



Warning! This is a short guide, and does not give all necessary safety information. Refer to the CP2000 Series User Manual for all safety information to avoid damage to the drive, motor or personal injury.

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Chapter 1 Introduction

Chapter 1 Introduction

This Quick Start Guide shows you how to configure the CP2000 Series drive settings to work with your Delta Controls controllers. The guide assumes the drive has already been installed on-site by a qualified technician.

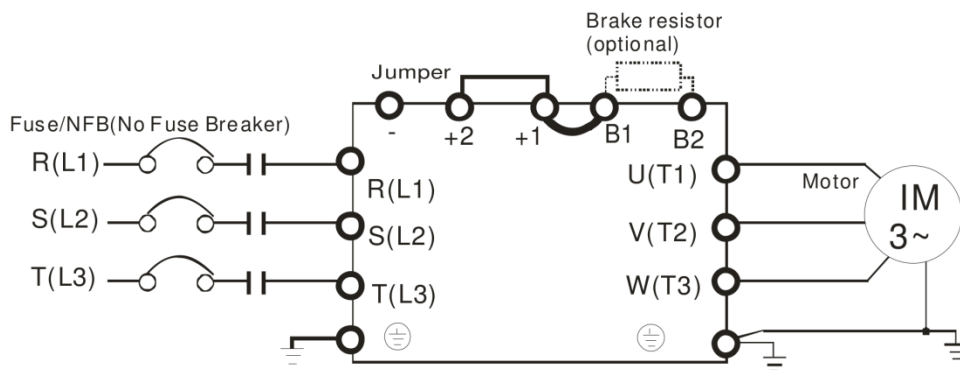


Refer to the CP2000 Series User Manual for more information about how to unpack (Chapter 3), install (Chapter 2) and wire the drive (Chapter 4 and 5) to its power supply.

1-1 Before You Start

Verify the following wiring setup before you turn on the VFD for the first time.

- Make sure the line voltage (L1/L2/L3) is not connected to the output terminals (U/V/W) of the VFD.
- Ensure the motor is connected to the drive before applying power to the VFD.



Chapter 2 Control Wiring

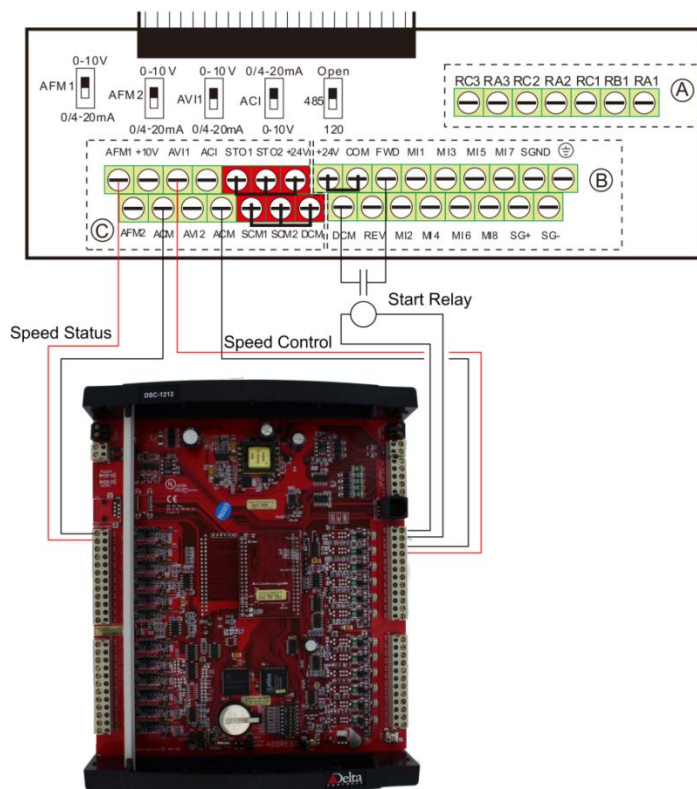
Chapter 2 Control Wiring



Do not remove the factory jumpers between STO1/STO2/+24V and SCM1/SCM2/DCM.

Make sure the AFM1 and AVI1 switches are in the 0-10V position.

Make sure the Start Relay shown is not in a closed state when the drive is initially powered up.



For the conventional start/stop, speed control and speed feedback via hard-wired I/O, the following wiring terminations are required:

- **Start/Stop:** Control relay contacts wired between FWD and DCM.
- **Speed Control:** 0-10V speed control is connected to AVI1 (+) and ACM (-).
- **Speed Feedback:** 0-10V speed status is connected to AFM (+) and ACM (-).

2-1 Cabling

The analog speed signals should be using shielded cable.

Chapter 3 Set Up the VFD Parameters

Chapter 3 Set Up the VFD Parameters

This section describes how to set up the VFD parameters when you turn on the drive for the first time, and how to use the digital keypad on the VFD to access these parameter settings.

3-1 About Parameters

The VFD parameters are organized in groups which are numbered from 00 to 13. Members in the same group share a common prefix (00 to 13) and each parameter member is identified by a unique number. The parameters and their settings are accessible on the keypad main menu by selecting Parameter Setup.

For example, the group Basic Parameters share the prefix “01” and “01-00” is the maximum operation frequency parameter.



See Chapter 11 and 12 in the VFD-CP2000 User Manual for more details about the parameters and their factory settings.

3-2 VFD Digital Keypad








The digital keypad consists of keys and a display screen. This section only applies to the KPC CC01 keypad.



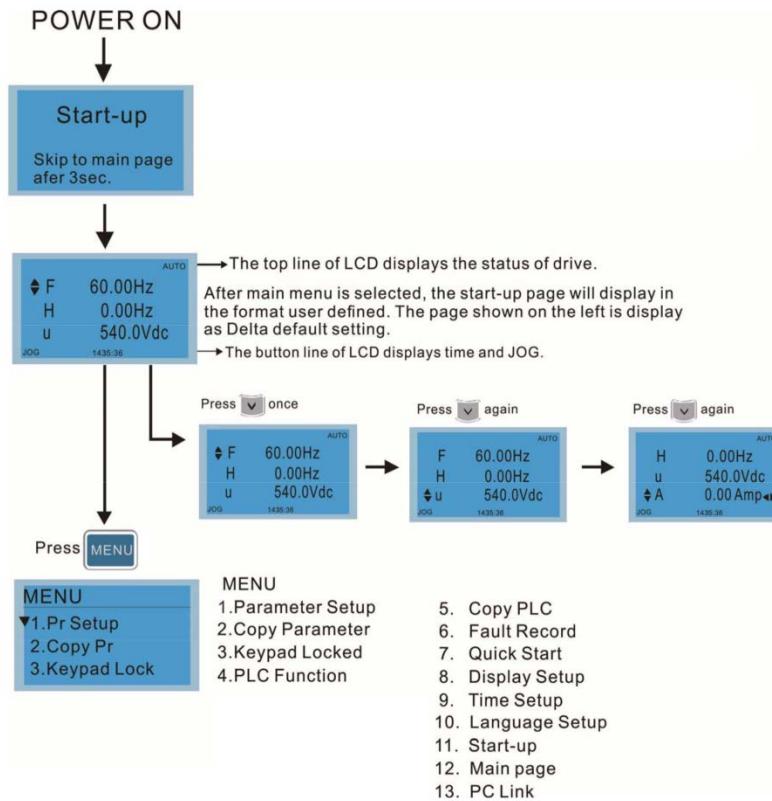
See Chapter 10 in the VFD-CP2000 User Manual for more information.

3-3 Digital Keypad Keys



Key	Description of Function
RUN	When the VFD is in HAND mode, pressing RUN starts the motor.
STOP/RESET	This key has the highest processing priority in any situation. Pressing STOP stops the VFD whether the VFD is in HAND mode or AUTO mode. Once the drive has stopped, pressing STOP/RESET will clear an outstanding Fault.
FWD/REV	Used to reverse the rotation direction of the motor. <i>Not used in HVAC applications.</i>
HAND	Pressing HAND puts the VFD into local control mode, where remote signals are ignored. "HAND" displays on the keypad screen. While in this mode, it is possible to start the VFD and to manually control the speed using the keypad.
AUTO	Pressing AUTO puts the VFD into remote control mode, which can be either hardwired I/O or BACnet control. "AUTO" displays on the keypad screen. The local RUN and speed control is displayed while in AUTO.
MENU	Press MENU to open or return to the main menu that lists 13 options, including Parameter (Pr) Setup and Display Setup.
ESC	Press ESC to leave the current menu and go back up one level in the menu. It will also leave any parameter viewed without making any change to the value.
ENTER	Press ENTER to go to the next level in the menu. It will also apply a change to a parameter whose value has been altered.
	These keys perform two functions, depending on the state of the display. When in the menu,  and  scroll through the different menu levels and parameters. When a single parameter is being adjusted,  and  determine which digit of the setting will be adjusted when you use  and  . On the display's main page, these keys can be used to adjust the running speed of the drive.
F1, F2, F3, F4	These keys are not used by default, but can be customized to perform application specific functions.

3-4 Display Workflow



3-5 Setting Up Parameters for the First Time





This section describes how to configure the drive correctly after turning it on for the first time.

To access the VFD parameters on the keypad display,

1. Push the MENU button on the keypad.
2. Scroll through the menu using **↑** and **↓** to select **1. Pr Setup** and press ENTER.

Parameter (Pr) Setup is a menu option that allows you to change the drive's setup parameters. The parameters are organized as groups under Parameter Setup, from System or Drive Parameters (00) to Industry Application Parameters (13).

3. Scroll through the list using **↑** and **↓** to select the parameter group you want to modify. Press ENTER to view the parameters in the selected group.
4. Use **↑** and **↓** to select the parameter you want to modify. Press ENTER to go to the parameter's option menu.
5. To select a number that represents the option you want to set, use **↑** and **↓**.

To enter a value, use  and  to increase or decrease the number displayed. In some cases when you are presented with a string of numbers, decimal places, dates or times, you may need to use  and  to move the cursor's position to make a specific change.

6. Press ENTER to save the option or changes you've made. Use ESC button to go back up one level in the menu, or push MENU to return to the main menu.
7. Use steps 3 to 6 to make the required changes to the parameters listed below.

The following tables list the parameters that you need to set up and their recommended values.

Changes to System Parameters (00) group

Parameter	Display Text	Description of Parameter	Default Value	Preferred Value
00-20 Source of frequency	Source of FREQ	The source of frequency parameter determines which control signal controls the drive's frequency in AUTO mode. Parameter options: 0 - Keypad (not recommended) 1 - RS-485 BACnet 2 - Analog Input (used for hardwired I/O control)	0	2
00-21 Source of operation	Source of OPER	This determines which control signal starts or stops the drive in AUTO mode. Parameter options: 0 - Keypad (not recommended) 1 - Hardwired I/O Terminals 2 - RS-485 BACnet 3 - not used 4 - not used 5 - not used	0	1
00-22 Stop method	Stop Methods	This determines what the drive does when commanded to stop. Parameter options: 0 – Ramp to stop 1 – Coast to stop (preferred for HVAC)	0	1

Parameter	Display Text	Description of Parameter	Default Value	Preferred Value
00-32 Keypad stop function	KPD STOP ENABLE	This determines whether the STOP key on the keypad is active when the drive is running in AUTO mode. Parameter options: 0 – STOP key disabled. 1 – STOP key enabled (preferred for safety)	0	1

Changes to Basic Parameters (01) group

Parameter	Display Text	Description of Parameter	Default Value	Preferred Value
01-11 Output frequency lower limit	Lower Bound FREQ	This determines the minimum speed of the drive motor. It is important that this speed is not too low to prevent motor overheating.	0.00 Hz	10-15 Hz
01-12 Acceleration time 1	1st ACC Time	This is the time, in seconds, for the drive to ramp up from 0 Hz to 60 Hz. It's important that this time is not too fast, or an overload fault will trip. The factory default time is too low.	10 secs	60 secs
01-13 Deceleration time 1	1st DEC Time	This is the time, in seconds, for the drive to ramp down from 60 Hz to 0 Hz. If this time is set too low, an OVN fault will occur. The factory default time is too low for large inertia loads like centrifugal fans.	10 secs	60 secs

Digital Input / Output Parameters (02) group

Parameter	Display Text	Description of Parameter	Default Value	Preferred Value
02-35 External operation after reset and activate	Fault Reset OP	When set to 1, the drive automatically restarts after a power failure, assuming the FWD terminal is still closed. When set to 0, the drive powers up again and stops, requiring a cycle of the Start signal (turn off and then turn on again) to resume normal operation (Value 0 is not recommended).	0	1

Motor Parameters (05) group

Parameter	Display Text	Description of Parameter	Default Value	Preferred Value
05-01 Full load current of motor	Motor 1 Rated A	This determines the full load rating of the motor in amps.	None	As stated on the motor nameplate.
05-02 Rated power of motor	Motor 1 Rated P	This determines the motor power in kW.	None	As stated on the motor nameplate. Note: kW = HP * 0.746
05-03 RPM of motor	Motor 1 Rated	This determines the motor's 60Hz RPM.	1710 RPM. This is fine for 4 pole motors.	As stated on the motor nameplate.
05-04 Number of poles in motor	Motor 1 Poles	This determines the motor's number of poles. Parameter options: 2 – 3600 RPM 4 – 1800 RPM 6 – 1200 RPM 8 – 900 RPM	4, which is correct for ~1800 RPM motors.	RPM value as stated on the motor nameplate.

Special Parameters (07) group

Setting up these parameters is optional but useful to minimize efforts to correct drive faults.

Parameter	Display Text	Description of Parameter	Default Value	Preferred Value
07-06 Restart after momentary power down	Momentary Power	The operation mode when the AC motor drive restarts from a momentary power loss. Parameter options: 0 – Stop operation 1 – Speed search start, at the current speed 2 – Speed search start, at minimum frequency	0	1
07-07 Maximum power loss duration	Power Loss Time	The duration of the period of power loss in seconds before the drive will stop operation. Range is between 2 to 20 seconds.	2 secs	20 secs
07-10 Restart after fault	Fault Re-RUN Way	This determines what the drive does after a fault occurs. Parameter options: 0 – Stop operation 1 – Restarts automatically, speed search starts with current speed 2- Restarts automatically, speed search starts with minimum frequency	0	1
07-11 Number of auto restarts	Auto Restart	The number of times the drive can restart automatically after a fault. Range is 0 to 10 times.	0	1 or more

Parameter	Display Text	Description of Parameter	Default Value	Preferred Value
07-12 Speed search on startup	Restart Method	<p>This determines how the drive starts the motor. This is a useful setting if the drive occasionally starts when the motor is already spinning.</p> <p>Parameter options: 0 – Disable. Wait for the motor to stop spinning before next start. 1 – Speed search, starting from maximum frequency (normally 60Hz). 2 – Speed search, starting from motor start frequency (normally 0.5Hz). 3 – Speed search, starting from minimum frequency.</p>	0	3
07-33 Auto restart internal of fault (Internal time counter for faults)	Reset RestartCNT	<p>When a restart occurs after a fault, the drive starts this internal time clock and counts the number of faults that occur within this time period. If the number of faults do not exceed the number recorded in the 07-11 parameter, the time clock and fault are reset back to zero.</p> <p>When the number of faults exceed the 07-11 parameter value, the drive faults and stops, requiring user intervention.</p>	60 secs	60 secs

Communication Parameters (09) group

These parameters are only necessary if you are planning to communicate to the built-in BACnet interface in the drive.

Parameter	Display Text	Description of Parameter	Default Value	Preferred Value
09-31 Internal communication protocol	COM1 Protocol	<p>Set up the protocol communication used.</p> <p>Parameter options: 0 – Modbus 1 – BACnet MS/TP</p>	0	1

Parameter	Display Text	Description of Parameter	Default Value	Preferred Value
09-50 BACnet Dnet	BACnet Address	MS/TP MAC address, range of 0 127.	10	To avoid conflict with Delta NET2 port, do not use 0.
09-51 BACnet Baud Rate	BACnet BaudRate	MS/TP Baud rate 9.6, 19.2, 38.4, 76.8 kbps	38.4	76.8
09-52 BACnet Device ID L ‡	BACnet DeviceIDL	BACnet device address, low word, range 0 to 6553. This value is added to the value of parameter 9-53 * 65536.	10	Site specific
09-53 BACnet Device ID H ‡	BACnet DeviceIDH	BACnet device address, high word, range 0 to 63. This value is multiplied by 65536 and added to parameter value 9-52 .	0	Site specific
09-55 BACnet max address	BACnet Poll Max	MS/TP Max Master. This should be left at the default of 127.	127	127

‡ The device address requires a bit of explanation. Let's say we wanted to address the drive to 99701. In this case, the value is above 65535, so the value of parameter **9-53** can't be 0. Take the address you want (99701) and divide it by 65536, then truncate that value (which gives us 1). This is the value to use in parameter **9-53**. Next, take the value of parameter **9-53** (in this case, it's 1) and multiply it by 65536 (65536). Take that value and subtract it from the address you actually want. (99701 - 65536 = 34165) This is the value to use in parameter **9-52**.

Chapter 4 Start Up Test

Chapter 4 Start Up Test

1. After the drive has been installed and configured correctly, complete this start up test.
2. Cycle power to the drive, as some of the parameters require a drive restart to take effect.
3. Push the HAND button on the keypad so that the drive is running under local control.
4. Use the keypad to set a safe running speed command for the motor. This is value F on the display. A speed of 20 Hz should be safe.
5. Push the START button. The drive should start and the motor spin up to 20 Hz, as indicated by the H value on the display.
6. If the motor is running okay, use the keypad to run the motor through its entire speed range (minimum speed to 60 Hz). Assuming the motor and load responds well to all speeds, move on.
7. Push the STOP button to stop the drive.
8. Once the motor comes to a stop, push the AUTO button to put the drive into automatic (non-local) control.
9. On the Delta controller, set the AO for speed to a safe speed.
10. On the Delta controller command the BO to start the drive.

The drive should now be starting, and running up to the commanded speed.

11. Adjust the Delta controller's AO value across its range to ensure that the full speed range can be commanded, and that the minimum speed of the drive is being enforced.
12. Verify that the feedback speed (AI) is reading properly.
13. Stop the drive by commanding the BO to stop.

Appendix A Publication History

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Document Version	Date Published	Change Description
1.0	August 2017	First release.