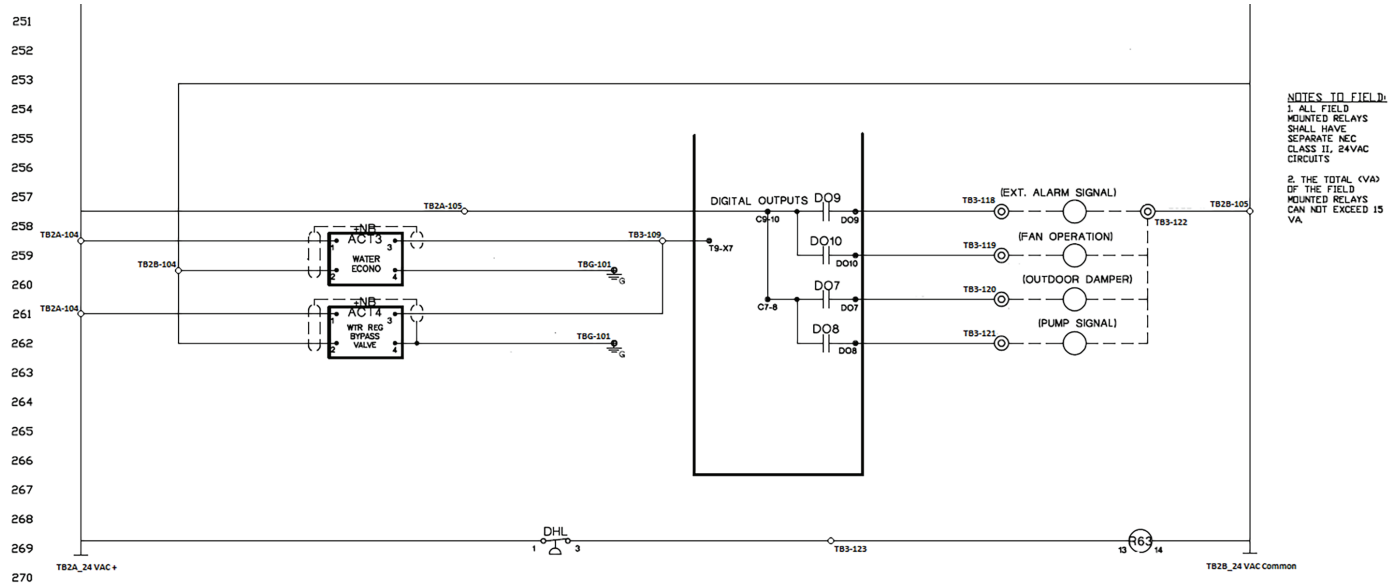


Figure 27: 800s Wiring Diagram

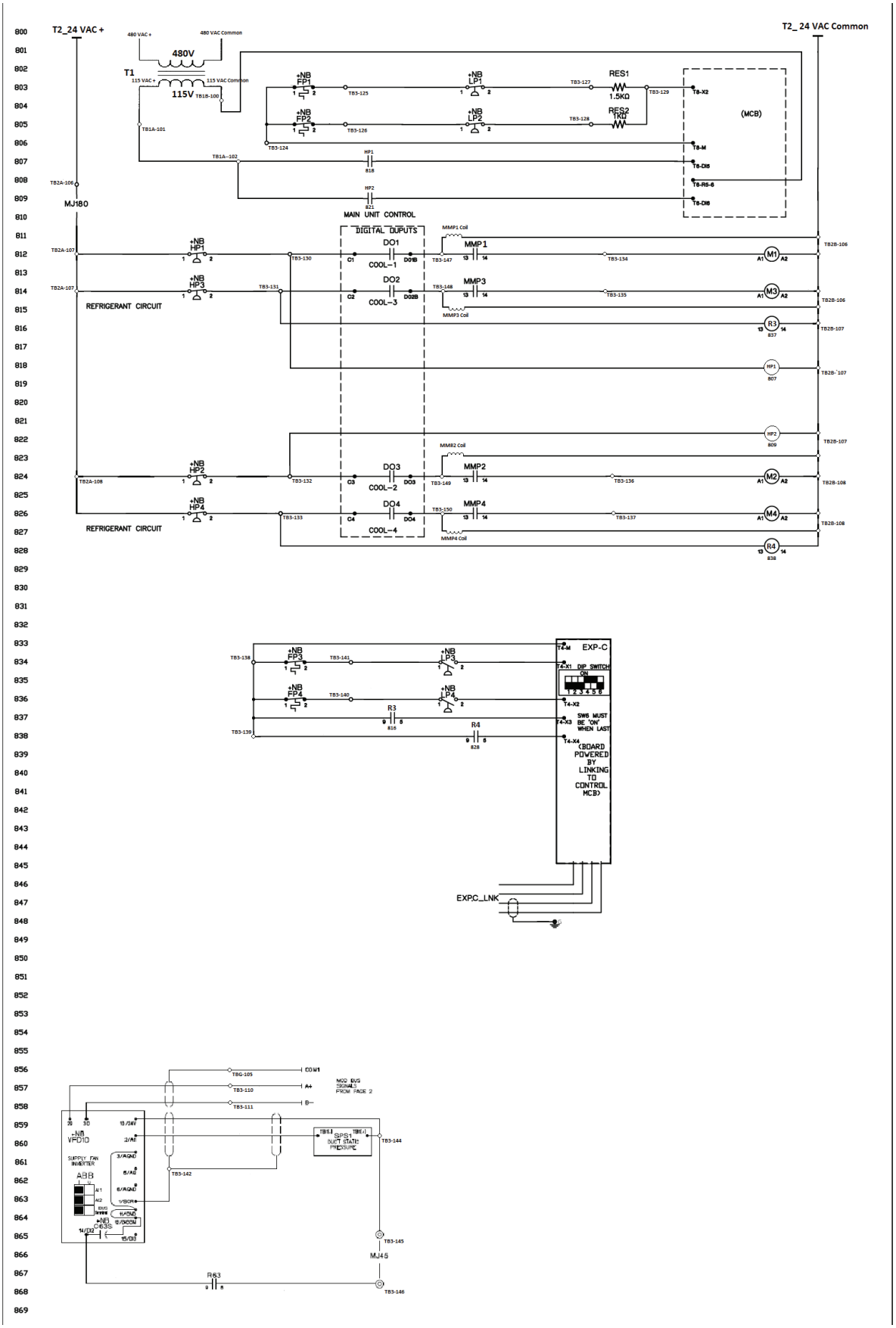
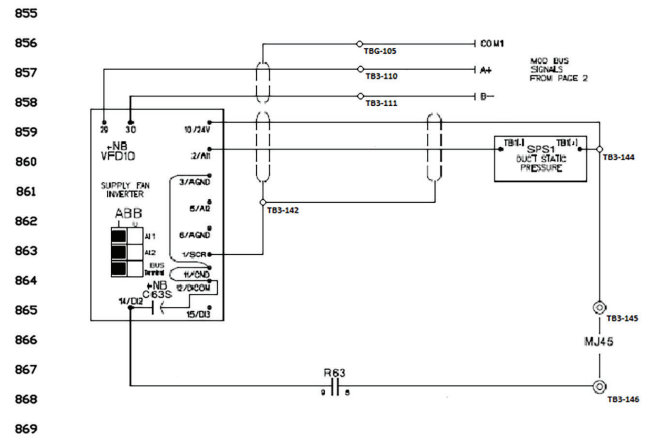


Figure 27 continued: 800s Wiring Diagram



Appendix C

Figure 28: Code Update SIL

DAIKIN

Service Information Letter

Technical Response Center – Applied Air – Plymouth, MN

SIL-ALL-18-001 Date: February 16, 2018
Originator: Faraz Currimbhoy, Technical Response Center
Supersedes: SIL-ALL-17-016

Microtech III Controller Software Upgrade Procedures

Use this procedure to upgrade the MicroTech III controller application software and firmware.

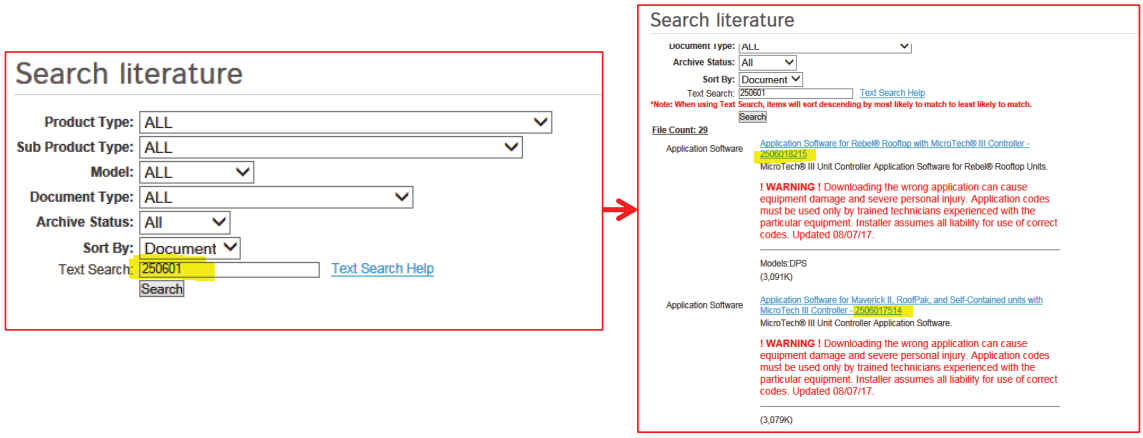
Tools Required:

- 3/64" (1 mm) Allen Key
- Flat head screw driver to open control panel door
- SD memory card no larger than 2GB for firmware less than 8.46
- SD memory card no larger than 8GB with a FAT32 file system format for firmware higher than 8.46

Note – If the controller has a BSP version older than 8.40 or the APP version is earlier than 2506017300 contact Daikin Applied Technical Response group for support.

Preparing the SD Card

1. To download the software code files online, navigate to http://www.daikinapplied.com/search.php
2. Under the Search Literature section type "250601" under the text search box and click search



3. Scroll down to find the appropriate software version to download and save it to the Desktop.
   a. 2506017xxx represents Roofpack, Maverick (MPS), and Self-Contained (SWP, SWT) code.
   b. 2506018xxx represents Rebel (DPS) code

   Note: (XXX) changes as the software versions are revised for the respective product lines below.

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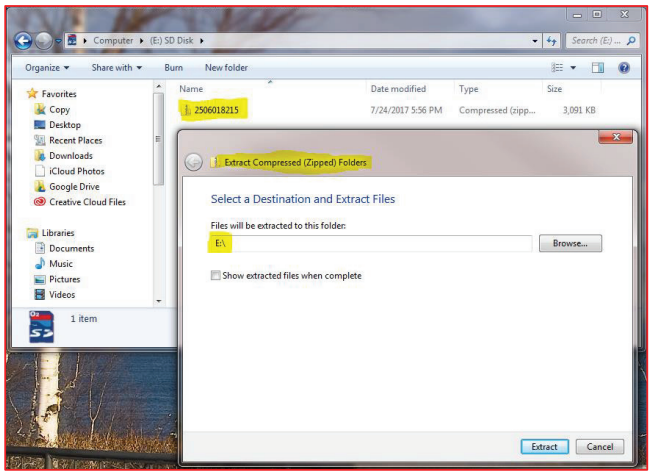
Figure 28 continued: Code Update SIL

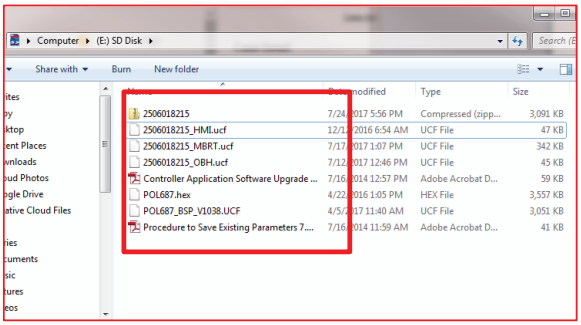
4. Drag the zip file to the freshly formatted SD card and extract it to the root directory of the SD card. See picture below as an example of where the zip file resides on the SD card (E:\) directory.
   Note: Every computer will have a different drive letter designation for the SD card. Root directory represents the first location that appears when opening the SD card since the Microtech III controller cannot see files from any folders.



5. Once all the files are extracted there will be a total of 8-9 files appearing on the SD card. Total files counts can change with new software revisions. The list below show critical files needed for a software download.

   • HMI.ucf • MBRT.ucf • OBH.ucf • POL687.ucf • POL687.hex ***(omitted after 513 and 214 codes)***

   Complete list of files including all critical ones shown below



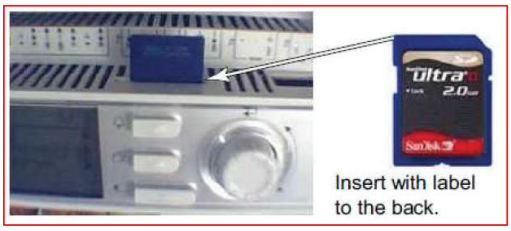
6. This completes preparing the SD card for the download process and should be now taken to the Microtech controller.

Saving Parameters to an SD Card

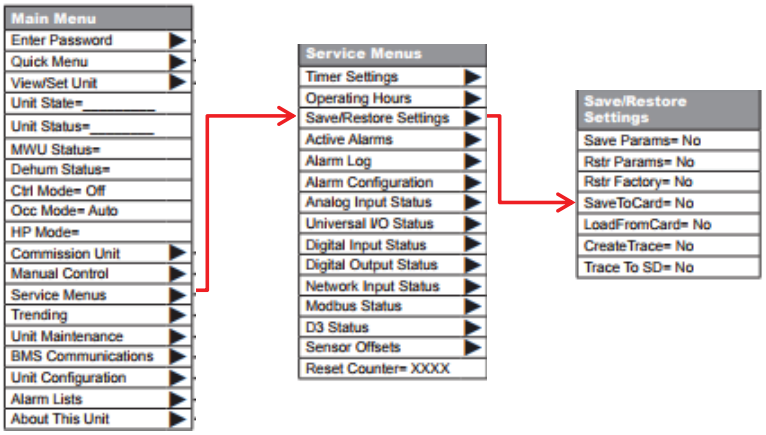
Note: DO NOT save parameters if the controller experienced a glitch in its operation and skip to the "Download Software to the Controller" section.

1. Enter the level 2 password.
2. From the Main Menu, **set the Control Mode to Off**.
3. Insert the SD memory card into the controller's memory card slot. The label on the card should be facing to the rear, toward the controller.

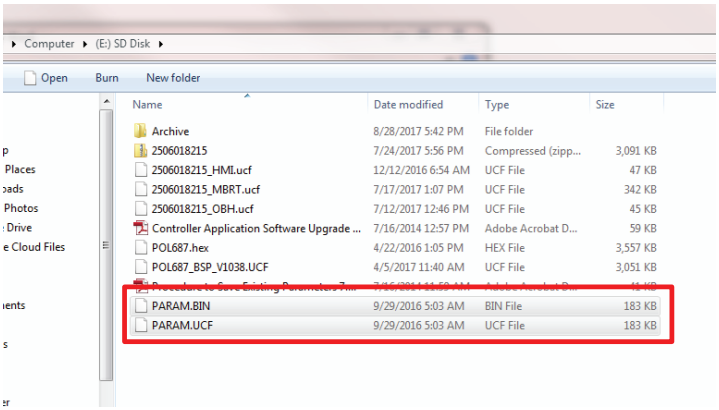
Figure 28 continued: Code Update SIL



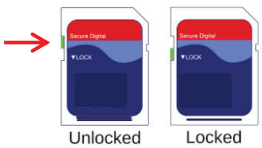
4. Save the existing configuration and parameters to the memory card.
   a. From the Main Menu select Service Menus then Save/Restore Settings.
   b. Set SaveToCard option to “Yes” and press the Enter button. Wait till “Yes” reverts to “No”



5. Remove the SD card from the controller and inserting the SD card into the Laptop.
6. Verify 2 parameter files (Param.bin & Param.ucf) saved and their file sizes are larger than 100 KB
7. If the param file sizes are less than 100 KB then repeat step 4



8. If the files are not saving to the existing SD card then check the SD card lock or try a different SD card



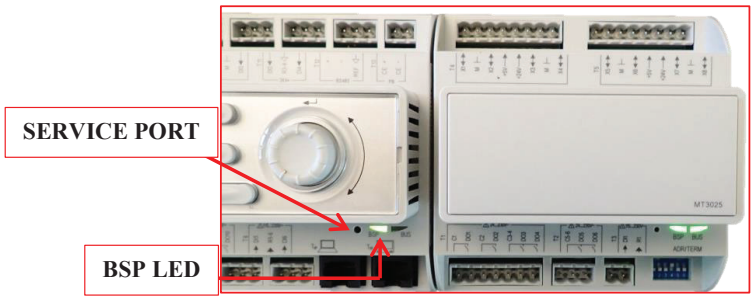
9. This completes saving parameters to the SD card

Page 3 of 9

Figure 28 continued: Code Update SIL

Downloading Software to the Controller

1. Power the controller off and wait 15 seconds
2. Make sure that all communication modules that need to be updated are connected.
3. Insert the end of a 3/64" Allen Key or other similar tool in the service port on the controller and hold the service button depressed. (The service button will "click" once depressed).



4. While holding the service button depressed, apply power to the controller.
5. Continue depressing the service button and observe the BSP LED begins to flash between red and green.
6. Release the service button after the flashing red/green sequence lasts for 3 or more seconds.
7. When the BSP LED's has stopped flashing between red and green check if the BSP LED is either off or amber. If off then repeat the download process again.
    a. **Note:** If a BMS communication module is connected to the controller, wait for the controller to automatically reset (approximately 30 seconds) before proceeding to the next step.
    b. **Note: Updating from version 8.xx BSP to 10.xx BSP firmware will require repeating the download process twice. During some software downloads, the controller display may flash blue.**
8. Cycle power to the controller after a solid amber BSP LED is present.
9. From the Main Menu scroll down to About this AHU and observe the APP version shows the same value as the zip file originally downloaded (2506017xxx or 8xxx).

Restoring Parameters to the Controller

1. Make sure the SD memory card is still within the controller's memory card slot.
2. Enter the Level 2 Password.
3. From the Main Menu select Service Menus then Save/Restore Settings.
4. Set the LoadFromCard parameter to Yes, and press the enter button.
    a. The controller will reset but may perform an additional reset if a communication module is installed.
    b. Wait 10 seconds after the main menu appears before proceeding

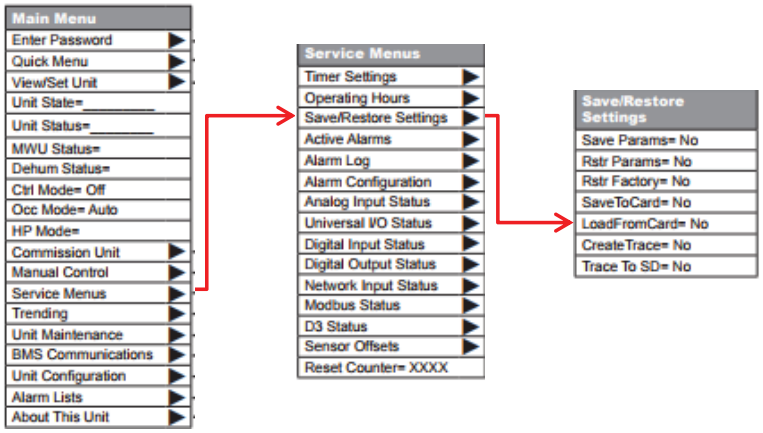
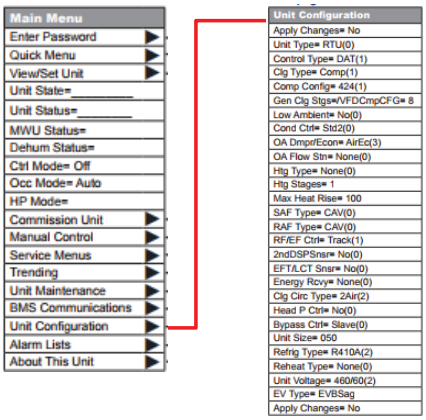


Figure 28 continued: Code Update SIL

5. From the Main Menu scroll down to About this AHU and observe the APP version has no square bracket "…]"at the end. If a square bracket appears then the parameter restore process failed and needs to be repeated.
6. Once the restore process is complete, remove the SD memory card by momentarily pushing it in and releasing to retract.
7. This completes the parameter restore from SD card process

Manually Programming the Unit Configuration

1. If a Save and Restore was not performed then setup the unit per the software configuration sticker installed on the unit door.
    a. Description of each configurator value is shown under the "Unit Configuration Menu" list below. OM 920 also contains the unit configuration menu.
2. Enter the Level 2 Password.
3. From the Main Menu select Unit Configuration.
4. Scroll through each option within the Unit Configuration menu, changing any parameters not matching the software configuration sticker on the door.



5. Once all the values under the Unit Configuration menu are confirmed, set the Apply Changes parameter to Yes and press the enter button.
6. The controller will perform an automatic reset
7. If the controller did not reset then verify the APP version for an error as mentioned under the "Restore parameters to the controller" section, step 4.
8. This completes the download and programming process.
9. Proceed with setting up individual setting to commission the unit as required for the application.

Figure 28 continued: Code Update SIL

UNIT CONFIGURATION

Configuration Code Position	Description	Values (Default in Bold)	Special Condition	RTU	MPS	DPS	DPS_H	SCU
1	Unit Type	**0=Applied Rooftop (RTU)** 1=Self-Contained (SCU) 2=Commercial Rooftop (MPS) 3=Rebel Cool Only (DPS/DAH) 4=Rebel Heat Pump (DPS_H)		●	●	●	●	●
2	Control Type	0=Zone Control **1=DAT Control** **2=1ZoneVAV**		●	●	●	●	●
3	Cooling Type	0 = None **1=Standard Compressorized Clg** 2=Chilled Water 3=F&BP 4=Variable Comp Circuit 1 5=Variable Comp Circuit 2 6=VRV 7=NA 8=NA 9=Digital Comp 1 Circuit 10=Digital Comp 2 Circuits		●	●	●	●	●
4	Compressorized Cooling Configuration	0=None 1=Generic Condenser 2=2Cmp/2Circ/3Stg 3=3Cmp/2Circ/4StgorVar (Var used for initial MPS026, 030&035 release) 4=2Cmp/2Circ/2or6StgorVar (6 stg if 7=2,3,4or5) 5=3Cmp/3Circ/3Stg_NoWRV 6=3Cmp/3Circ/3Stg_WRV 7=4Cmp/2Circ/4StgorVar 8=4Cmp/4Circ/4Stg_NoWRV 9=4Cmp/4Circ/4Stg_WRV A=6Cmp/2Circ/6StgorVar B=6Cmp/6Circ/6Stg_NoWRV C=6Cmp/6Circ/6Stg_WRV D=3Cmp/2Circ/5StgorVar E=4Cmp/2Circ/5or8StgorVar (Var used for initial MPS040) (8 stg if 7=2,3,4or5) F=8Cmp/4Circ/8Stg G=8Cmp/8Circ/8Stg H=6Cmp/3Circ/6Stg I=Not Used J=3 Cmp/3Circ/4Stg K=Spare L=1Var/1Circ M=Var/1STD/1Circ		●	●	●	●	●
5	Generic Condenser Stages	1 – 8 Stages (**default = 8**)/		●	● (if 4=4, 5or 6)	● (if 4=4, 5or 6)		
6	Low Ambient	**0 = No** 1 = Yes	This position currently has no effect on unit operation.					
7	Condenser Control	0=Std Method 1 1=Std Method 2 2=Evap ABB 3=Evap MD2		●	●	●	●	

Figure 28 continued: Code Update SIL

		4=Evap MD3 5=Evap DF 6=Not Used 7=EBM 8=INV 9=INV w/MicroC OA Coil						
8	Damper Type	0=None 1=Single Position 30% 2=Single Position 100% **3=Economizer Airside** 4=Economizer Waterside 5=100%OA_D3 6=AirEcon_D3 7=30%_D3 8=EconoAirsideFDD 9=EconFDDD3	Values 1, 2, 5 & 7 only apply if Position 1 = 0 (RTU), 2 (MPS), 3 or 4 (DPS) Value 4 only applies if Position 1 = 1 (SCU)	•	•	•	•	•
9	OA Flow Station	**0=None** 1=DF_015-030 (800) 2=DF_036-042 (802) 3=DF_045-075 (047) 4=DF_080-135 (077) 5=Generic Flow Station 6=Generic Flow Station w/CO2		•	•	•	•	•
10	Heating Type	**0=None** 1=F&BP Control 2=Staged 3=Modulated Gas, 3-1 4=Modulated Gas 20-1 5=Steam or Hot Water 6=SCR Electric 7=MPSLoGas 8=MPSHiGas		•	•	•	•	•
11	Max Heating Stages	1-8 Stages (**Default = 1**)		•	•	•	•	•
12, 13, 14	Max Heat Rise	Three Digits (**Default = 100**)		•	•	•	•	•
15	Supply Fan Type	**0=Constant Volume** 1=VFD/ABB_BD 2=VFD/DF_BD 3=VFD/MD2_BD 4=VFD/MD3_BD 5=VFD/MD6_BD 6=EBMVAV_DD 7=EBMCAV_DD 8=ABBVAV_DD 9=ABBCAV_DD		•	•	•	•	•
16	Return Fan Type	**0=CAV** 1=RF_EF VFD/ABB 2=RF_EF VFD/DF 3=RF_EF VFD/MD2 4=RF_EF VFD/MD3 5=RF_EF VFD/MD6 6=PrpEx VFD/ABB 7=PrpEx VFD/DF 8=PrpEx VFD/MD2 9=PrpEx VFD/MD3 A=PrpEx VFD/MD6 B=None C=1StageExh D=2StageExh E=3StageExh F=EBMVAV_DD G=EBMCAV_DD H=ABBVAV_DD I=Not Used J=ABBCAV_DD		•	•	•	•	

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Figure 28 continued: Code Update SIL

17	Return/Exhaust Fan Capacity Control Method	0=None **1=Tracking** 2=Building Pressure 3=Speed 4=OADamper		•	•	•	•	
18	Second Duct Pressure Sensor	**0=No** 1= Yes		•				•
19	Entering Fan Temp Sensor	**0=No** 1=Yes		•	•	•	•	
20	Energy Recovery	**0=None** 1=ConstSpdWhl/NoRH 2=VarSpdWhl/Danfoss 3=VarSpdWhl/MD2 4=VarSpdWhl/MD3 5=VarSpdWhl/ABB 6=ConstSpdWhl/wRH		•	•	•	•	
21	Cooling Circuit Type	**0=Individual** 1=2,3 or 4 Circ. Water Condenser 2=2 Circ. Air Condenser	Values 0 and 1 are valid only when Position 1 = 1 (SCU)	•	•			•
22	Head Pressure Control	**0=No** 1=Yes	This position is valid only when Position 1 = 1 (SCU).					•
23	Bypass Valve Control	**0=Slave** 1=Bypass	This position is valid only when Position 1 = 1 (SCU).					•
24, 25, 26	Unit Size	Three digits **(default 050)**		•	•	•	•	•
27	Refrigerant Type	**0=R22** 1=R407C 2=R410A		•	•	•	•	•
28	Reheat Type	**0=None** 1=StgHG 2=ModHG 3=StdHtRht 4=ModLSC 5=ModHG&LSC		•	•	•	•	
29	Unit Voltage	0=208/60Hz 1=230/60Hz **2=460/60Hz** 3=575/60Hz 4=208/50Hz 5=230/50Hz 6=460/50Hz 7=575/50Hz		•	•	•	•	•
30	EVType	0=None 1=EVB_Sag 2=EVB_DF 3=MTIII_Sag 4=MTIII_DF 5=MTIII_Sag_DF 6=MTIII_DF_Sag 7=MTIII_DF_C				•	•	

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Figure 28 continued: Code Update SIL

For questions about the procedure please contact the Technical Response team at:
TechresponseAAH@daikinapplied.com or 844-521-3928

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Appendix D

Table 4: ACS320 and ACH550 Parameters

MD4 Parameters		Unit	RoofPak & Self C	DPS 016–028 MPS 015–050	DPS 016–028 MPS 015–050	RPS / RDT / RCS	RPE / RDE	RoofPak	Maverick II & Rebel
#	Name		SAF, RAF & EAF	SAF	EAF	Condenser Fan	Condenser Fan	Energy Rec Wheel	Energy Rec Wheel
9802	COMM PROT SEL		STD MODBUS	STD MODBUS	STD MODBUS	Not Selected	STD MODBUS	STD MODBUS	STD MODBUS
9901	LANGUAGE		ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH
9902	APPLIC MARCO		HVAC DEFAULT	HVAC DEFAULT	HVAC DEFAULT	HVAC DEFAULT	HVAC DEFAULT	HVAC DEFAULT	HVAC DEFAULT
9905	MOTOR NOM VOLT	V	460	460	460	460	460	460	460
9906	MOTOR NOM CURR	A	35	24	4	2.6	11.2	1.1	0.5
9907	MOTOR NOM FREQ	Hz	60	60	60	60	60	60	60
9908	MOTOR NOM SPEED	rpm	1775	1775	1140	1142	1775	1775	1775
9909	MOTOR NOM POWER	hp	30	20	3	1.5	5	1	0.2
1001	EXT1 COMMANDS		COMM	COMM	COMM	DI1	COMM	COMM	COMM
1102	EXT1/EXT2 SEL		EXT1	EXT1	EXT1	EXT1	EXT1	EXT1	EXT1
1103	REF1 SELECT		COMM	COMM	COMM	AI 1	COMM	COMM	COMM
1104	REF1 MIN	Hz	0	0	0	24	0	0	0
1105	REF1 MAX	Hz	60	60	60	60	60	60	60
1106	REF2 SELECT		KEYPAD	KEYPAD	KEYPAD	KEYPAD	KEYPAD	KEYPAD	KEYPAD
1201	CONST SPEED SEL		NOT SEL	NOT SEL	NOT SEL	DI 3	NOT SEL	NOT SEL	NOT SEL
1601	RUN ENABLE		COMM	COMM	COMM	DI 2	COMM	COMM	COMM
1604	FAULT RESET SEL		COMM	COMM	COMM	KEYPAD	COMM	COMM	COMM
1607	PARAM SAVE		DONE	DONE	DONE	DONE	DONE	DONE	DONE
1608	START ENABLE 1		COMM	COMM	COMM	DI 4	NOT SEL	COMM	COMM
1611	PARAMETER VIEW		LONG VIEW	LONG VIEW	LONG VIEW	LONG VIEW	LONG VIEW	LONG VIEW	LONG VIEW
2101	START FUNCTION		SCAN START	SCAN START	SCAN START	SCAN START	SCAN START	SCAN START	SCAN START
2202	ACCELER TIME 1	s	60	60	60	10	5	60	60
2203	DECELER TIME 1	s	60	60	60	10	30	60	60
2605	U/F RATIO		LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
3003	EXTERNAL FAULT 1		DI 2(INV)	NOT SEL	NOT SEL	NOT SEL	NOT SEL	NOT SEL	NOT SEL
3009	BREAK POINT FREQ	Hz	45	45	45	45	45	45	45
3101	NUMBER TRIALS		5	5	5	5	5	5	5
3103	DELAY TIME	s	3	3	3	3	3	3	3
3104	AR OVERCURRENT		ENABLE	ENABLE	ENABLE	DISABLE	ENABLE	ENABLE	ENABLE
3404	OUTPUT1 DSP FORM		DIRECT	DIRECT	DIRECT	+0.0	+0.0	DIRECT	DIRECT
3405	OUTPUT1 UNIT		%	Hz	Hz	% SP	Hz	Hz	Hz
3415	SIGNAL3 PARAM		AI 1	SPEED	SPEED	AI 1	SPEED	SPEED	SPEED
3418	OUTPUT3 DSP FORM		+0.0	DIRECT	DIRECT	+0.0	DIRECT	DIRECT	DIRECT
3421	OUTPUT3 MAX		44ma	1800 rpm	1800 rpm	10v	1800rpm	1800 rpm	1800 rpm
4201	GAIN		The Daikin software version [will grow over time]						
4202	INTEGRATION TIME	s	279	252	228	106	103	202	204
5302	EFB STATION ID		SAF=1,R/EAF=2	1	2	1	4	3	3
5303	EFB BAUD RATE		192	192	192	96	192	192	192
5304	EFP PARITY		8 NONE 2	8 NONE 2	8 NONE 2	Values Vary	8 NONE 2	8 NONE 2	8 NONE 2
5306	EFB OK MESSAGES		Usually a big number that continues to grow						
5307	EFB CRC ERRORS		0	0	0	0	0	0	0
5308	EFB UART ERRORS		Should be a small number that rarely grows unless a MicroTech III communication problem occurred						
5309	EFB STATUS		ON-LINE	ON-LINE	ON-LINE	ON-LINE	ON-LINE	ON-LINE	ON-LINE
8120	INTERLOCKS		NOT SEL	NOT SEL	NOT SEL	DI 4	NOT SEL	NOT SEL	NOT SEL
1002	EXT2 COMMANDS		NOT SEL	NOT SEL	NOT SEL	DI 1	NOT SEL	NOT SEL	NOT SEL
1301	MINIMUM AI1	%	MicroTech III limits minimum speed to 20 hz			10	MicroTech III limits minimum speed to 20 hz		
1302	MAXIMUM AI1	%	MicroTech III limits maximum speed to 60 hz			50	MicroTech III limits maximum speed to 60 hz		
1303	FILTER AI1	s				0.1			
3502	INPUT SELECTION					A I 1			
4210	SET POINT SEL					AI 1			
1202	CONST SPEED 1	Hz				60			
1401	RELAY OUTPUT 1					FAULT			

Vary depending on motor nameplate voltage and hp
These values vary depending on the application
Not important, will be HVAC default values

Table 5: ACH580 Parameters

MD5 Parameters

#	Name	Unit	VALUE
GROUP 96 - SYSTEM			
	96.04 MACRO SELECT		HVAC DEFAULT
GROUP 99 - MOTOR DATA			
	99.06 MOTOR NOM CURR	A	Motor Specific
	99.07 MOTOR NOM VOLT	V	Motor Specific
	99.09 MOTOR NOM SPEED	RPM	Motor Specific
	99.10 MOTOR NOM POWER	HP	Motor Specific
GROUP 12 - STANDARD AI			
	12.15 AI1 UNIT SELECTION		MA
	12.19 AI1 SCALED ATAI1 MIN		200
	12.20 AI1 SCALED AT AI1 MAX		1000
	12.25 AI2 UNIT SELECTION		MA
	12.29 AI2 SCALED AT AI2 MIN		200
	12.30 AI2 SCALED AT AI2 MAX		1000
GROUP 20 - START/STOP/DIR			
	20.01 EXT1 COMMANDS		EMBEDDED FIELDBUS
	20.21 DIRECTION		FORWARD
	20.41 START INTERLOCK 1		NOT USED
	20.42 START INTERLOCK 2		NOT USED
GROUP 22 - REFERENCE SELECT			
	22.11 EXT SPEED REF1		EFB REF1
	22.22 CONSTANT SPEED SEL1		ALWAYS OFF
	22.41 SPEED REF SAFE	RPM	0
GROUP 28 - FREQUENCY REFERENCE CHAIN			
	28.11 EXT1 FREQUENCY REF1		EFB REF1
	28.22 CONSTANT FREQ SEL1		ALWAYS OFF
	28.41 FREQUENCY REF SAFE	Hz	0
	28.72 FREQ ACCELERATION TIME 1	S	60
	28.73 FREQ DECELERATION TIME 1	S	60
GROUP 31 - FAULT FUNCTIONS			
	31.01 External Event 1 Source		DI2
	31.14 NUMBER OF TRIALS		5
	31.16 DELAY TIME	S	3
	31.27 STALL FREQUENCY LIMIT	Hz	45
	31.25 AR OVERCURRENT		ENABLE
GROUP 46 - MONITOR / SCALING SETTINGS			
	46.02 FREQUENCY SCALING		1000
GROUP 58 - EMBEDDED FILEDBUS			
	58.01 PROTOCOL ENABLE		MODBUS RTU
	58.03 NODE ADDRESS		1 (SAF) or 2 (RF/EF)
	58.04 BAUD RATE		19.2 KBPS
	58.05 PARITY		8 NONE 2
	58.14 COMMUNICATION LOSS ACTION		SPEED REF SAFE
	58.15 COMMUNICATION LOSS MODE		CW/REF1/REF2
	58.16 COMMUNICATION LOSS TIME	S	25.0 S
	58.33 ADDRESSING MODE		MODE0
	58.06 Communication Control		Enabled
GROUP 71 - EXTERNAL PID1			
	71.32 GAIN		1.00
	71.33 INTEGRATION TIME	S	2155
GROUP 97 - MOTOR CONTROL			
	97.20 U/F RATIO		LINEAR

Appendix E

Figure 29: Parameters

	On the PC exactly…	Appears as…				
Parameter	**MCT 10 Noun**	**MCT 10 value**	**Keypad Menu-then drop**	**Keypad Noun**	**Keypad Value**	**Comments**
0-03	Regional Settings	North America	start at 0-0* Basic Settings	0-03 Regional Settings	[1] North America	Required change to allow many 60 Hz settings
1-21	Motor Power [HP]	enter dataplate value	start at 1-** Load and Motor	1-21 Motor Power [HP]	enter dataplate value	**FACTORY ENTER**
1-22	Motor Voltage	enter dataplate value	start at 1-** Load and Motor	1-22 Motor Voltage	enter dataplate value	**FACTORY ENTER**
1-23	Motor Frequency	60Hz	start at 1-** Load and Motor	1-23 Motor Frequency	60Hz	Almost always 60 Hz
1-25	Motor Nominal Speed	1760	start at 1-** Load and Motor	1-25 Motor Nominal Speed	1760	1760 is close, motor nameplate may be different.
1-73	Flying Start	Enabled	start at 1-** Load and Motor	1-73 Flying Start	[1] Enabled	
3-02	Minimum Reference	00.00	start at 3-0* Reference Limits	3-02 Minimum Reference	00.000	Modbus comms controls the lowest motor speed.
3-04	Reference Function	Sum	start at 3-0* Reference Limits	3-04 Reference Function	[0] Sum	Sum of all presets-Writes via modbus to parameter 3-10. Others will be zero.
3-15	Reference 1 Source	No Function	start at 3-1* References	3-15 Reference 1 Source	[0] No function	Duct Static P1: Signal between 53 & 55. Set switch A53 to ON for ma.
3-16	Reference 2 Source	No Function	start at 3-1* References	3-16 Reference 2 Source	[0] No Function	Duct Static P2: Signal between 54 & 55. Set switch A54 to ON for ma.
3-17	Reference 3 Source	No Function	start at 3-1* References	3-17 Reference 3 Source	[0] No Function	
3-41	Ramp 1 Ramp Up Time	60.00	start at 3-4* Ramp 1	3-41 Ramp 1 Ramp Up Time	60.00s	
3-42	Ramp 1 Ramp Down Time	60.00	start at 3-4* Ramp 1	3-42 Ramp 1 Ramp Down Time	60.00s	
5-01	Terminal 27 Mode	Input	start at 5-00 Digital I/O mode	5-01 Terminal 27 mode	[0] Input	Contacts between 27 and 12.
5-02	Terminal 29 Mode	Output	start at 5-00 Digital I/O mode	5-02 Terminal 27 mode	[1] Output	If not [1] then 5-31 is locked-out.
5-12	Terminal 27 Digital Input	External Interlock	start at 5-1* Digital Inputs	5-12 Terminal 27 Digital Input	[7] External Interlock	
5-14	Terminal 32 Digital Input	Fire Mode	start at 5-1* Digital Inputs	5-14- Terminal 32 Digital Input	[37] Fire Mode	
5-15	Terminal 33 Digital input	No Operation	start 5-1* Digital Inputs	5-15 Terminal 33 Digital Input	[0] No Operation	
5-31	Terminal 29 Digital Output	No Operation	start 5-3* Digital Outputs	5-31 Terminal 29 Digital Output	[60] Comparator 0	Must set 5-02 first, then 13-10, 13-11, and 13-12, then 5-31 last.
8-30	Protocol	FC (required for write to drive)	start at 8-3* FC Port Settings	8-30 Protocol	[2] RTU Modbus	Change via keypad, power cycle required. Wired +@#68, -@ #69, Shield at #61
8-31	Address	1 (found at default)	start at 8-3* FC Port Settings	8-31 Address	[1]SAF,[2]RAF,[3]EXH	Change via keypad, power cycle required. Choose MT3 address of VFD to be controlled
8-32	Baud rate	9600 Baud (found at default)	start at 8-3* FC Port Settings	8-32 Baud rate	[3] 19200 Baud	Change via keypad, power cycle required. 19,200 required for MT3 coms
8-33	Parity / Stop Bits	Even Parity,1 Stop Bit (at default)	start at 8-3* FC Port Settings	8-33 Parity, Stop Bits	[3] No Parity, 2 Stop Bits	Change via keypad, power cycle required. Required for MT3 comms
8-35	Minimum Response Delay	need to enter new value = 100	start at 8-3* FC Port Settings	8-35 Minimum Response Delay	100ms	MT3 best operation this setting
8-50	Protocol	Logic OR (default)	8-50* Digital Bus	8-50 Coasting Select	[3] Logic OR	MT3 best operation this setting
8-53	Start Select	Logic OR (default)	8-50* Digital Bus	8-53 Start Select Logic OR	[3] Logic OR	Modbus OR Input 53
13-10.00	Comparator Operand	Alarm Number	Comparators-1 13-1*	13-10 Comparator Operand	[20] Alarm Number	Set 5-02 first, then 13-10, then 13-11 next
13-11.0	Comparator Operator	(equal)	Comparators-1 13-1*	13-11 Comparator Operator	[1] = (equal)	Set 13-10 first, then 13-11, then 13-12 next
13-12.0	Comparator Value	60.000	Comparators-1 13-1*	13-12 Comparator Value	60.000	Set 13-11 first, then 13-12, then 5-31 last
Switch- TERM.		Set to IN at highest address of 8-31			Set to IN at highest address of 8-31	
Switch A53		set to = I			set to = I	Switch is behind keypad.
Switch A54		set to = I			set to = I	Switch is behind keypad.

IMPORTANT NOTES: **Technical assistance from Danfoss 414-365-8639, cell 414-704-8997; Ken Fonstad or others.**

"Numeric" keypads only display the parameter value as a number, it is not followed by words as the "Graphical" keypad displays.

Yellow shaded parameters are unique to MT3 controls and MODBUS communications

Light Green shaded parameters are general in nature, some are FACTORY set from motor dataplate values.

Danfoss FC102 drives are configured for FC port communications "out of the box". Use a PC and the MCT 10 software which performs a WRITE to DRIVE that downloads all except the Modbus communications parameters into the drive. Additional instructions are

Change the Communication parameters 8-30, 8-31, 8-32, & 8-33 with the keypad. Cycle the power.

If unit will not communicate, FC102 terminals 68 & 69 might be accidently exchanged.

Keypad Password access parameters are 0-60, 0-61, 0-65 & 0-66. Full Access is normal. Graphic keypads can "transport" parameters to other drives. Use parameter 0-50 = [2] Copt All From LCP. Use 0-50 = [1] to Copt All TO LCP. Numeric keypads cannot do this copy operation..

P:\Engineering\ENG_data\AFD PARAMETER SOURCE FILES\170632800.xls
MT3 FC102 All Modbus

Appendix F

Figure 30: ATV 212 (MD2) Drive Parameters

PART NUMBER		REV	PART DESCRIPTION				
170632000		B	Rooftop - MT3 SAF (set 321) PARAMETERS				
			Drive	Voltage	HP	Application	
			ATV21	ALL	ALL	SAF/RAF, RT/SC	
Code	Function Description	Unit	Min. Value	Max. Value	Default Value	New Value	Logical Address
AU1	Automatic acceleration/deceleration	1	0	2	1	**0**	0
AU4	Automatic function setting	1	0	4	0	**1**	40
CMOd	Command mode selection	1	0	2	0	**2**	3
FMOd	Frequency setting mode selection 1	1	1	5	1	**4**	4
FMSL	Meter selection	1	0	19	0		5
FM	Meter adjustment	1	1	1280	145	**318**	6
tyP	Default setting	1	0	9	0	**7**	7
Fr	Forward/reverse run selection (Operation panel)	1	0	3	0		8
ACC	Acceleration time 1	0.1sec	0,0	3200,0	10	**60**	9
DEC	Deceleration time 1	0.1sec	0,0	3200,0	10	**60**	10
FH	Maximum frequency	0.01Hz	30,00	200,00	50	**60**	11
UL	Upper limit frequency	0.01Hz	0,50	80,00	50	**60**	12
LL	Lower limit frequency	0.01Hz	0,00	60,00	0	**20**	13
vL	Base frequency 1	0.01Hz	25,00	200,00	50	**60**	14
vLv	Base frequency voltage 1	0.1V	50,0	660,0		**McQuay load**	409
Pt	V/F control mode selection 1	1	0	6	1		15
vb	Torque boost 1	0.10%	0,0	30,0	5		16
tHr	Motor electronic-thermal protection level 1	1%	10	100	100		600
OLM	Electric-thermal protection characteristic selection	1	0	7	0	**1**	17
Sr1	Preset-speed operation frequency 1	0.01Hz	0,00	60,00	15		18
Sr2	Preset-speed operation frequency 2	0.01Hz	0,00	60,00	20		19
Sr3	Preset-speed operation frequency 3	0.01Hz	0,00	60,00	25		20
Sr4	Preset-speed operation frequency 4	0.01Hz	0,00	60,00	30		21
Sr5	Preset-speed operation frequency 5	0.01Hz	0,00	60,00	35		22
Sr6	Preset-speed operation frequency 6	0.01Hz	0,00	60,00	40		23
Sr7	Preset-speed operation frequency 7	0.01Hz	0,00	60,00	45		24
F100	Low-speed signal output frequency	0.01Hz	0,00	80,00	0		100
F101	Speed reach setting frequency	0.01Hz	0,00	80,00	0		101
F102	Speed reach detection band	0.01Hz	0,00	80,00	2.5		102
F108	2nd always-active function selection	1	0	71	0		108
F109	Analog/contact input function selection (VIA/VIB)	1	0	2	0		109
F110	Always-active function selection	1	0	71	1		110
F111	Input terminal selection1 (F)	1	0	71	2	**45**	111
F112	Input terminal selection 2 (R)	1	0	71	6	**0**	112
F113	Input terminal selection 3 (RST)	1	0	71	10		113
F118	Input terminal selection 8 (VIA)	1	0	71	7		118
F130	Output terminal selection 1A (RY-RC)	1	0	255	4	**14**	130
F132	Output terminal selection 3 (FL)	1	0	255	11		132
F137	Output terminal selection 1B (RY-RC)	1	0	255	255		137
F139	Output terminal logic selection (RY-RC/OUT-NO)	1	0	1	0		139
F167	Frequency command agreement detection range	0.01Hz	0,00	80,00	2.5		167
F170	Base frequency 2	0.01Hz	25,00	200,00	50	**60**	170
F171	Base frequency voltage 2	0.1V	50,0	660,0			171
F172	Torque boost 2	0.10%	0,0	30,0	5		172
F173	Motor electronic-thermal protection level 2	1%	10	100	100		173
F185	Stall prevention level 2	1%	10	111	110		185
F200	Frequency priority selection	1	0	1	0		200
F201	VIA input point 1 setting	1%	0	100	0		201
F202	VIA input point 1 frequency	0.01Hz	0,00	200,00	0		202
F203	VIA input point 2 setting	1%	0	100	100		203
F204	VIA input point 2 frequency	0.01Hz	0,00	200,00	50		204

ATV21 MT3 SAF PAGE 1

Figure 30 continued: ATV 212 (MD2) Drive Parameters

PART NUMBER		REV	PART DESCRIPTION				
170632000		B	Rooftop - MT3 SAF (set 321) PARAMETERS				
			Drive	Voltage	HP	Application	
			ATV21	ALL	ALL	SAF/RAF, RT/SC	
Code	Function Description	Unit	Min. Value	Max. Value	Default Value	New Value	Logical Address
F207	Frequency setting mode selection 2	1	1	5	2		207
F210	VIB input point 1 setting	1%	0	100	0		210
F211	VIB input point 1 frequency	0.01Hz	0,00	200,00	0		211
F212	VIB input point 2 setting	1%	0	100	100		212
F213	VIB input point 2 frequency	0.01Hz	0,00	200,00	50		213
F240	Starting frequency setting	0.01Hz	0,50	10,00	0.5		240
F241	Operation starting frequency	0.01Hz	0,00	80,00	0		241
F242	Operation starting frequency hysteresis	0.01Hz	0,00	80,00	0		242
F250	DC braking starting frequency	0.01Hz	0,00	80,00	0		250
F251	DC braking current	1%	0	100	50		251
F252	DC braking time	0.1sec	0,0	20,0	1		252
F256	Time limit for lower-limit frequency operation	0.1sec	0,0	600,0	0		256
F264	Input from external contacts-UP response time	0.1sec	0,0	10,0	0.1		264
F265	Input from external contacts-UP frequency step width	0.01Hz	0,00	80,00	0.1		265
F266	Input from external contacts-DOWN response time	0.1sec	0,0	10,0	0.1		266
F267	Input from external contacts-DOWN freq step width	0.01Hz	0,00	80,00	0.1		267
F268	Initial value of UP/DOWN frequency	0.01Hz	0,00	60,00	0	**20**	268
F269	Saving of changed value of UP/DOWN frequency	1	0	1	1		269
F270	Jump frequency 1	0.01Hz	0,00	80,00	0		270
F271	Jump width 1	0.01Hz	0,00	30,00	0		271
F272	Jump frequency 2	0.01Hz	0,00	80,00	0		272
F273	Jump width 2	0.01Hz	0,00	30,00	0		273
F274	Jump frequency 3	0.01Hz	0,00	80,00	0		274
F275	Jump width 3	0.01Hz	0,00	30,00	0		275
F294	Preset-speed operation frequency 15	0.01Hz	0,00	60,00	50		294
F295	Selection of bumpless	1	0	1	1		295
F300	PWM carrier frequency	0.1kHz	6,0	16,0			300
F301	Auto-restart control selection	1	0	4	3		301
F302	Regeneration power ride-through control (Deceleration stc	1	0	2	0		302
F303	Retry selection (number of times)	1	0	10	3	**5**	303
F305	Over-voltage limit operation (Slowdown stop mode selecti	1	0	3	2		305
F307	Supply voltage correction (limitation of output voltage)	1	0	3	3		307
F311	Reverse-run prohibition	1	0	2	1		311
F312	Random mode	1	0	1	0		312
F316	Carrier frequency control mode selection	1	0	3	1		316
F320	Drooping gain	1%	0	100	0		320
F323	Drooping insensitive torque band	1%	0	100	10		323
F359	PID control waiting time	1sec	0	2400	0		359
F360	PID control	1	0	2	0		360
F362	Proportional gain	0.01	0,01	100,00	0.3		362
F363	Integral gain	0.01	0,01	100,00	0.2		363
F366	Differential gain	0.01	0,00	2,55	0		366
F400	Auto-tuning	1	0	2	0		400
F401	Slip frequency gain	1%	0	150	50		401
F402	Motor constant #1 (primary resistance)	0.10%	0,0	30,0			402
F415	Motor rated current	0.1A	0,1	200,0			415
F416	Motor no-load current	1%	10	100			416
F417	Motor rated speed	1min-1	100	15000			417
F418	Speed control response coefficient	1	1	150	40		418
F419	Speed control stability coefficient	1	1	100	20		419
F470	VIA bias	1	0	255	128		470

ATV21 MT3 SAF PAGE 2

Figure 30 continued: ATV 212 (MD2) Drive Parameters

PART NUMBER		REV	PART DESCRIPTION				
170632000		B	Rooftop - MT3 SAF (set 321) PARAMETERS				
			Drive	Voltage	HP	Application	
			ATV21	ALL	ALL	SAF/RAF, RT/SC	
Code	Function Description	Unit	Min. Value	Max. Value	Default Value	New Value	Logical Address
F471	VIA gain	1	0	255	148		471
F472	VIB bias	1	0	255	128		472
F473	VIB gain	1	0	255	148		473
F480	Exciting strengthening coefficient	1%	100	130	100		480
F481	Factory adjustment 1	1	0	9999	0		481
F482	Factory adjustment2	1	0	9999	442		482
F483	Factory adjustment3	0.1	0,0	300,0	100		483
F485	Stall cooperation gain at field weakening zone 1	1	10	250	100		485
F492	Stall cooperation gain at field weakening zone 2	1	50	150	100		492
F494	Motor adjustment factor	1	0	200	70		494
F495	Maximum voltage adjustment factor	1%	90	120	104		495
F496	Carrier change adjustment factor	0.1kHz	0,1	14,0	14		496
F500	Acceleration time 2	0.1sec	0,0	3200,0	20		500
F501	Deceleration time 2	0.1sec	0,0	3200,0	20		501
F502	Acceleration/deceleration 1 pattern	1	0	2	0		502
F503	Acceleration/deceleration 2 pattern	1	0	2	0		503
F504	Acceleration/deceleration selection (1/2/3)	1	1	2	1		504
F505	Acceleration/deceleration 1 and 2 switching frequency	0.01Hz	0,00	60,00	0		505
F506	S-pattern lower-limit adjustment amount	1%	0	50	10		506
F507	S-pattern upper-limit adjustment amount	1%	0	50	10		507
F601	Stall prevention level 1	1%	10	111	110		601
F602	Inverter trip retention selection	1	0	1	0		602
F603	Emergency stop selection	1	0	2	0		603
F604	Emergency DC braking time	0.1sec	0,0	20,0	1		604
F605	Output phase failure detection mode selection	1	0	5	3	**5**	605
F607	Motor 150%-overload time limit	1sec	10	2400	300		607
F608	Input phase failure detection mode selection	1	0	1	1		608
F609	Hysteresis for small current detection	1%	1	20	10		609
F610	Low current trip/alarm	1	0	1	0		610
F611	Small current detection current	1%	0	100	0		611
F612	Small current detection time	1sec	0	255	0		612
F613	Detection of output short-circuit during start-up	1	0	3	0		613
F615	Over-torque trip/alarm selection	1	0	1	0		615
F616	Over-torque detection level	1%	0	250	130		616
F618	Over-torque detection time	0.1sec	0,0	10,0	0.5		618
F619	Over-torque detection level hysteresis	1%	0	100	10		619
F621	Cumulative operation time alarm setting	0.1	0,0	999,9	610		621
F626	Over-voltage stall protection level	1%	100	150	140		626
F627	Under-voltage trip/alarm selection	1	0	2	0		627
F632	Thermal memory selection	1	0	1	0		632
F633	Trip at VIA low level input mode	1%	0	100	0		633
F634	Annual avg ambient temp (calculation for life alarms)	1	1	6	3		634
F645	Selection of PTC thermal	1	0	2	0		645
F646	Detection level of PTC	1ohm	100	9999	3000		646
F650	Rorced/Fire-speed control selection	1	0	1	0		650
F691	Inclination characteristic of analog output	1	0	1	1		691
F692	Meter bias	1%	0	100	0		692
F700	Prohibition of change of parameter settings	1	0	1	0		700
F701	Unit selection	1	0	1	1		701
F702	Free unit selection	0.01	0,00	200,00	0		702
F705	Inclination characteristic of free unit display	1	0	1	1		705

ATV21 MT3 SAF PAGE 3

Figure 30 continued: ATV 212 (MD2) Drive Parameters

PART NUMBER		REV	PART DESCRIPTION				
170632000		B	Rooftop - MT3 SAF (set 321) PARAMETERS				
			Drive	Voltage	HP	Application	
			ATV21	ALL	ALL	SAF/RAF, RT/SC	
Code	Function Description	Unit	Min. Value	Max. Value	Default Value	New Value	Logical Address
F706	Free unit display bias	0.01Hz	0,00	80,00	0		706
F707	Free step 1 (pressing a panel key once)	0.01Hz	0,00	80,00	0		707
F708	Free step 2 (panel display)	1	0	255	0		708
F710	Standard monitor display selection	1	0	10	0		710
F721	Panel stop pattern	1	0	1	0		721
F730	Prohibition of freq. setting on the operation panel (FC)	1	0	1	0		730
F732	Panel operation prohibition (Local/Remote keys)	1	0	1	0	**1**	732
F733	Panel operation prohibition (RUN/STOP keys)	1	0	1	0		733
F734	Prohibition of panel emergency stop operation	1	0	1	0		734
F735	Prohibition of panel reset operation	1	0	1	0		735
F738	Selection of AUF	1	0	1	0		738
F748	Selection of watt hour memory	1	0	1	1		748
F749	Display unit selection of watt hour	1	0	3	0		749
F800	Communication band speed	1	0	1	1		800
F801	Parity	1	0	2	1	**=0; McQuay**	801
F802	Inverter number; SAF=1;RAF=2;HW=3	1	0	247	1	**=1;McQuay**	802
F803	Communication error trip time	1sec	0	100	3	**10**	803
F805	Communication waiting time	0.01sec	0,00	2,00	0		805
F806	Setting master & slave for comm between inverters	1	0	4	0		806
F811	Communication input point 1 setting	1%	0	100	0		811
F812	Communication input point 1 frequency	0.01Hz	0,00	200,00	0		812
F813	Communication input point 2 setting	1%	0	100	100		813
F814	Communication input point 2 frequency	0.01Hz	0,00	200,00	0	**=60;McQuay**	814
F829	Selection of communication protocol	1	0	4	1		829
F851	Inverter action at network & communication break	1	0	4	4	**0**	851
F856	Number of motor poles for comm speed calculation	1	1	8	2		856
F870	Block write data 1	1	0	6	0		870
F871	Block write data 2	1	0	6	0		871
F875	Block read data 1	1	0	11	0		875
F876	Block read data 2	1	0	11	0		876
F877	Block read data 3	1	0	11	0		877
F878	Block read data 4	1	0	11	0		878
F879	Block read data 5	1	0	11	0		879
F880	Free notes	1	0	65535	0	**321**	880
F890	Parameter for option 1	1	0	65535	0		890
F891	Parameter for option 2	1	0	65535	0		891
F892	Parameter for option 3	1	0	65535	0		892
F893	Parameter for option 4	1	0	65535	0		893
F894	Parameter for option 5	1	0	65535	0		894
F895	Parameter for option 6	1	0	65535	0		895
F896	Parameter for option 7	1	0	65535	0		896
F897	Parameter for option 8	1	0	65535	0		897
F898	Parameter for option 9	1	0	65535	0		898
F899	Parameter for option 10	1	0	65535	0		899
F910	Step-out detection current level (for PM motors)	1%	10	150	100		910
F911	Step-out detection time (for PM motors)	0.1sec	0,0	25,0	0.0		911
F912	q-axis self-inductance (for PM)	0.01mH	0,00	650,00	0.00		912

ATV21 MT3 SAF PAGE 4

Figure 30 continued: ATV 212 (MD2) Drive Parameters

PART NUMBER		REV	PART DESCRIPTION				
170632000		B	Rooftop - MT3 SAF (set 321) PARAMETERS				
			Drive	Voltage	HP	Application	
			ATV21	ALL	ALL	SAF/RAF, RT/SC	
Code	Function Description	Unit	Min. Value	Max. Value	Default Value	New Value	Logical Address
F706	Free unit display bias	0.01Hz	0,00	80,00	0		706
F707	Free step 1 (pressing a panel key once)	0.01Hz	0,00	80,00	0		707
F708	Free step 2 (panel display)	1	0	255	0		708
F710	Standard monitor display selection	1	0	10	0		710
F721	Panel stop pattern	1	0	1	0		721
F730	Prohibition of freq. setting on the operation panel (FC)	1	0	1	0		730
F732	Panel operation prohibition (Local/Remote keys)	1	0	1	0	**1**	732
F733	Panel operation prohibition (RUN/STOP keys)	1	0	1	0		733
F734	Prohibition of panel emergency stop operation	1	0	1	0		734
F735	Prohibition of panel reset operation	1	0	1	0		735
F738	Selection of AUF	1	0	1	0		738
F748	Selection of watt hour memory	1	0	1	1		748
F749	Display unit selection of watt hour	1	0	3	0		749
F800	Communication band speed	1	0	1	1		800
F801	Parity	1	0	2	1	**=0; McQuay**	801
F802	Inverter number; SAF=1;RAF=2;HW=3	1	0	247	1	**=1;McQuay**	802
F803	Communication error trip time	1sec	0	100	3	**10**	803
F805	Communication waiting time	0.01sec	0,00	2,00	0		805
F806	Setting master & slave for comm between inverters	1	0	4	0		806
F811	Communication input point 1 setting	1%	0	100	0		811
F812	Communication input point 1 frequency	0.01Hz	0,00	200,00	0		812
F813	Communication input point 2 setting	1%	0	100	100		813
F814	Communication input point 2 frequency	0.01Hz	0,00	200,00	0	**=60;McQuay**	814
F829	Selection of communication protocol	1	0	4	1		829
F851	Inverter action at network & communication break	1	0	4	4	**0**	851
F856	Number of motor poles for comm speed calculation	1	1	8	2		856
F870	Block write data 1	1	0	6	0		870
F871	Block write data 2	1	0	6	0		871
F875	Block read data 1	1	0	11	0		875
F876	Block read data 2	1	0	11	0		876
F877	Block read data 3	1	0	11	0		877
F878	Block read data 4	1	0	11	0		878
F879	Block read data 5	1	0	11	0		879
F880	Free notes	1	0	65535	0	**321**	880
F890	Parameter for option 1	1	0	65535	0		890
F891	Parameter for option 2	1	0	65535	0		891
F892	Parameter for option 3	1	0	65535	0		892
F893	Parameter for option 4	1	0	65535	0		893
F894	Parameter for option 5	1	0	65535	0		894
F895	Parameter for option 6	1	0	65535	0		895
F896	Parameter for option 7	1	0	65535	0		896
F897	Parameter for option 8	1	0	65535	0		897
F898	Parameter for option 9	1	0	65535	0		898
F899	Parameter for option 10	1	0	65535	0		899
F910	Step-out detection current level (for PM motors)	1%	10	150	100		910
F911	Step-out detection time (for PM motors)	0.1sec	0,0	25,0	0.0		911
F912	q-axis self-inductance (for PM)	0.01mH	0,00	650,00	0.00		912

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Appendix G

Figure 31: Danfoss VFD Wiring

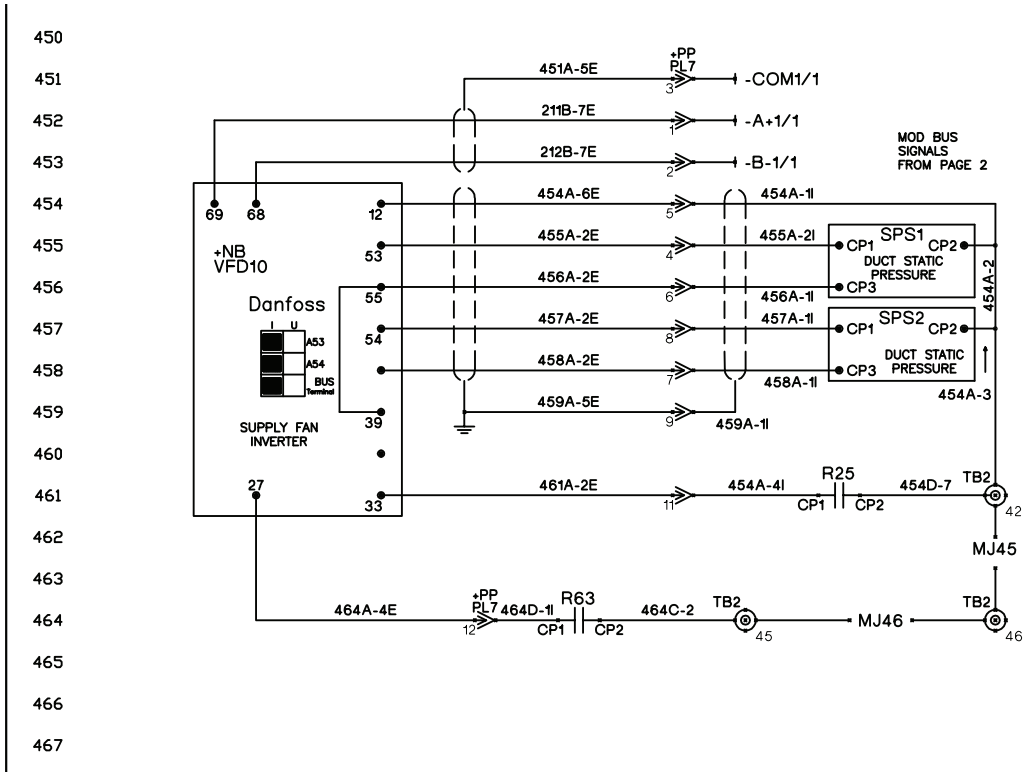
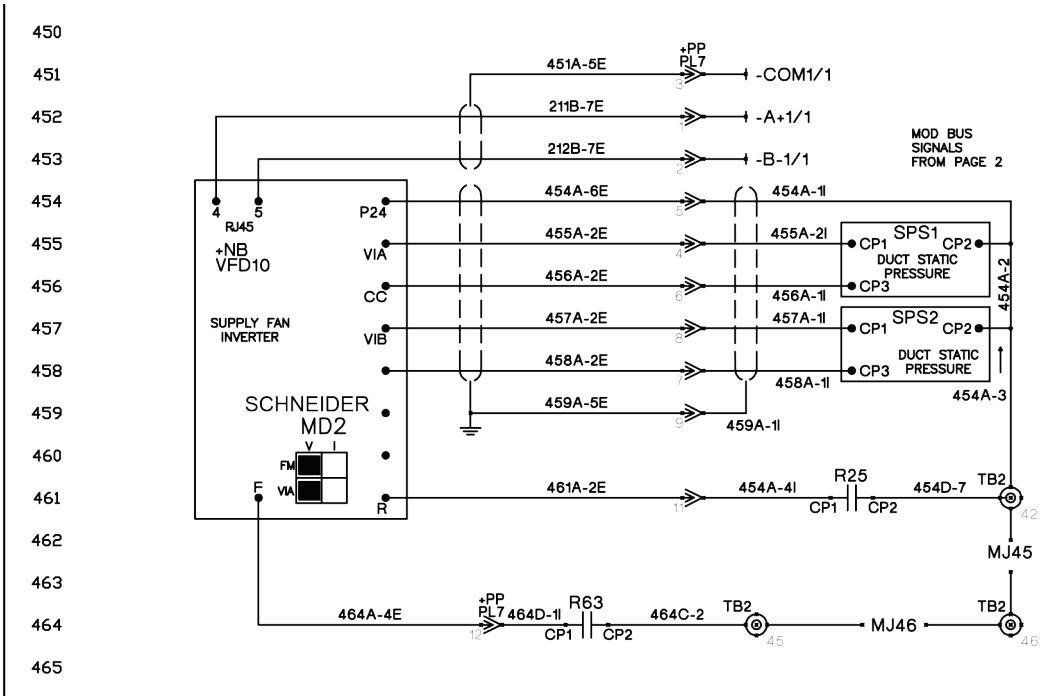
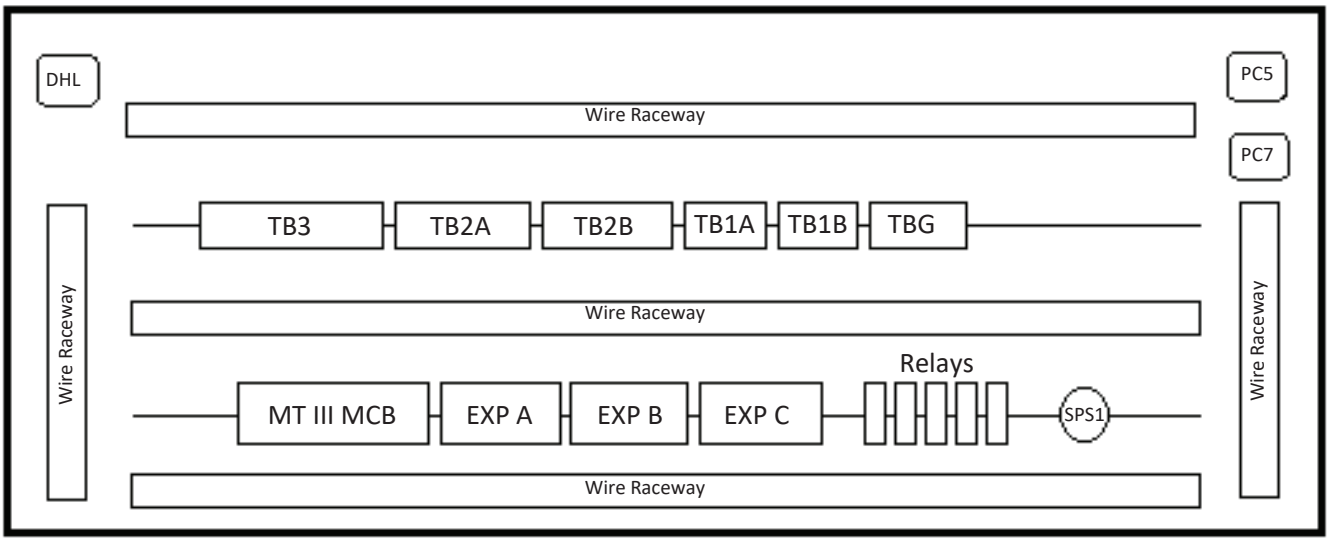


Figure 32: Schneider VFD Wiring



Appendix H

Figure 33: Typical Transformer Schematic



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