WORLDWIDE ELECTRIC CORPORATION

AC Variable Frequency Drive

WDG2 Quick Start Guide

0.4 – 22kW (0.5 – 30 HP) [Three Phase 230V / 460V]

Worldwide Electric Inc.
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QR Code

⚠ See Product Manual for Complete SAFETY Recommendations

This Quick Start Guide is intended For Qualified Personnel with fundamental knowledge of electricity and electric drive equipment. If you are unfamiliar with the installation and operation of Variable Frequency Drives or unsure about any procedure, contact a qualified installation expert.

⚠ **Danger** - Indicates an imminently hazardous situation, if not avoided, will result in severe injury or death

- Never remove the product cover or touch the internal printed circuit board or any contact points when the power is on.
- Do not start the product when the cover is open
- Wait at least 10 minutes before opening the covers and exposing the terminal connections after power off. Before staring the work on the inverter, test the connections to ensure all DC voltage has been fully discharged.

⚠ **Warning** - Indicates an potential hazardous situation, if not avoided, could result in injury or death

- Make sure to install ground connection between the equipment and the motor for safe use.
- Do not turn on the power if the product is damaged or faulty
- The inverter becomes hot during operation. Avoid touching the inverter until it becomes cool.
- Do not allow items such as screws, metal chips, debris, water or oil to get inside the inverter.
- Do not operate the switch with wet hands.
- Check the data of the protection level for the circuits and devices(Class 1)

(!) **Caution** - Indicates an potential hazardous situation, if not avoided, could result in minor injury or property damage.

1. Inspect Delivery

- Inspect the drive for any damages. If the drive appears damaged upon receipt, contact your supplier.
- Verify receipt of the correct model by checking the information on the nameplate as shown below. If you have received the wrong model, contact your supplier. The nameplate is on the side of the product.

WDG2 0004 - 2E0FN

WDG20022-2E0FN

Input	200-240V 3Phase 50/60Hz HD: 11.8A ND:13.1A
Output	0-InputV 3 Phase 0.01~400Hz HD: 11A ND: 12A 4.2kVA IP20 Serial Number: 5502106001F Inspected by D. L. Ui KCC-REM-LSR-XXXXXX

- **Model Name**
- **Motor Capacity**
  0004 – 0.4kW 0075 – 7.5kW
  0008 – 0.8kW 0110 – 11 kW
  0015 – 1.5kW 0150 – 15 kW
  0022 – 2.2kW 0185 – 18.5kW
  0040 – 4.0kW 0220 – 22 kW
  0055 – 5.5kW
- **Input Voltage**
  2 : 3-phase 200V – 240 V
  4 : 3-phase 380V – 480 V
- **Keypad**
  E : LED Keypad
- **UL Type**
  O : UL Open Type
  E : UL Type 1
- **EMC Filter**
  N : Non Built-in EMC Filter
  F : Built-in EMC Filter (C3)
- **Reactor**
  N : Non-Reactor

Important

- Verify that the input voltage rating matches the voltage source which will be applied to the VFD
- Confirm that the output power of the VFD is equal to or greater than the rating of the motor which will be connected

2. Installation

2-1. Installation Site

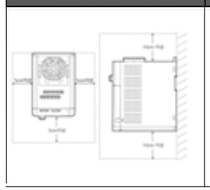
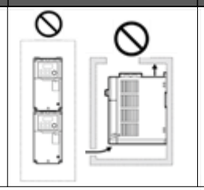
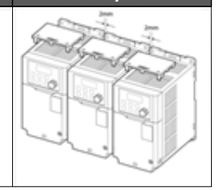
The location must be free from any vibration, and the inverter must be installed on A non-flammable surface that can support the inverter's weight

2-2. Air Circulation

The inverter can become very hot during operation. Install the inverter on the fire-resistant or flame-retardant surface with sufficient clearance around the inverter to all air to circulate. Illustrated the required installation clearance.

2-3. Side by Side Installation for multiple VFDs

If multiple inverters are installed in one panel, arrange them side-by-side and remove the top covers. Top covers MUST be removed for proper heat dissipation. Use a flat head screw driver to remove the top covers.
(Din-rail installation is also available)

Installation Site	Air Circulation	Side by Side
		

2-4.Environmental Specification

Inverters are composed by sensitive electronic components. Installed Environment can significantly impact the lifespan and reliability of the VFD. Its operational conditions specified in the table below

Items	Operational Specification
Ambient Temperature[1]	Heavy Load: -10 ~ 50 ^{0}C, Normal Load: -10 ~ 40 ^{0}C
Ambient Humidity	Less than 95% Relative Humidity (no condensation)
Storage Temperatire	-20 ~ 65 ^{0}C
Environmental Factors	An Environment free from Corrosive, Flammable Gases, Oil Residue, or Dust
Operation Altitude / Oscillation	Lower than 3,280 ft (1,000 m) above Sea Level, Less than 1G (9.8 m/sec^2)
Air Pressure	70 ~ 106 kPa

1: The ambient temperature is measured at point 2 inches from the inverter surface

3. Cable Selection and Wiring

⚠ **Danger** – Turn OFF all Power

3-1. Power and Ground Cable Specification

Load (kW)		Ground		Power I/O(mm^2)		Power I/O(AWG)		Terminal Size
		mm^2	AWG	R/S/T	U/V/W	R/S/T	U/V/W	
3 Phase 200V	0.4/0.75	4	12	1.5	1.5	16	16	M3
	1.5 / 2.2	4	12	4	2.5	12	14	M4
	4	6	10	6	6	10	10	M4
	5.5/7.5	6	10	16	10	6	8	M4
	11	14	6	16	16	6	6	M5
	15	14	6	25	25	4	4	M5
	18.5	14	6	35	25	2	4	M6
	22	14	6	35	35	2	2	M6
Load (kW)		**Ground**		**Power I/O(mm^2)**		**Power I/O(AWG)**		**Terminal Size**
		mm^2	AWG	R/S/T	U/V/W	R/S/T	U/V/W	
3 Phase 400V	0.4/0.75	2.5	14	1.5	1.5	16	16	M3.5
	1.5 / 2.2	2.5	14	1.5	1.5	16	16	M3.5
	4	6	10	2.5	2.5	14	14	M4
	5.5/7.5	6	10	10	6	8	10	M4
	11	14	6	10	10	8	8	M5
	15	14	6	10	10	8	8	M5
	18.5	14	6	16	10	6	8	M5
	22	14	6	25	16	4	6	M5

Note

- 200V Products require Class 3 grounding. Resistance to ground must be < 100Ω
- 400V Products require special Class 3 grounding. Resistance to ground must be < 10Ω

⚠ **Warning**

- Make sure to install ground connection between the equipment and the motor for safe use.

(!) **Caution**

- Apply rated torques to the terminal screws
- Do not connect two wires to one terminal when wiring the power
- Power supply wiring must be connected to R,S,T terminals, NOT U,V,W
- Motor wiring must be connected to U, V, W

3-2. Signal (Control) Cable Specifications

Terminals	Without Crimp Terminal Connectors (Bare Wire)		With Crimp Terminal Connectors (Boothlace Ferrule)	
	mm^2	R/S/T	mm^2	R/S/T
P1~P5/CM/VR/V1/I2/AO/24 /A1/B1/C1/A2/C2/S+/S-	0.8	18	0.5	20

3.3 Cable Wiring

(!) **Caution**

- Install the inverter before wiring connections
- Ensure no small metal debris from the wire cut, remained inside inverter
- Tighten terminal screws to the specified torque value.
- Do not place heavy objects on top of electric cables to prevent damages
- Only use a grounded power supply system. Do not use TT, TN, IT, or corner grounded system with the inverter
- When installing the residual current device (RCD) or residual current monitoring (RCM), use Type B RCDs and Type B RCM.
- Use cables with the largest cross-sectional area for poser terminal wiring to ensure the voltage drop does not exceed 2%
- Use copper wires only with 600V, 75^{0}C rating for the power terminal wiring and 300V, 75^{0}C rating for the control terminal wiring
- Separate control circuit wires from the main circuits and other high voltage circuits.
- Check for short circuits or if wiring failure in the control circuit
- Use shielded cables for control terminal wiring. Failure to do so may cause malfunction due to interference. If grounding is needed, use shielded twisted pair (STP) cables
- If need re-wire the terminals due to the wiring related faults, ensure that the inverter keypad display is turned off and the charge lamp under the front cover is off in prior. The inverter may hold a high voltage electric charge longer after the power is turned off

4. Terminal Screw Specification

4-1. Input/Output Terminal Screw Specification

Product (kW)		Terminal Screw size	Terminal Torque(Kgf-cm/Nm)
3-Phase 200V	0.4/0.75	R/S/T,U/V/W: M3	R/S/T,U/V/W: 5.1/0.5
	1.5/2.2	R/S/T,U/V/W: M4	R/S/T,U/V/W: 12.1/1.2
	4	R/S/T,U/V/W: M4	R/S/T, U/V/W: 18.4/1.8
	5.5/7.5	R/S/T,U/V/W: M4	R/S/T: 14.0/1.4, U/V/W: 15.0/1.5
	11/15	R/S/T,U/V/W: M5	R/S/T, U/V/W: 25.34/2.5
	18.5/22	R/S/T,U/V/W: M6	R/S/T, U/V/W: 30.5/3
3-Phase 400V	0.4/0.75/1.5/2.2	R/S/T,U/V/W: M3.5	R/S/T, U/V/W: 10.3/1.0
	4	R/S/T,U/V/W: M4	R/S/T, U/V/W: 18.4/1.8
	5.5/7.5	R/S/T,U/V/W: M4	R/S/T: 14.0/1.4, U/V/W: 18.4/1.8
	11/15/18/22	R/S/T,U/V/W: M5	R/S/T, U/V/W: 25.34/2.5

4-2. Input/Output Terminal Screw Specification

Terminal	Terminal Screw size	Terminal Torque(Kgf-cm/Nm)
24/P1 ~ P5/CM	M2.6	2.2~2.5 / 0.22~0.25
VR/V1/V2/I2/AO/CM/S+/S- /A1/B1/C1/A2/C2	M2.6	4.0/0.4

- WDG2 supports Q1/EG Terminal as a substitute of A2/C2 terminal

(!) **Caution**

- Tighten terminal screws to rated torque values. Loose screws or over-tightening may cause damage or malfunctions.

5. Main Power Connection

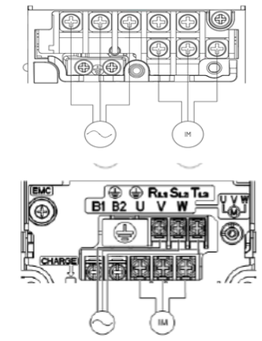
5-1. Power Terminal

Turn Off the Power before any wiring!! See the wiring diagrams for the proper three phase application. For proper wire gauge recommendation, see the User Manual. Follow the good wiring and grounding practice. Follow the applicable local codes as need.

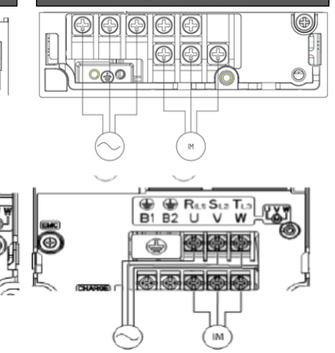
⚠ **Danger** ⚠

Lethal Voltages are Present. Be sure that all Power is Turned OFF while performing the Recommended Power Wiring. Reinstall all Protective Covers on the WDG2 before Reapplying the Power

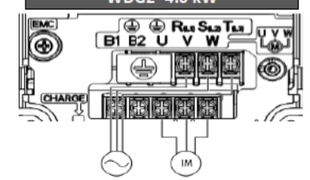
WDG2 0.4~0.8kW



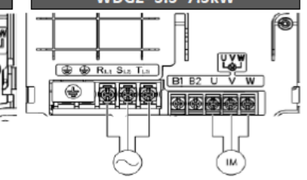
WDG2 1.5~2.2kW



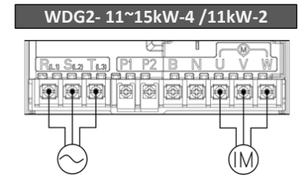
WDG2- 4.0 kW



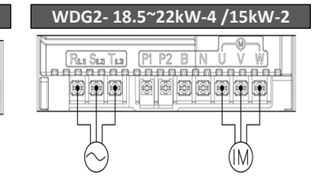
WDG2- 5.5~7.5kW



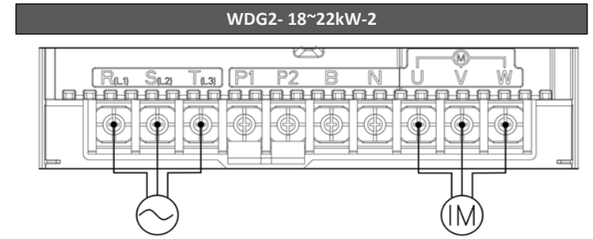
WDG2- 11~15kW-4 /11kW-2



WDG2- 18.5~22kW-4 /15kW-2

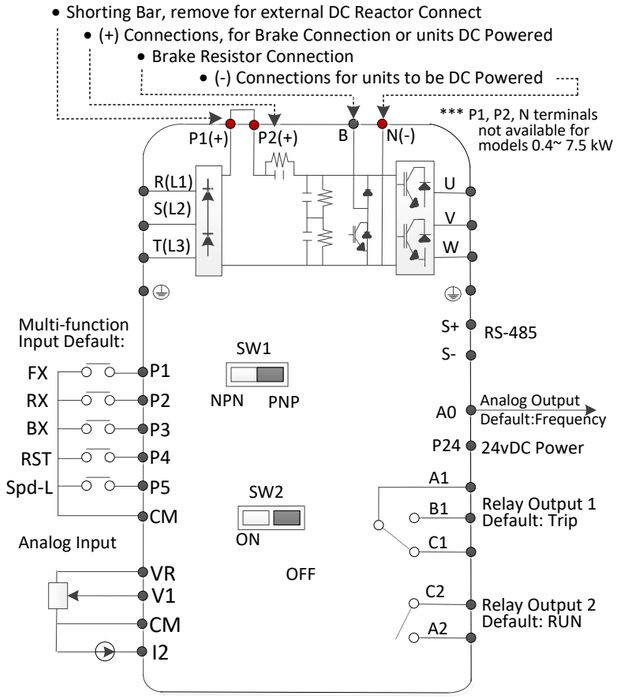


WDG2- 18~22kW-2



Terminal Labels	Name
⏚	Ground Terminal – Earth Grounding
R(L1)/S(L2)/T(L3)	AC Power Input Terminal–Main Power Supply
P2/N (11~22kW)	DC Link Terminal
P1/P2 (11~22kW)	DC Reactor Terminal (Remove the short-circuit bar)
B1/B2(0.4~7.5kW) P2/B (11~22kW)	Braking Resistor Terminal
U/V/W	Motor Output Terminals – 3 Phase AC Motor Wiring

6. Control Terminal



6-1. Switches

Switch	Description
SW1	• NPN /PNP Mode Selection Switch
SW2	• Terminating Resistor Selection Switch
RJ-45 Connector	• Connect to Remote I/O or smart copier, connect with RS-485 Communication

6-2. Input Terminals

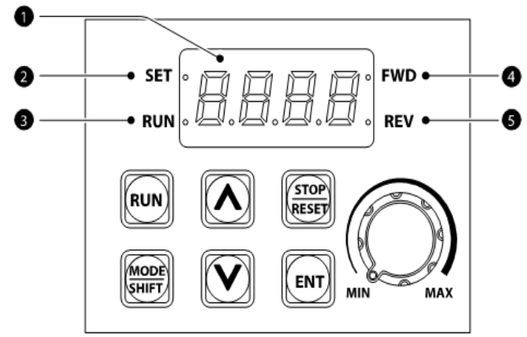
Labels	Linked Parameters	Description / Factory Default
P1 ~ P5	IN-65, IN-66, IN-67, IN-68 IN-69	• Multi Functions for digital Input Terminals P1:FX, P2:RX, P3: BX, P4: RST, P5: Speed-L
CM	-	• Common Terminal for Analog Terminal inputs/outputs
VR	-	Set Frequency reference via analog V or I • Maximum Voltage Output: 12VDC • Maximum Current Output: 100mA • Potentiometer: 1/5kΩ
V1	IN – 05 ~ 16	Set Frequency reference via analog V input • Unipolar: 0 ~ 10 V: 12V Max • Bipolar: -10 ~ 10 V: (±12V Max)
I1	IN – 50 ~ 62	Set Frequency reference via analog I input • Input current: 4~20mA Max Input I: 20mA • Input resistance: 249Ω

6-3. Output / Communication Terminals

Labels	Linked Parameters	Description / Factory Default
V0		VFD output information of frequency, voltage, current, or DC voltage • Output Voltage: 0~10V • Maximum Output V/I: 12V/10mA • Factory default output: Output frequency
A1/B1/C1	OU-31	Send Fault signal1 when the safety features are activated (AC250V <1A, DC30V <1A) • Fault condition: A1 and C1 contacts are connected (B1 & C1 open connection) • Normal operation: B1 and C1 contacts are connected (A1 & C1 open connection)

Labels	Linked Parameters	Description / Factory Default
A2/C2	OU-33	Send fault signal2 when the safety features are activated (AC250V <1A, DC30V <1A) • Fault condition: A2 and C2 contacts are open connection • Normal operation: A2 and C2 contacts are connected
Q1		• Open-collector output terminal substitute for A2/C2 fault signal output 2 • DC 24V, 100mA or less
S+ / S-		• Used to send or receive RS-485 signals

7. Keypad



NO	Name	Description / Factory Default
1	7 Segment Display	Displays current operational status and parameter information
2	SET Indicator	LED flashes during parameter configuration, or when the ESC key operates as a multi-functional key
3	RUN Indicator	LED turns on (steady) during an operation, or flashes during acceleration or deceleration
4	FWD Indicator	LED turns on (steady) during forward Run
5	REV Indicator	LED turns on(steady) during Reverse Run

Key	Key Name : Functional Description
RUN	RUN: Used to run the inverter
STOP RESET	STOP/RESET : Used to stop the inverter or resets if a fault or failure occurred
∧ ∨	Up/Down: Switches between codes, or increases/ decreases parameter values
MODE SHIFT	MODE/SHIFT: Moves between groups or moves to the digit on the left when setting the parameters. Press the MODE/SHIFT key once again on the maximum number of digits to move to the minimum number of digits
ENT	Enter: Switches from the selected state of parameter to the input state. Edits parameters and apply changes. Accesses the operation information screen during failure
MIN MAX	Potentiometer: Set the operational frequency
∧ + ∨	Press UP & DOWN arrow keys at same time to return to main menu.

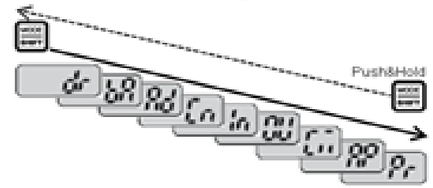
8. Basic Programming

8-1. Parameter Group Navigation and Setting

[Home Screen]
- Press and Release [▲] and [▼] keys at same time to return to home Screen

[Operation Group]
- 14 basic parameters are categorized in operation group
- Codes can be accessed by pressing [▲] and [▼] keys.
- Items can be accessed by pressing [ENT] key.

[Parameter Groups and Settings]



- Groups can be accessed with the [MODE/SHIFT] key.
- Group access in the other direction can be accessed by pressing the [MODE/SHIFT] key for more than 1sec.
- Parameters can be accessed with [▲] and [▼] keys.
- Press the [ENT] key to change the setting of parameter.
- Press the [ENT] twice to save the settings.

Group	Dis-play	Description / Factory Default
Operation		Configures Parameters for basic Operation
Drive	dr	Configures Parameters for basic Operations: jog, motor capacity evaluation, torque boost, other keypad related
Basic	ba	Configures Parameters for basic Operations: motor parameters and multi-step frequency parameters
Advanced	ad	Configures acceleration or deceleration patterns, frequency limits, etc.
Control	cn	Configures sensorless vector-related features
Input Terminal	in	Configures input terminal-related features: digital multi-functional inputs and analog outputs
OutputTerminal	ou	Configures output terminal-related features: relays and analog outputs
Communication	cm	Configures communication features for RS-485 or other communication options
Application	ap	Configures functions related to PID control
Protection	pr	Configures motor and inverter protection fetures
Second Motor (2nd**M**otor)	m2	Configures secondary motor related features. The secondary motor (M2) group appears on the keypad only when one of the multi-function input terminals (In.65~In.69) has been set to 26(second motor)

8-2. Confirm Motor Direction - Bump Test

This step explains how to check motor direction by running the motor at a low speed via the keypad. Verify that the power and motor wiring matches the previous step and covers are installed before applying power.

8-3. Speed Setting

At the very first power up, the display will look like the "0.00". This indicates the frequency reference of 0.00 Hz.

Press [ENT] key

Set LED illuminates Press[MODE/SHIFT] x3 to shift over the digits

Press **[▲]** key until 10.00 is displayed. Then Press **[ENT] x2** to save the value.

8-4. Setting Command Source

Press **[▲] arrow key 4 times** until drv is displayed.

Then press [ENT] to display setting.

Press [▼] key to change setting to 0.

Then Press the [ENT] key twice to save the setting.
※ This activates the RUN/STOP keys as the command source

To return to the frequency display use the [ESC] key by pressing the following:
- [▲] + [▼],
- [▲] + [MODE/SHIFT],

or
- [▼] + [MODE/SHIFT]

- Confirm it is safe to run the motor at low speed. When ready, press [RUN] key to run the motor.
- The display will briefly show the output frequency of the VFD until it reaches 10Hz.
- Watch the motor shaft to verify the rotation.
- Press the [STOP/RESET] key stop.
- If motor direction is incorrect, stop the motor with the [STOP/RESET] key, and power down the VFD.

⚠ Danger ⚠

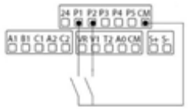
Wait at least 5 minutes to let the VFD capacitors discharged

- To change motor direction – swap any two OUTPUT leads between the VFD and the motor.
- Verify correct rotation via the previous steps.

8-5. Start/Stop and Speed Command Settings

[Run Command Source Setting]

2-Wire Control (1:Fx/Rx-1)



NO	Name
0	Keypad
1	FX/RX-1
2	FX/RX-2
3	INT 485
4	Field Bus

- Press **[▲]** arrow key three times until dry is displayed.
- Then, Press {ENT] to display the value.

[Frequency Source Setting]

NO	Name
0	KeyPad-1
1	KeyPad-2
2	V1
3	
4	V0
5	I2
6	INT 485
8	Field Bus

- Press **[▲]** arrow key four times until frequency is displayed.
- Then, Press {ENT] to display the value.

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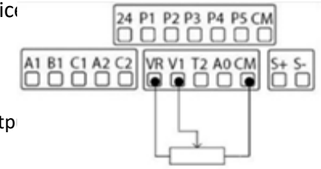
WDG2 Quick Start Guide

Speed Potentiometer Wiring (2: V1, 0-10V)

Control VFD speed by an external Analog Signal from PLC or other devic

- Set frequency => 2
- Wire V1 and CM as shown in the diagram

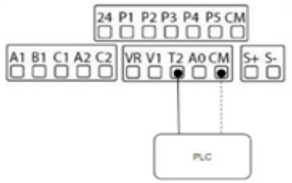


- VR = 10VDC Outp
- V1 = Wiper
- CM = Common

PLC or Controller Wiring (2: V1, 0-10V)

Speed control by 4 ~ 20mA signal

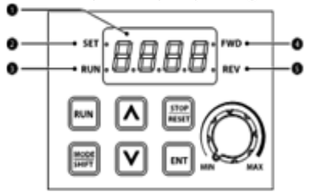
- Set frequency => 5



- I2 = + Signal
- CM = Common

Built – in Potentiometer (4: V0)

Control speed by adjusting the built- in Potentiometer



NO	Name
1	7 Segment Display
2	SET Indicator
3	RUN Indicator
4	FWD Indicator
5	REV Indicator

4) *Acceleration and Deceleration Time Setting*

- Press **[▲]** key from the main display (0.00) until Acc is displayed.
- Press **[ENT]** key to display the current setting.
- Use **[▲] and [▼]** key to increase and decrease the value.
- Use **[MODE/SHIFT]** key to move the cursor over to the next digit.
- Press **[ENT] x2** to save the setting.
- Acc will be displayed again indicating the parameter change has taken effect.

5) *Program Values from Motor Nameplate*

Grp	Code	Name	Setting
dr	14	Motor Capacity	Motor Capacity Setting
bA	11	Poles	Motor Capacity (2 ~ 12)
	12	Motor Rated Slip	Motor Capacity Setting (RPM)
	13	Motor Rated Current	Motor Capacity Setting
	15	Motor Voltage	Motor Capacity Setting

- HP to kW Conversion Chart

Grp	1/4	1/2	1	2	3	5	7.5	10	15	20	25	30
kW	0.2	0.4	0.75	1.5	2.2	4.0	5.5	7.5	11	15	18.5	22

- Motor Poles to Synchronous RPM Conversion Chart

Poles	2		4		6		8	
HZ	50	60	50	60	50	60	50	60
RPM	**3000**	**3600**	1500	1800	**1000**	**1200**	750	900

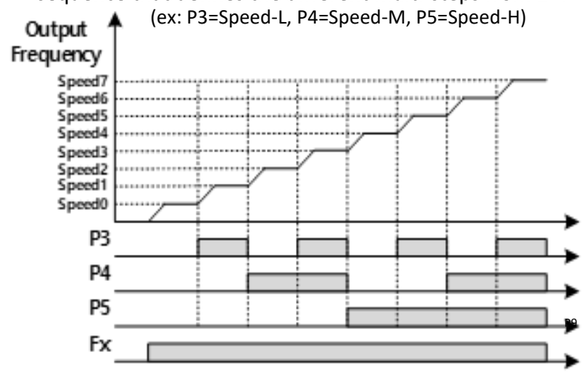
** If the motor nameplate is 1750, set bA11 = 4 and bA12 = 50

8-7. Multi-Step Frequency (Preset Speed) Setting

- Assign multi-step frequency to Digital Inputs

Grp	Code	Name	Setting
In	65	P1 Function Setting	7: Speed – L 8: Speed – M 9: Speed – H
	66	P2 Function Setting	
	67	P3 Function Setting	
	68	P4 Function Setting	
	69	P5 Function Setting	

- Digital input of Speed – L/M/H function as a binary sequence that defines the different multi-steps from 1~7 (ex: P3=Speed-L, P4=Speed-M, P5=Speed-H)



Speed	P3	P4	P5	Description
0	-	-	-	Speed Setting according to the Source Setting in Freq.
1	√	-	-	St-1_Multi-step speed frequency 1
2	-	√	-	St-2_Multi-step speed frequency 2
3	√	√	-	St-3_Multi-step speed frequency 3
4	-	-	√	bA-53_Multi-step speed frequency 4
5	√	-	√	bA-54_Multi-step speed frequency 5
6	-	√	√	bA-55_Multi-step speed frequency 6
7	√	√	√	bA-56_Multi-step speed frequency 7

Caution: "SAFETY CONSIDERATIONS" for items noted below:

1) *Power on Run*

- For an automatic start after a power loss or soon after the invert is powered up, set Ad10_Poweron Run = 1

2) *Automatic Restart*

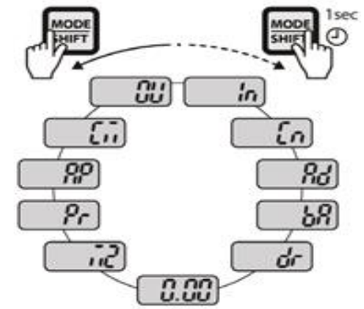
- Automatic restart function is only operable with (Fx/Rx – 1 or 2).
- Settings: Pr8 Auto Restart select= 1, Pr9 = Restart Attempts: Pr10 Restart delay time in Seconds

3) *Speed Search*

- To catch a spinning motor, after a fault reset, eanble speed search setting

Grp	Code	P4	Setting	Description
In	65	Speed Search Selection	- - 1 - (0010)	Initialization after a fault

9. Common Parameters



Note: Gray Highlighted Parameter Selections are most commonly used

Group	Operation Parameters	Initial Value	Range	New
0.00	Target Frequency VFD operates Motor	0.00	0~400Hz	
ACC	Acceleration Time in Seconds	5.0	0~600	
dEC	Deceleration Time in Seconds	10.0	0~600	
drv	Drive Mode: Run/Stop Command Source	1 Fx/Rx-1	0~4	
	0: keypad, 1: Fx/Rx-1, 2:Fx/Rx-2, 3: Int 485, 4: Field Bus			
	** drv appears as dru on keypad screen			
Frq	Frequency Reference Source Setting	0	0~8	
	0: Keypad-1, 1: Keypad-2, 2: V1(0 – 10 V DC), 4: Keypad pot/ potentiometer, 5: I Current (4 – 20 mA), 6: Int485, 8: Field Bus			
St1	Multi-step Speed Frequency 1 (Hz)	10.00	0~Max f	
St2	Multi-step Speed Frequency 2 (Hz)	20.00	0~Max f	
St3	Multi-step Speed Frequency 3 (Hz)	30.00	0~Max f	
Cur	Output Current			
Rpm	Motor Revolution per Minute (RPM)			
dCL	Inverter DC Bus Voltage			
VOL	Inverter Output Voltage			
nOn	Out of Order Signal (Fault)			
drC	Select Rotation of Motor	F	F-r	
	F: Forward, r:reverse			

dr	Drive Group (use < or > arrow keys) best to begin from Hz displayed	Default	Range	New
dr9	Control Mode	0	0 ~ 4	
	0: V/F, 2: Slip Compensation, 4: IM Sensorless			
dr14	Motor kW rating: HP x 0.746 = kW		0.5 ~ 30	
dr15	Torque Boost	0	0~1	
	0: Manual, 1: Auto			
dr18	Base Frequency (Hz)	60.00	30~400	
	Set to Motor Hz Nameplate Value – Typically 60 Hz			
dr19	Start Frequency (Hz)	0.50	0.01~10.	
dr20	Max Frequency: 40.00~400.00 Hz in V/f,	60.00	40~400	
	or in Slip Compensation but 40.00~120.00 Hz in IM Sensorless			
dr81	Select Monitor Code	0	0 ~ 3	
	0: Output Voltage, 1: Output kW, 2: TQ, 3: PID feedback			
dr89	Changed Parameters	0	0 ~ 1	
	0: View All, 1: View Changed			
dr91	Smart Copy	0	0 ~ 5	
	0: None, 1: SmartDownload, 3: SmartUpLoad, 4: RemoteUpload, 5: Remote Download,			
dr92	Parameter Save	0	0 ~ 1	
	1: Parameter Save to Remote Keypad,			
dr93	Parameter Initialize (Total 14 Selections)	0	0~14	
	0: NO, 1: All Grp, 2: dr Grp, 3: bA Grp, 4: Ad Grp, 5 ~ 14			

bA	Basic Group	Default	Range	New
bA4	2nd Command Source	1	0~4	
	0: Keypad; 1: FX/RX-1; 2: FX/RX-2; 3: Int 485; 4: Field Bus			
bA5	2nd Frequency Source	0	0~8	
	0: Keypad – 1, 1:Keypad-2, 2: V1, 5: I2, 6: Int 485			
bA7	V/F Pattern	0	0~3	
	0: Linear, 1: Square, 2: User V/F, 3: Square 2			
bA9	Time Scale for Acc/Dec Ramps	1	0~2	
	0: 0.01 Sec, 1: 0.1 Sec, 2: 1 Sec			
bA10	Input Power (base) Frequency (Hz)	0	60 / 50	
	0: 60 Hz, 1: 50 Hz			
bA11	Motor Pole Number	4	2 ~48	
	2Pole: 3600RPM, 4Pole:1800RPM, 6 Pole:1200 RPM, 8 pole:800			
bA12	Motor Rated Slip			
	Use Motor Nameplate RPM			
bA13	Motor Rated Current			
	Use Motor Nameplate Full Load Amps			
bA14	Motor No Load Current in Amps			
	Typical Value of 30% of FLA			
bA15	Motor Rated Voltage (Voltz)	0	100-480	
bA19	VFD AC Input Power Voltage (Voltz)		240/480	
bA20	Auto Tuning	0	0~6	
	0: None, 1: All Rotation, 2: All Static, 3: Rotate Lsigma, 6: Tr(Static)			

Ad	Advanced Group	Default	Range	New
Ad1	Acceleration Pattern	0	0~1	
	0: Linear; 1: S-Curve			
Ad2	Deceleration Pattern	0	0~1	
	0: Linear, 1:S-Curve			
Ad8	Stop Mode	0	0~4	
	0: Decel, 1: DC Brake, 2: Free Run, 3: Reserve, 4: Power Braking			
Ad9	Run Prevent	0	0~2	
	0: None, 1: FWD Prevent, 2: REV Prevent			
Ad10	Starting Power-On	0	0~1	
	0: NO, 1: Yes: SAFETY Warning – See Full Manual before Using			
Ad24	Frequency Limit Enable	0	0~1	
	0: NO, 1: Yes: Must Enable to set ADV25 & ADV26			
Ad25	Frequency Low Limit (Hz)	0.50	0~400	
Ad26	Frequency High Limit (Hz)	60.00	0.1~400	
	Minimum Frequency to Maximum Frequency			
Ad64	Cooling Fan Control	0	0~2	
	0: During Run, 1: Always On, 2; Temperature Control			
Ad74	Regen Evasion Enabled	0	0~1	
	0: No, 1: Yes			
Ad75	Regen Evasion Level			
	Set 10vdc above VFD bus value When VFD is powered on, but not running the motor.			
Ad76	Compensation Frequency Limit (Hz)	1.00	0.00~10.	
	Above VFD reference Value: 10.00 is Common			
Ad77	Regen Evasion P-Gain (%)	50.0	0.0~100	
	How MUCH change takes place: 50.00 ~ 100.00 is Common			
Ad78	Regen Evasion I-Gain (mS)	500	20-30000	
	How FAST Change takes place: 20 ~500 mS is Common			

Cn	Control Group	Default	Range	New
Cn4	Carrier Frequency Select (kHz)	3	1.0~15.0	
Cn71	Speed Search Operation (bit Level)	0000	0000~1111	
	0001: Selects the speed search function at accleration, 0010: Initialization			

In	Input Terminal Group	Default	Range	New
In1	Frequency for Maximum Analog Input	60.00	0~Max F	
In5	V1 Input Voltage Display:	0.0	0.0~10.0	
	Monitor Input Signal at V1 Terminal			
In10	V1 Maximum Input Voltage (volts)	10.00	-12~+12	
	Used to Scale V1 Analog Input V. When in 06 is 1(bipolar), V=-12			
In16	Change Rotation Direction of V1	0	0 ~ 1	
	0: No, 1: Yes			
In50	I2 Input Current Display	0.0	0~20.00	
	Monitor Input Signal at I2 Terminal			
In55	I2 Maximum Input Current Display	20.00	0~20.00	
	Used to Scale I2 Analog Input (mA)			
In65	P1 Define Digital Input 1	1	0~52	
	0: None, 1: FX, 2: RX, 3: RST, 4: Ext Trip, 5:BX, 6:Jog			
In66	P2 Define Digital Input 2	2	0~52	
	7: Speed-Low, 8: Speed-Medium, 9: Speed-High, 13:RUN Enable			
In67	P3 Define Digital Input 3	5	0~52	
	14: 3-Wire, 15:2nd Source, 17: Up, 18: Down, 20:Up/Down Clear			
In68	P4 Define Digital Input 4	3	0~52	
	23:PID Open Loop, 24: PID Gain2, 27: U/D Enable, 34:PreExite			
In69	P5 Define Digital Input 5	7	0~52	
	38:Timer In, 40: Disable Aux Ref, 46: FWD Jog, 47: REV Jog			
	49:XCEL-H, 51: Fire Mode, 52: KEB-1 Select			
In87	Digital Inputs: (5bits) NO/NC Selection	00000	0~11111	
	0(down): Normally Open, 1(Up): Normally Closed			
In90	Digital Input Status; Troubleshooting Tool	0	0~1	
	0: Off (Normally Open), 1: On (Normally Closed)			
In99	SW1 (NPN/PNP) Status	0	0~1	
	0: Segment Down for NPN, 1: Segment Up for PNP			

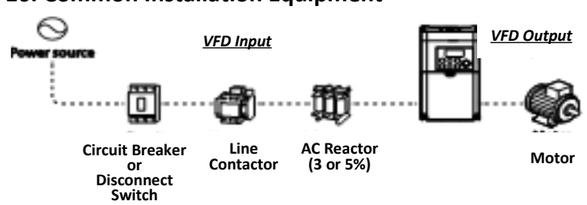
OU	Output Terminal Group	Default	Range	New
OU1	Analog 0ut (AO) 1 Assignment	0	0~15	
	0: Freq,1:Out Amps, 2:Out Volt, 3:DC Bus, 4:Torque, 5:Out Pwr 8: Target Freq, 9: Ramp Freq,10: Speed Fdb, 12: PID Reference Value, 13: PID Fdk Value, 14: PID Output, 15: Constant			
OU6	A01 Monitor Signal (%)	0.0	0~1000	
OU31	Relay 1	29	0~44	
OU33	Relay 2	14	0~44	
	0:None, 1:FDT1, 2:FDT2, 3:FDT-3, 4:FDT-4, 5:OL, 6: IOL, 7:Under Load, 8: Fan Warning, 9: Stall, 10: OV, 11:UV, 12: Over Heat, 13: Lost Command, 14: Run, 15: Stop, 16: Steady, 17: Inverter Line, 18: Comm Line, 19: Speed Search, 21: Regeneration, 22: Ready, 23: Zero Speed, 28: Timer Out, 29: Trip, 31: DB Warn % ED, 34:On/Off Control, 35: Brake Control, 37: Fan Exchange, 38: Fire Mode, 40: KEB Operating, 41: Pre Overheat, 42: Minor Fault, 43: Torque Detect 1, 44: Torque Detect 2			
OU41	Relay 1 and Relay 2 Output Status	00	00 - 11	
	0: Off, 1: On			
OU52	Digital Output NO/NC Selection- Relay1,2	00	00 - 11	
	0(down): Normally Open, 1(up): Normally Closed			
OU57	Detection Frequency (Hz)	30.00	0~ Max	

CM	Communication Group	Default	Range	New
CM1	Built-in Communication Inverter ID	1	1~250	
CM3	Built-in Communication Speed	3	0~3	
	0: 1200 bps, 1:2400 bps, 2: 4800 bps, 3: 9600 bps6 k6, 4: 19200 bps, 5: 38400bps, 6: 56000bps, 7: 115200bps			

AP	Application Group	Default	Range	New
AP 1	Application Function Selection	1	0~2	
	0: None, 1: Reserved, 2: Process PID			
AP16	PID Output Monitor (%)	0.00		
AP17	PID Reference Monitor (%)	0.00		
AP18	PID Feedback Monitor (%)	0.00		
AP19	PID Reference Setting (%)	50	-100~100	
	Range -100 ~ +100			
AP20	PID Reference Source	0	0~7	
	0: Keypad, 1: V1 Volts, 3: Keypad, 4: I2 Current, 5: Int 485, 7:FieldBus			
AP21	PID Feedback Source	0	0~6	
	0: V1 volts, 2: V0, 3: I2 Current, 4: Int 485, 5: Fieldbus			
AP22	PID Proportional- P Gain 0~1000 %	50.0	0~1000.	
AP23	PID Integral- I Gain (%)	10.0	0~200.0	
AP24	PID Differentiation – D Time (mS)	0	0~1000	

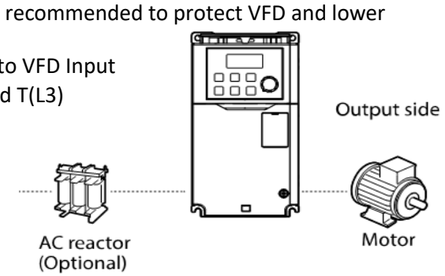
Pr	Protection Group	Default	Range	New
Pr4	Load Duty	1	0~1	
	0: Normal Duty; 1:Heavy Duty			
Pr5	Input/ Output Open Phase Protection	0	00~11	
	Bit Low: Off, Bit High: On (See Manual)			
Pr6	Input Voltage Range during Phase Loss,V	15	1~100	
	During Open-Phase; Adjustable 1 – 100 volts			
Pr8	Select Start at Trip Reset	0	0~1	
	0: NO, 1: Yes Safety Caution- VFD my start automatically			
Pr9	Retry Number	0	0~10	
	Auto Restart Number of Attempts			
Pr10	Auto Restart Delay Time (Seconds)	1.0	0.0~60.0	
Pr20	Overload Trip Select	1	0~2	
	0: None, 1: Free-Run, 2: Decel to Stop			
Pr21	Overload Trip Level (%)	180	30~200	
	Percent of Motor FLA in BA13			
Pr22	Overload Trip Time (Sec)	60.0	0~60.00	

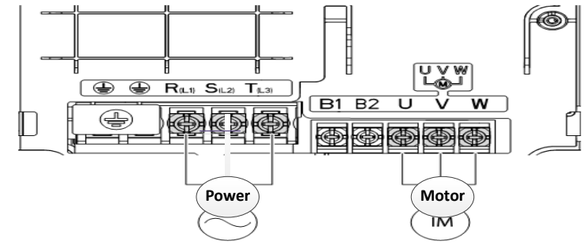
10. Common Installation Equipment



11. Typical Single-Phase Installation

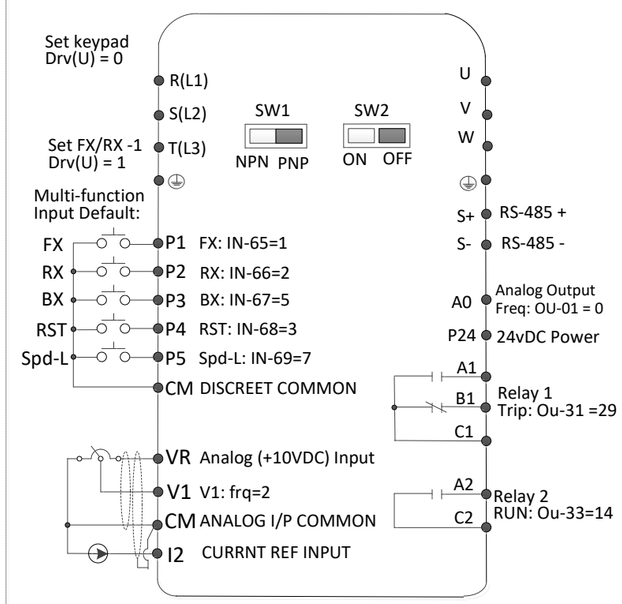
1) VFD is twice the HP rating of the Motor HP
2) Line reactor recommended to protect VFD and lower harmonics
3) Line power to VFD Input at R(L1) and T(L3)





12. Drive Control by Digital Input P1 – P5 and 0-10vDC Potentiometer

12-1. Terminal Control & Configuration



12-2. Input Designations

P1 FX: IN-65 = 1
P2 RX: IN-66 = 2

- P1 In0ut: F= Forward and X= Wired to Terminal Strip
- P2 Input: R=Reverse and X=Wired to Terminal Strip

12-3. Keypad Control

Typical VFD Control Configurations

[Control VFD from Keypad]

- Drv = 0 (keypad RUN / STOP)
- Frq = 4 (keypad Potentiometer) OR
- Frq = 0 (keypad ARROWS)

12-4. Terminal Control

[Control VFD from digital inputs P1 ~ P5]

- Drv = 1 (terminal strip P1 START/FX)
- Frq = 2 (terminal strip VR, V1 & CM)

13. Troubleshooting Fault Trips

See the full manual

14. Frequently Asked Questions (FAQ)

Q1:The motor does not rotate & output current is too high at START
Cause: The load is too high.
Solution: Utilize a manual/auto torque boost and change parameters shown below:

	Parameter	Instruction
1	Manual Torque Boost	Slightly increase the forward boost dr-16 or reverse boost dr-17. Torque boost set too high may trigger an IOL fault
2	Auto Torque Boost	Set dr-15 to 1; then, adjust values in dr-26 ~ 28 (recommended over Manual Boost)
3	Start Frequency	Slightly increase start frequency to increase torque: dr-19(05 -> 1.0-> 1.5 -> 2.0 Hz)
4	User V/f Pattern	bA-07 = 2(User V/f) A custom 4-step User pattern is defined in bA41 through bA48. Goal is to match load requirements

Q2: Motor makes an odd humming sound
Solution: Slightly increase or decrease the carrier frequency in Cn-04.

Q3:When driver operates motor, my Earth-Leakage Circuit Breaker (ELCB) trips
Cause: The ELCB will disconnect the power if leakage current flows to earth ground when drive operates the motor.
Solution:
S1: Connect the drive to the panel grounding terminal.
S2: Confirm ground resistance is < 100Ω for 230V or < 30Ω for 460V .
S3: Confirm breaker amp rating is proper for the attached drive.
S4: Reduce the carrier frequency in Cn-04.
S5: Keep cable distance from the drive to motor short as possible.

Q4: How do I reset the drive back to factory default settings?
Solution: Set dr-93 to 1(All groups) and press the [ENTER] twice. Then dr-93 is displayed again when the factory default is done.

Q5: How do I adjust the time it takes the motor to speed up or down?
Solution: Adjust the acceleration time in ACC and deceleration time in dEC.

Q6: How do I prevent the drive from tripping on an OV fault (overvoltage) while the motor is ramping down?
Solution:
S1: Increase the deceleration time in dEC.
S2: Set Stop Mode Ad8 = 2 (Free Run), Motor will coast to stop.
S3: Activate flux braking in Pr-50. Activate the very first bit on the left.
S4: A DB resistor may be required to stop the inertia of the load.

Q7: How do I prevent the drive from tripping on an OLT(overload) while the motor is ramping up or down?
Solution: Confirm motor Full Load Amps in bA-13 and motor overload parameter setting in Pr-20(Overload trip selection), Pr-21(Overload trip level), and Pr-22(Overload trip time). Adjust if needed.

Q8: Does the drive create harmonics and are they a problem?
All 6-pulse drives create 5th and 7th harmonic frequencies. Depending upon the application, harmonic current can cause problems such as transformer heating, breaker tripping, blown fuses, or interference with other communication devices installed near the drive.

Solution:
S1: Lowering the carrier frequency in Cn-04 to a lower value may help.
S2: Line reactors, passive filters or active filters may be required.
S3: Low impedance grounding is required.