Operation Manual

Variable Frequency Drive (VFD)

7 ½ - 25 Ton Units with ClearControl™



⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Modifying or changing parameters whose function is not described in this manual will affect drive controller operation. Some register changes will take effect as soon as they are entered.
- Do not modify or change parameters whose function is not described in this instruction bulletin.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

No adjustments of the VFD are required for installation or operation of this unit.

Table of Contents

Hazard Categories and Special Symbols 3
Before You Begin 4
Bus Voltage Measurement Procedure 5
General VFD Information 6
Model 6
Replacement 6
Operation 6
Integrated Display Terminal 6
Programming 8
Mode Access 8
Parameter Groups 8
Access to Menus and Parameters 9
VFD Parameter Settings - “Program” for units with ClearControl™ 10
Troubleshooting 12
Control terminals and switches 13
Fault and Alarm Codes 14
Drive Controller Fault Conditions 14
Drive Controller Alarm Conditions 18
Pre-Alarm Displays 20
Resetting the Drive Controller After a Fault Condition 20

Hazard Categories and Special Symbols

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of a lightning bolt or ANSI man symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

The exclamation point symbol is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Symbol	Name
	Lightning Bolt
	ANSI Man
	Exclamation Point

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death, serious injury, or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in property damage.

Before You Begin

Read and understand these instructions before performing any procedure on this drive controller.

⚠ DANGER

HAZARDOUS VOLTAGE

- Read and understand this manual before installing or operating the VFD controller. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this drive controller, including the printed circuit boards, operate at the line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- Before servicing the drive controller:
    - Disconnect all power.
    - Place a “DO NOT TURN ON” label on all power disconnects.
    - Lock all power disconnects in the open/off position.
- DO NOT touch unshielded components or terminal strip screw connections with voltage present.
- DO NOT short across terminals PA/+ and PC/- or across the DC bus capacitors.
- Install and close all covers before applying power or starting and stopping the drive controller.
- Disconnect all power, including external control power that may be present, before servicing the drive controller. WAIT 15 MINUTES to allow the DC bus capacitors to discharge. Then follow the DC bus voltage measurement procedure on page 6 to verify that the DC voltage is less than 45 V. The drive LEDs are not accurate indicators of the absence of
- DC bus voltage.

Failure to follow these instructions will result in death or serious injury.

⚠ CAUTION

IMPROPER DRIVE CONTROLLER OPERATION

- If the drive controller is de-energized for a prolonged period, the performance of the **electrolytic capacitors** will be reduced.
- Once a year, apply power to the drive controller for at least 5 hours to restore the performance of the capacitors, then check its operation.
- If the drive has not been powered for more than a year, do not connect the drive controller to the line voltage. Gradually increase the voltage using an adjustable AC source.

Failure to follow these instructions can result in injury and equipment damage.

⚠ DANGER

AUTOMATIC RESTART ENABLED

- This drive controller can restart under fault conditions.
- Equipment must be shut down, locked out and tagged out to perform servicing or maintenance.

Failure to follow these instructions will result in death or serious injury.

Bus Voltage Measurement Procedure

Before working on the drive controller, turn it off and wait 15 minutes to allow the DC bus to discharge and then measure the DC bus voltage. Note: An LED charging indicator shown in Figure 1 is lit when capacitors are charging.

⚠ DANGER

HAZARDOUS VOLTAGE

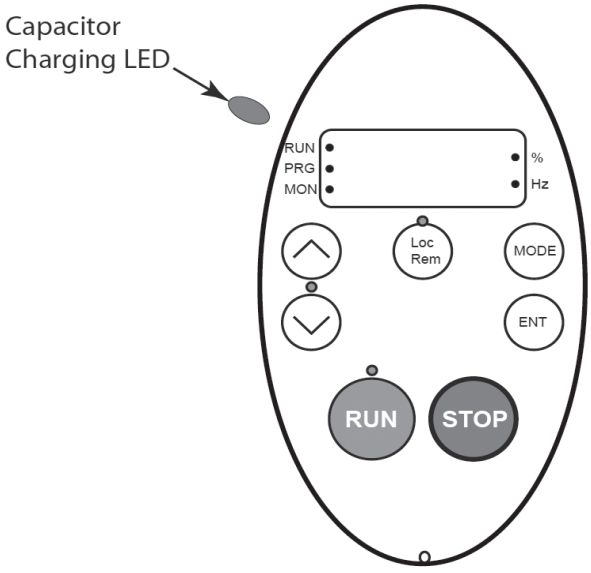
Read and understand the precautions in “Before You Begin” on page 4 before performing this procedure.

Failure to follow these instructions will result in death or serious injury.

The DC bus voltage can exceed 1000 Vdc. Use a properly rated voltage-sensing device when performing this procedure. To measure the DC bus voltage:

1. Disconnect all power and wait 15 minutes to allow the DC bus to discharge.
2. Measure the voltage of the DC bus between the PA/+ and PC/– terminals to ensure that the voltage is less than 45 Vdc.
3. If the DC bus capacitors do not discharge completely, contact your local Factory representative. Do not repair or operate the drive controller.

Figure 1 Capacitor Charging LED



General VFD Information

Model

The parameters of this Schneider Altivar 212 VFD have been modified (programmed) specifically to operate in conjunction with the ClearControl™ system. **No adjustments of the VFD are required for installation or operation of this unit.** Any change to the factory set parameters may cause unintended operation.

Replacement

The VFD is horsepower and voltage specific therefore; replacement must be the same model as the existing. A preprogrammed VFD is recommended and available from ProStock. A non-programmed Schneider Altivar 212 may be used but must be programmed exactly per Table 4 for safe and proper function.

Operation

The purpose of the VFD is to allow low airflow in Fan Only (G) and First Stage Cooling (Y1) operation of a two stage unit. Unit air balancing should be performed at 100% airflow (60Hz at VFD) during a W1, W2, or Y2 call by adjusting the blower motor sheave. First Stage Cool and Fan Only speeds are factory set at 50% airflow (30 Hz at VFD) to meet ASHRAE 90.1-2010 and for best performance. Both of these speeds are independently adjustable at the RTU-C in section 6.15 (VARIABLE FREQ DR). The VFD display will indicate an equivalent value in Hz (i.e. Low Cool adjusted to 60% will display as 36Hz at the VFD). A 20 second (adjustable at the VFD) ramp-up or ramp-down is used whenever the blower speed is increased or decreased. Since the VFD operates on 24VDC control voltage, a blower relay (with 24VAC across the coil) is used to turn the VFD on. Blower speeds are changed via Modbus communication from the RTU-C.

Integrated Display Terminal

The LEDs and keys on the integrated display terminal are illustrated in Figure 2 and described in Table 1.

Figure 2 Description of Display Terminal

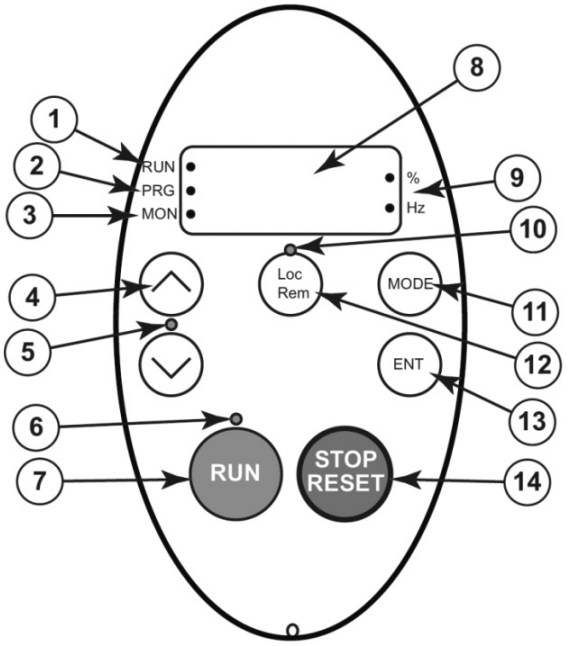


Table 1 Display Terminal Features

Item	LED/Key	Characteristics
1	Display RUN LED	• Illuminates when a Run command is applied to the drive controller. • Flashes when there is a speed reference present with a Run command.
2	Display PRG LED	• Illuminates when Programming mode is active. • Flashes in AUF-Gru modes.
3	Display MON LED	• Illuminates when Monitoring mode is active. • Flashes in Fault History Display mode.
4	Up/Down Keys	Depending on the mode, you can use the arrows to: • Navigate between the menus • Change a value • Change the speed reference when the Up/Down LED (5) is illuminated
5	Up/Down LED	Illuminates when the navigation arrows are controlling the speed reference.
6	Run LED	Illuminates when the Run key is enabled.
7	Run Button	Pressing this button/key when the Run LED is illuminated starts the drive
8	Display	4-digit, 7-segment LED display
9	Units LEDs	• The % LED illuminates when the display numeric value is in percentage. • The Hz LED illuminates when the display numeric value is in Hertz.
10	Loc/Rem LED	• Local/Remote mode indicator. Illuminates when Local mode is selected.
11	Mode Button	Press to select the Mode • Display mode (default) • Adjustment mode • Monitoring mode Can also be used to go back to the previous menu
12	Loc/Rem Button	Switches between Local and Remote modes
13	ENT Button	Press to display a parameter's value or to save a changed value
14	Stop Button	• In Local mode (12), pressing the STOP key decelerates the drive to a stop • In Remote mode (see table item #10), while the VFD is being controlled by the unit controlle r, pressing the STOP key will allow the drive to freewheel stop (drive display will indicate a flashing "E")

Programming

Mode Access

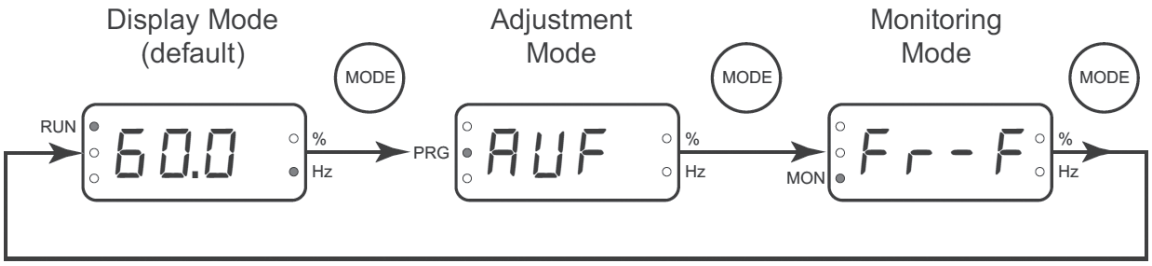
VFD controllers have three modes of operation described in Table 2.

Table 2 Mode Descriptions

Display mode (default)	• Active when power is applied to the drive controller • Use to display drive controller parameters, alarms, and faults
Adjustment mode	• Use to modify drive controller param eters
Monitoring mode	• Use to monitor drive controller status

Figure 3 illustrates how to access the modes with the display terminal MODE key

Figure 3 Mode Access



Parameter Groups

VFD controllers are factory programmed per your HVAC application (refer to unit wiring schematics and parameter settings table 4 for application settings).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Any parameter values altered from the VFD control panel will affect the operation of the drive.
- If parameter "tYP" is selected and changed, altered parameters will be transferred into the VFD memory and may affect safe operation of the equipment.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Table 3 Parameter Types

Parameter Type	Description
Basic parameters	Parameters that need validation before using the drive controller.
Extended Parameters (menu F- - -)	Parameters for special settings and applications.
User Parameters (menu USr - U_)	Subset of Basic and Extended parameters whose values have changed from the VFD default settings.
Quick menu (menu *RIF*)	Subset of Basic and Extended parameters frequently used.
History Parameters (menu *RUH*)	Subset of Basic and Extended parameters displaying the five parameters that were last changed, displayed in reverse chronological order.

Access to Menus and Parameters

Figure 4 Menu Access

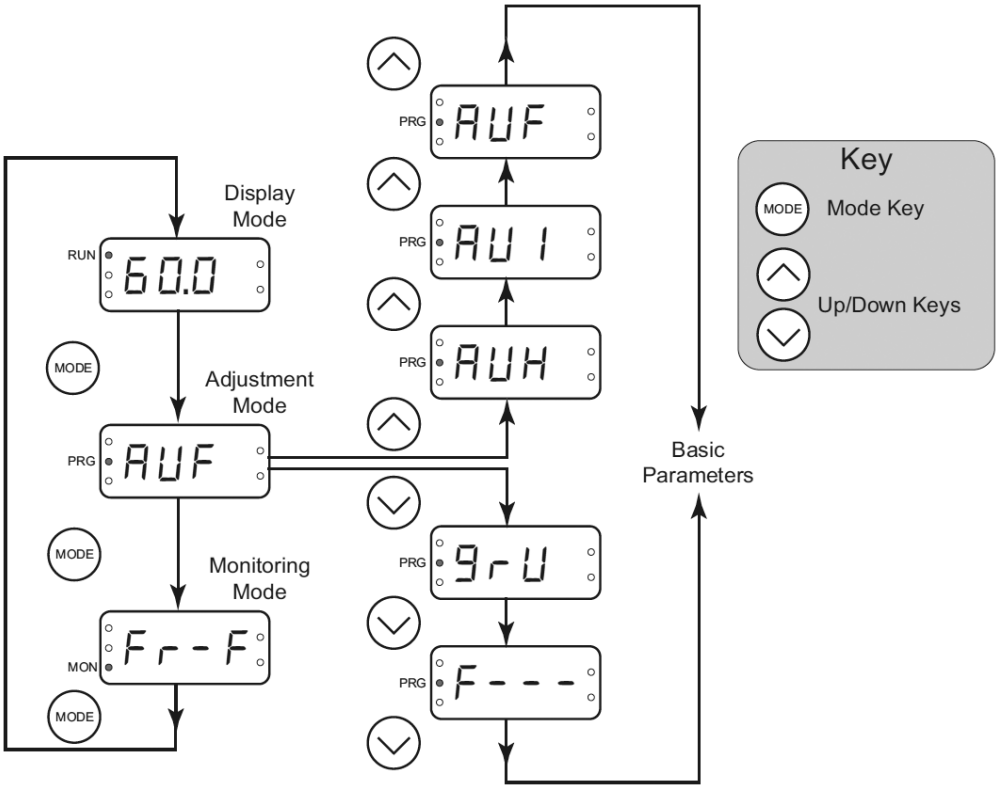
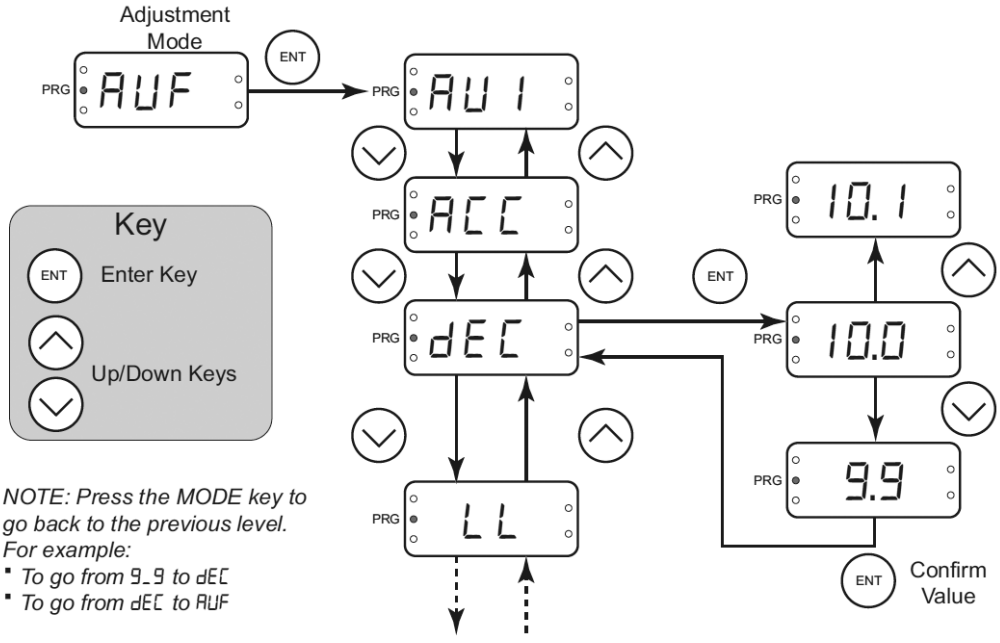


Figure 5 Access to Parameters



NOTE: Press the MODE key to go back to the previous level.
For example:
- *To go from 9.9 to dEC*
- *To go from dEC to AUF*

VFD Parameter Settings - “Program” for units with ClearControl™

Table 4 contains the parameter settings required for VFD operation with ClearControl™.

Table 4 VFD Program

Code	Logical Address	Function Description	Default Value	Revised Value Rev -01
AU 1	0	Automatic acceleration/deceleration	1	**0**
FrOd	4	Frequency setting mode selection 1	1	**4**
tYP	7	Default setting	0	**2**
ACC	9	Acceleration time 1	10	**20**
dEC	10	Deceleration time 1	10	**20**
FH	11	Maximum frequency	50	**60**
UL	12	Upper limit frequency	50	**60**
LL	13	Lower limit frequency	0	**29.9**
uL	14	Base frequency 1	50	**60**
uLu	409	Base frequency voltage 1		**208, 230, 460**
tHr	600	Motor electronic-thermal protection level 1	100	**100**
Sr 1	18	Preset-speed operation frequency 1	15	**30**
Sr2	19	Preset-speed operation frequency 2	20	**30**
Sr3	20	Preset-speed operation frequency 3	25	**30**
F 111	111	Input terminal selection1 (F)	2	**56**
F 112	112	Input terminal selection 2 (R)	6	**0**
F 113	113	Input terminal selection 3 (RST)	10	**0**
F 118	118	Input terminal selection 8 (VIA)	7	**0**
F 130	130	Output terminal selection 1A (RY-RC)	4	**14**
F 170	170	Base frequency 2	50	**60**
F202	202	VIA input point 1 frequency	0	**60**
F204	204	VIA input point 2 frequency	50	**60**
F2 13	213	VIB input point 2 frequency	50	**60**
F268	268	Initial value of UP/DOWN frequency	0	**30**
F300	300	PWM carrier frequency		**8**
F732	732	Panel operation prohibition (Local/Remote keys)	0	**1**
F800	800	Communication band speed (RJ45)	1	**1**
F80 1	801	Parity (RJ45)	1	**1**
F802	802	Inverter number	1	**5**
F803	803	Communication error trip time	3	**0**
F807	807	Communication channel choice	1	**1**
F820	820	Communication band speed (screw terminal)	1	**0**
F82 1	821	Parity (screw terminal)	1	**0**
F829	829	Selection of communication protocol	0	**1**
F85 1	851	Inverter action at network & communication break	0	**1**
F856	856	Number of motor poles for communication speed calc	2	**4**
uLu (Base frequency voltage 1) is factory set to 230 or 460V and must be adjusted for 208V operation.				

VFD Parameter Settings “Program” for units with 2 wire control

Code	Logical Address	Function Description	Default Value	New Value
AU 1	0	Automatic acceleration/deceleration	1	**0**
FrOd	4	Frequency setting mode selection 1	1	**4**
tYP	7	Default setting	0	**2**
ACC	9	Acceleration time 1	10	**20**
dEC	10	Deceleration time 1	10	**20**
FH	11	Maximum frequency	50	**60**
UL	12	Upper limit frequency	50	**60**
LL	13	Lower limit frequency	0	**37.5**
uL	14	Base frequency 1	50	**60**
uLu	409	Base frequency voltage 1		
tHr	600	Motor electronic-thermal protection level 1	100	**100**
Sr 1	18	Preset-speed operation frequency 1	15	**60**
F 112	112	Input terminal selection 2 (R)	6	**6**
F 170	170	Base frequency 2	50	**60**
F300	300	PWM carrier frequency		**8**
F732	732	Panel operation prohibition (Local/Remote keys)	0	**1**
F856	856	Number of motor poles for communication speed calc	0	**4**
uLu	Base Frequency voltage must be set to 230 or 460 and must be adjusted for 208V operation.			

Troubleshooting

- **Loss of Modbus communication between VFD and RTU-C**
    - Indications
        - VFD displays 29.9 Hz during normal operation
        - RTU-C display (VFD menu) indicates drive is “unavailable”
    - Remedies
        - Check Modbus harness
        - Cycle power to the unit
        - Replace VFD Modbus board
        - Set LL (Lower frequency limit) to 60Hz temporarily, to run unit at full airflow, while obtaining a replacement board.

- **Fan stops during normal operation**
    - Overcurrent - Fault code OC (See Fault and Alarm Codes Section)
        - Fan operating outside of recommended CFM and static
        - Increase or Decrease RPM as necessary at blower sheave
    - VFD Overheat - Fault code OH (See Fault and Alarm Codes Section)
        - Remove sticker from top of VFD (New VFD ships with a sticker that covers the top ventilation openings, this must be removed after installation) see figure 6.
        - Verify VFD cooling fan is operating and is unobstructed

- **Troubleshooting 2 Wire**
    - VFD does not run
        - Check wiring between unit and VFD terminal F and R.
        - DC voltage should be present between F, R and CC.
            - F to CC first stage airflow.
            - F and R to CC for full stage airflow.
        - LOC/REM
            - Ensure the local remote switch at the top of the menu is not green.

- See Fault and Alarm Codes section for more information.

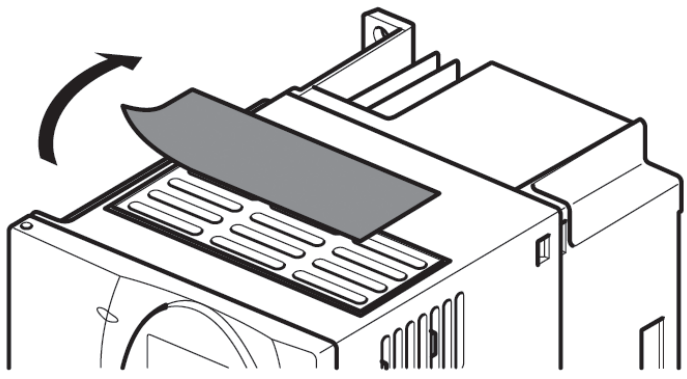
- Note: Stop button invokes an emergency stop.
    - Blower stops without ramp down
    - Clear power to reset

For more information refer to the Schneider Altivar 212 Programming Guide at:

http://products.schneider-electric.us/products-services/products/ac-drives-and-soft-starts/ac-variable-torque/altivar-212-ac-drive/

Select the “Documents and Downloads” tab.

Figure 6 Ventilation Sticker



Control terminals and switches

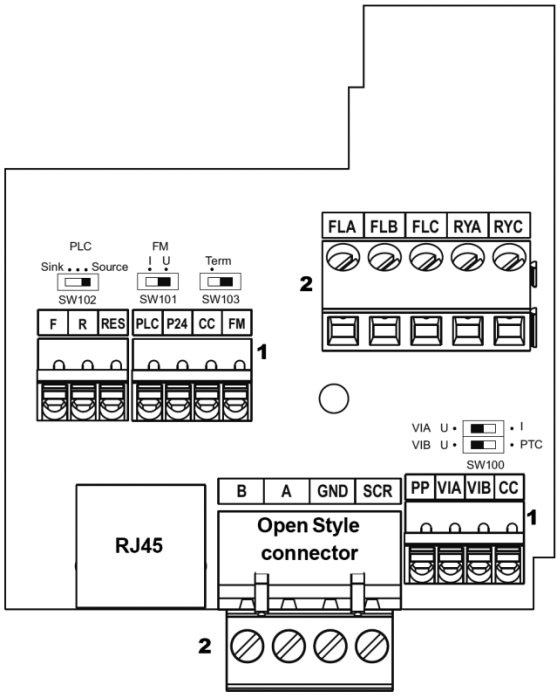
Dip switches are shown in factory positions (Figure 7 and Table 5) and should not be changed for normal operation.

See unit wiring diagram on control box cover or unit I&O manual for wiring information.

Connect the control terminals after connecting the power terminals.

Start / Stop function is accomplished by closing or opening a connection between P24 and F.
Speed commands are supplied to the VFD via Modbus through terminals B, A and GND.
The VFD can be programmed via the RJ45 port. No other control terminals are used in this application.

Figure 7 Control Terminals



1 spring terminals
2 screw terminals

Table 5 Switch Settings

Switch	Factory Setting
SW100 VIA voltage/current selection VIB voltage/PTC selection (1)	 Voltage (U) Voltage (U)
SW101 (FM voltage/ current selection)	 Voltage (U)
SW102 Selection of logic type	 Source
SW103 Selection of communication terminal resistor (2)	Term no resistor

Fault and Alarm Codes

When an alarm or fault occurs, use Tables 6 and 7 to diagnose and resolve the problem.

If the problem cannot be resolved by any of the actions described in the tables, refer to the programming guide or contact your Factory representative.

Drive Controller Fault Conditions

Table 6 Fault Codes

Error Code	Failure Code	Problem	Possible Causes	Remedies
OC 1 OC 1P	0001 0025	Overcurrent during acceleration Transistor overcurrent	• The acceleration time ACC is too short. • The V/Hz setting is improper. • A restart signal is input to the rotating motor after a momentary stop, etc. • A special motor (e.g. motor with a small impedance) is used. • Possible ground fault.	• Increase the acceleration time, ACC. • Check the V/Hz parameter. • Use F301 (auto-restart) and F302 (ride-through control). • Adjust the switching frequency F300 • Set the switching frequency control mode selection parameter • F316 to 1 or 3 (switching frequency decreased automatically).
OC2 OC2P	0002 0026	Overcurrent during deceleration Transistor overcurrent	• The deceleration time • dEC is too short. • Possible ground fault.	• Increase the deceleration time dEC • Set the switching frequency control mode selection parameter • F316 to 1 or 3 (switching frequency decreased automatically).
OC3 OC3P	0003 0027	Overcurrent during constant speed operation Transistor overcurrent	• The load fluctuates abruptly. • Mechanical blockage	• Reduce the load fluctuation. • Check the load (operated machine). • Set the switching frequency control mode selection parameter • F316 to 1 or 3 (switching frequency decreased automatically).
OC 1P OC2P OC3P	0025 0026 0027	Ground fault Motor overcurrent at start-up (for 15 and 20 hp models only)	• A current leaked from an output cable or the motor to ground. • A main circuit element is defective.	• Contact your Factory representative. • Check the cables connecting the drive controller to the motor, and check the motor insulation. • Reduce the switching frequency. • Connect output filters in series with the motor.

Table 6 Fault Codes *(continued)*

Error Code	Failure Code	Problem	Possible Causes	Remedies
OCL	0004	Overcurrent (an overcurrent on the load side at start-up)	• The insulation of the output main circuit or motor is defective. • Motor impedance is too low • Current is leaked from an output cable or the motor to ground.	• Check the cables and wires for defective insulation. • Check cables, • connectors, and so on for ground faults.
OCA	0005	Motor overcurrent at start-up	• A main circuit elements is defective. • Possible ground fault	• Check the cables connecting the drive controller to the motor, and check the motor insulation. • Reduce the switching frequency. • Connect output filters in series with the motor. • Contact your McQuay representative.
EPH 1 *	0008	Input phase loss	• Input phase loss, blown fuse • Three-phase drive controller used on a single phase line supply • Input phase imbalance • Transient phase fault	• Check the main circuit input line for phase loss. • Enable F606 (input phase loss detection).
EPHO *	0009	Output phase loss	• Loss of phase at drive controller output • Downstream contactor open • Motor not connected • Instability in the motor current • Drive controller oversized for motor	• Check the main circuit output line, motor, etc. for phase loss. • Enable F605 (output phase loss detection). Troubleshooting Fault and Alarm Codes
OP 1	000A	Overvoltage during acceleration	• Line voltage too high • Line supply transients • A restart signal is input to the rotating motor after a momentary stop, etc. • There is possibility of output phase loss.	• Check the line voltage. Compare with the drive controller nameplate rating. • Reset the drive controller. • Install a line reactor • Use F301 (auto-restart) and F302 (ride-through control). • Check the main circuit output line, motor, etc. for phase loss.
OP2	000B	Overvoltage during deceleration	• The deceleration time dEC is too short. (regenerative energy is too large.) • F305 (overvoltage limit operation) is off. • The input voltage fluctuates abnormally: • Overhauling load • There is possibility of output phase loss.	• Increase the deceleration time dEC. • Enable F305 • (overvoltage limit operation). • Check the main circuit output line, motor, etc. for phase loss.

Table 6 Fault Codes *(continued)*

Error Code	Failure Code	Problem	Possible Causes	Remedies
OP3	000C	Overvoltage during constant-speed operation	• The input voltage fluctuates abnormally. • The motor is in a regenerative state because the load causes the motor to run at a frequency higher than • the drive controller output frequency. • There is possibility of output phase loss.	• Check the main circuit output line, motor, etc. for phase loss.
OL 1	000D	Drive controller overload	• The acceleration time RCC is too short. • The DC braking level is too large. • The V/Hz setting is improper. • A restart signal is input to the rotating motor after a momentary stop, etc. • The load is too large.	• Increase the acceleration time RCC. • Reduce the DC braking amount F251 and the DC braking time F252. • Check the V/Hz • parameter setting. • Use F301 (auto-restart) and F302 (ride-through control). • Use an drive controller with a larger rating.
OL 2	000E	Motor overload	• The V/Hz setting is improper. • The motor is locked. • Low-speed operation is performed continuously. • An excessive load is applied to the motor during operation.	• Check the V/Hz • parameter setting. • Check the load (operated machine). • Adjust OL mT to the overload that the motor can withstand during operation in a low speed range.
OE*	0020	Over-torque fault	• Over-torque during operation.	• Enable F615 (overtorque fault selection). • Check system error.
OH	0010	Drive controller over temperature	• The cooling fan does not rotate. • The ambient • Temperature is too high. • The vent is blocked. • A heat generating device is installed close to the drive controller. • The thermistor in the unit is broken.	• Restart the operation by resetting the drive controller after it has cooled down. • The fan requires replacement if it does not rotate during operation. • Ensure sufficient space around the drive • controller. • Do not place any heat generating device near the drive controller. • Contact your Factory representative.
OH2	002E	External thermal fault	• External thermal fault. • External PTC probe fault.	• Check the external thermal input. • Check the PTC in the motor.
E	0011	Emergency stop	• During automatic • operation, a stop command is entered • From the operation panel or a remote input device.	• Reset the drive controller.

Table 6 Fault Codes *(continued)*

Error Code	Failure Code	Problem	Possible Causes	Remedies
EEP1	0012	EEPROM fault 1	• Data writing error.	• Turn off the drive controller, then turn it again. If it does not recover from the error, contact your Factory representative.
EEP2	0013	EEPROM fault 2	• Power supply is cut off during tYP operation and data writing is aborted.	• Turn the power off temporarily and turn it back on, and then try tYP operation again.
EEP3	0014	EEPROM fault 3	• A data reading error occurred.	• Turn off the drive controller, then turn it again. If it does not recover from the error, contact your Factory representative.
Err2	0015	Main unit RAM fault	• The control RAM is defective.	• Contact your Factory representative.
Err3	0016	Main unit ROM fault	• The control ROM is defective.	• Contact your Factory representative.
Err4	0017	CPU fault 1	• The control CPU is defective.	• Contact your Factory representative.
Err5	0018	Communication error	• An error arises during serial communication.	• Check the remote control device, cables, etc.
Err7	001A	Current detector fault	• The current detector is defective.	• Contact your Factory representative.
Err8	001B	Network error	• The error has occurred during Network communication.	• Check the Network device and wiring.
UC	001D	Low-current operation fault	• The output current decreased to a low- current detection level during operation.	• Enable F610 (low-current detection). • Check the suitable detection level for the system (F611, F612).
UP1	001E	Undervoltage fault (main circuit)	• The input voltage (in the main circuit) is too low.	• Check the input voltage. • Enable F627 (undervoltage fault selection). • To cope with a • momentary stop due to undervoltage, enable • F302 (ride-through control) and F301 (auto-restart).
EF2	0022	Ground fault	• A ground fault occurs in the output cable or the motor.	• Check the cable and the motor for ground faults.
Etn	0054	Auto-tuning error	• Check the motor parameter F401 to F494. • The motor is rotating. • The drive controller is used for loads other than those of three-phase induction motors.	
EtYP	0029	Drive controller type error	• Circuit board is changed. (or main circuit/drive circuit board)	• Contact your Factory representative.

Table 6 Fault Codes *(continued)*

Error Code	Failure Code	Problem	Possible Causes	Remedies
E- 18	0032	Break in analog signal cable	• The signal input via VIA is below the analog • Signal detection level set with F633.	• Check the cables for breaks. And check the setting of input signal or setting value of F633.
E- 19	0033	CPU communication error	• A communications error occurs between control CPUs.	• Contact your Factory representative.
E- 20	0034	Excessive voltage boost	• The voltage boost parameter F402 is set • too high. • Impedance of the motor is too low	• Decrease the setting of the voltage boost parameter F402.
E- 21	0035	CPU fault 2	• The control CPU is defective.	• Contact your Factory representative.
SOUt	002F	Step-out (for PM motor only)	• The motor shaft is locked. • One output phase is open. • An impact load is applied.	• Unlock the motor shaft. • Check the interconnect cables between the drive controller and the motor.

** You can select a trip ON/OFF by parameters.*

Drive Controller Alarm Conditions

Alarms do not cause the drive controller to fault. See Table 7.

Table 7 Alarm Codes

Error Code	Problem	Possible Causes	Remedies
OFF	ST terminal OFF	• The ST-CC circuit is opened.	• Close the ST-CC circuit.
nOFF	Undervoltage in main circuit	• The supply voltage between R, S and T is under voltage.	• Measure the main circuit supply voltage. • If the voltage is at a normal level, the drive controller requires repairing.
rtry	Restart in process	• The drive controller is in the process of restart. • A momentary stop occurred.	• The drive controller is operating normally if it restarts after • several tens of seconds.
Err 1	Frequency point setting error alarm	• The frequency setting signals at points 1 and 2 are set too close to each other.	• Set the frequency setting signals at points 1 and 2 apart from each other.
CLr	Clear command acceptable	• This message is displayed when pressing the STOP key while an error code is displayed.	• Press the STOP key again to clear the fault.
EOFF	Emergency stop command acceptable	• The operation panel is used to stop the operation in automatic control or remote control mode.	• Press the STOP key for an emergency stop. • To cancel the emergency stop, press any other key.

Table 7 Alarm Codes *(continued)*

Error Code	Problem	Possible Causes	Remedies
HI / LO	Setting error alarm / An error code and data are displayed alternately twice each.	• An error is found in a setting when data is reading or writing.	• Check whether the setting is made correctly.
HEAd / End	Display of first/last data items	• The first and last data item in the data group is displayed.	• Press MODE key to exit the data group.
db	DC braking	• DC braking in process	• The message goes off in several tens of seconds if no problem occurs.
E 1	Flowing out of excess number of digits	• The number of digits such as frequencies is more than 4. (The upper digits have a priority.)	• Lower the frequency free unit magnification F702.
StOP	Momentary power failure slowdown stop function activated.	• The slowdown stop prohibition function set with F302 • (momentary power failure ride-operation through operation) is activated.	• To restart operation, reset the drive controller or input an operation signal again.
LStP	Auto-stop because of continuous operation at the lower-limit frequency	• The automatic stop function selected with F256 was activated.	• To deactivate the automatic stop function, increase the frequency command above the lower-limit frequency (LL) + 0.2 Hz or turn off the operation command. • Troubleshooting Fault and Alarm Codes
InIt	Parameters in the process of initialization	• Parameters are being initialized to default values.	• Normal if the message disappears after a while (several seconds to several tens of seconds).
E- 17	Operation panel key fault	• The RUN or STOP key is held down for more than 20 seconds. • The RUN or STOP key is faulty.	• Check the operation panel.
AtnI	Auto-tuning	• Auto-tuning in process	• Normal if it the message disappears after a few seconds.
h999	Integral input power	• Integral input power is more than 999.99 kWh.	• Press and hold down the key for 3 seconds or more when power • is off or when the input terminal function CKWH is turned on or displayed.
H999	Integral output power	• Integral output power is more than 999.99 kWh.	• Press and hold down the key for 3 seconds or more when power • is off or when the input terminal function CKWH is turned on or displayed.

Pre-Alarm Displays

Table 8 Pre-Alarm Codes

C	Overcurrent alarm	Same as OC (overcurrent)
P	Overvoltage alarm	Same as OP (overvoltage)
L	Overload alarm	Same as OL 1 and OL 2 (overload)
H	Overheating alarm	Same as OH (overheating)

The pre-alarms are displayed, blinking, in the following order from left to right: C, P, L, H.

If two or more problems arise simultaneously, one of the following alarms appears and blinks: CP, PL, CPL.

Resetting the Drive Controller After a Fault Condition

Do not reset the drive controller when faulted because of a failure or error before eliminating the cause of the fault. Resetting the tripped drive controller before eliminating the problem causes it to fault again.

Cycle power to the unit to reset the drive controller after a fault.

CAUTION

MOTOR OVERHEATING
• Repeated reset of the thermal state after a thermal overload can result in thermal stress to the motor.
• When faults occur, promptly inspect motor and driven equipment for problems (locked shaft, mechanical overload, etc.) before restarting. Also check power supplied to the motor for abnormal conditions (phase loss, phase imbalance, etc.).
Failure to follow these instructions can result in equipment damage.
Page