WORLDWIDE

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## WORLDDRIVE WD4X

## Quick Start Guide



This Quick Start Guide is intended to allow a user to become quickly familiar with the basic operations of the WorldDrive 4X (WD4X).

For all other configurations, please refer to the specific setup and configuration instructions available on the WorldWide Electric website: wwec.co/WD4X

## WD4X Quick Start Guide

## Safety Information

- NOTE: This Quick Start Guide is intended for users with basic knowledge of electricity and electric devices. If you are unfamiliar with the installation and operation of Variable Frequency Drives or are unsure about any procedure, please contact qualified personnel for installation assistance.
- Do not open the cover of the Variable Frequency Drive (VFD) while it is on or energized. Do not operate the VFD while the cover is open. Exposure of high voltage terminals or charging area to the external environment may result in an electric shock. Do not remove any covers or touch the internal circuit boards (PCBs) or electrical contacts on the product when the power is on or during operation. Doing so may result in serious injury, death, or serious property damage.
- Do not open the cover of the VFD even when the power supply to the VFD has been turned off unless it is necessary for maintenance or regular inspection. Opening the cover may result in an electric shock even when the power supply is off.
- The equipment may hold charge long after the power supply has been turned off. Use a multimeter to make sure that there is no voltage before working on the VFD, motor or motor cable.
- This equipment must be grounded for safe and proper operation.
- Do not supply power to a faulty VFD. If you find that the VFD is faulty, disconnect the power supply and have the VFD repaired or replaced.
- The VFD becomes hot during operation. Avoid touching the VFD until it has cooled to avoid burns.
- Do not allow foreign objects, such as screws, metal chips, debris, water, or oil to get inside the VFD. Allowing foreign objects inside the VFD may cause the VFD to malfunction or result in a fire.
- Do not operate the VFD with wet hands. Doing so may result in electric shock.


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## Power and Control Input and Output Wiring Diagram



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## Keypad Functions



| Display | Term | Function Description |  |
| :---: | :---: | :---: | :---: |
| nus | RUN Key | Run command |  |
|  | STOP/RESET Key | STOP: Stop command during operation, RESET: Reset command when a fault occurs. |  |
|  | UP Key | Used to scroll through codes or to increase a parameter value |  |
|  | DOWN Key | Used to scroll through codes or to decrease a parameter value |  |
| $\leqslant$ | Left Key | Used to jump to other parameter groups or move the cursor to the left |  |
|  | Right Key | Used to jump to other parameter groups or move the cursor to the right |  |
| EET | Enter Key | Used to set a parameter value or to save the changed parameter value |  |
| ssc | Escape Key | Used to cancel the Jog or Remote/Local change key or when editing |  |
| FWD | Forward Run | Illuminated during forward run | Flickering when a fault occurs |
| REV | Reverse Run | Illuminated during reverse run |  |
| RUN | RUN Key | Illuminated during operation (flickering during acceleration/deceleration) |  |
| SET | Setting | Illuminated during parameter setting/Flickering when the ESC key is operating as a multi-key |  |
| 7-Segment | Current Value | Indicates operating conditions and parameter data |  |

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Keypad Functions (continued)

| Group Name |
| :---: | :---: | :---: |
| Drive Group <br> (Drive) | | The most basic parameters required for operation such as a target frequency, acceleration/ |
| :--- |
| Basic Function Group |
| (Basic) |

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## Keypad Functions (continued)

How to move between groups in the first code of each group:


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## Keypad Functions (continued)

Protective functions for output current and input voltage:

| Display | LCD Indication | Type | Description |
| :---: | :---: | :---: | :---: |
| H16 | Over Load | Latch | Displayed when motor overload protection is selected and the load exceeds the set value. It works only if Pr .20 is set as a value other than 0 . |
| 116 | Under Load | Latch | Displayed when the under-load protection function is selected and the motor load is below the set normal duty level. It works only if Pr. 27 is set as a value other than 0 . |
| HLE | Over Current1 | Latch | Displayed when the drive output current rises above $200 \%$ of rated current. |
| Nut | Over Voltage | Latch | Displayed when the voltage of the DC circuit increases above the specified value. |
| cut | Low Voltage | Level | Displayed when the voltage of the DC circuit decreases below the specified value. |
| LuE | Low Voltage2 | Latch | Displayed when the voltage of the DC circuit decreases below the specified value when operating the drive. |
| F6\% | Ground Trip | Latch | Displayed when current is flowing above the specified value because of a ground fault at the drive output stage. The ground fault detection current is different for each drive capacity. |
| ELS | E-Thermal | Latch | Prevents overheating when operating a motor in overload for an extended time period and operates according to inverse time characteristics. It works only if Pr. 40 is set as a value other than 0 . |
| 972 | Out Phase Open | Latch | Displayed when any output phase to the 3 -phase motor is open circuit. It works only if bit 1 of Pr. 05 is set as 1 . |
| 187 | In Phase Open | Latch | Displayed when any output phase to the 3 -phase motor is open circuit. It works only if bit 2 of Pr. 05 is set as 1. |
| 1 HL | Drive OLT | Latch | Inverse time thermal property protection function for protecting the drive from overheating. The criteria is $150 \%, 1$ minute, $200 \%, 4$ seconds based on the drive rated current. The $200 \%, 4$ seconds is different for each drive capacity. |
| nit | No Motor Trip | Latch | Displayed when a motor is not connected when operating the drive. It works only if Pr. 31 is set as 1 . |

Protective Functions by the keypad and option:


## Keypad Functions (continued)

Protective functions by internal circuit faults and external signals:

| Display | LCD Indication | Type | Description |
| :---: | :---: | :---: | :---: |
| HHE | Over Heat | Latch | A fault occurs if the temperature of the drive heat sink rises above the specified value. |
| $\mathrm{VF}^{2}$ | Over Current2 | Latch | A fault occurs if the DC unit in the drive detects a shor-circuit current value. |
| 54 | External Trip | Latch | Indicates that a fault has occurred to wiring connected to a multi-function terminal that has been configured as 'External trip' (Data code 4 set in function IN 65 ~71) |
| 6 | BX | Level | Indicates that a signal has been received to a multi-function terminal that has been configured as ' BX Base Block' (Data code 5 set in function $\operatorname{IN} 65 \sim 71$ ) |
| M11 | H/W-Diag | Fatal | There is an internal fault on the memory (EEPRom), analog-digital corverter output (ADC Off Set), and CPU malfunction (Watch Dog-1, Watch Dog-2) etc. in the drive. <br> - EEP Err: There is an internal fault when reading/writing parameters due to KPD EEP Rom damage. -ADC Off Set: There is a fault with the internal current sensing circuit. |
| net | NTC Open | Latch | This fault occurs if an error is detected in the temperature detecting sensor of the power semiconductor (IGBT). |
| FR | Fan Trip | Latch | This fault occurs if a cooling fan error is detected. It works if Pr. 79 is selected as 0 . |
| 01 | Pre-PID Fail | Latch | While operating Pre-PID by setting a function between AP.34~36, if the control valuelPID feedbacklis continuously entered below the set value, this fault is displayed. |
| 48 | Ext-Brake | Latch | This error can happen when operating external brake signals and any of the multi-function input terminals have been configured accordingly. If the drive output current at starting is held at less than Ad-41 level this fault is output. <br> Set one of OU-31, 32 as no. 35 BR Control. |
| $55$ | Safety A(B) Err | Level | This error occurs if a fault with the safety inputs occur. If either input A or B is missing, the drive will display this fault code. |

Fault recovery:

| Display | Type | Cause | Solution |
| :---: | :---: | :---: | :---: |
| Tit | Over Load | Load is larger than the motor rating. <br> The value set in the overload fault level (Pr.21) is too small. | Increase the capacity of motor and drive. Increase the set value of the overload fault level |
| $112$ | Under Load | There is a problem in the connection between the motor and the load. <br> The normal duty level (Pr. 29, 30) is set larger than minimum load of the system. | Decrease the capacity of motor and drive. Lower the set value of the light load level. |
| MEL | Over Current1 | The acceleration/deceleration is too short for the inertia of load(GD2). The drive load is larger than the rating. The drive output is applied when the motor is idling. Motor mechanical brake is on. | Set the acceleration/deceleration time longer. <br> Replace with an drive with large capacity. <br> Operate after the motor stops or use the speed search function. <br> Check the mechanical brake. |

## Keypad Functions (continued)

| Display | Type | Cause | Solution |
| :---: | :---: | :---: | :---: |
| nut | Over Voltage | The deceleration time is too short compared to the inertia of load (GD2). <br> A regenerative load is connected to the drive output. AC input voltage is high. | Set the deceleration time longer. Use a braking resistor. Check whether the $A C$ input voltage is above the specified value. |
| $i v i$ | Low Voltage | AC input voltage is low. Larger load than the power capacity is connected to the power system. (Welding machine or motor line-start etc.) A device on the power input side of the drive is defective. | Check whether the $A C$ input voltage is below the specified value. <br> Increase the power capacity. <br> Replace the electromagnetic contactor. |
| $405$ | Low Voltage2 | AC input voltage is lowered during operation. There is an input open phase under the low AC input voltage condition. <br> A device on the power input side of the drive is defective. | Check whether the AC input voltage is below the specified value. <br> Check the input wiring. Replace the electromagnetic contactor. |
| FEL | Ground Trip | The drive output wire has a ground fault. The motor insulation has failed. | Investigate the drive output terminal wiring. Replace the motor. |
| E6H | E-Thermal | The motor is overheated. <br> The drive load is larger than the rating. Electronic thermal level is set low. The drive has been operating at low speed for a long time. | Reduce the load or the operating frequency. Increase the drive capacity. <br> Set the appropriate electronic thermal level. Force cool the motor. |
| $976$ | Out Phase Open | Bad connection or open circuit at an output device. Output wiring \& defect occurred. | Check for faulty/open device on the drive output device. <br> Check the output wiring. |
| $109$ | In Phase Open | Bad connection on a device on the drive input side. Input wiring defect occurred. Consider replacing the drive DC unit condenser. | Check the device at the drive input side. Check the input wiring. Replace the drive DC unit condenser. Contact the nearest service center. |
| 176 | Drive OLT | Load is larger than the drive rating. The torque boost amount is too large. | Increase the capacity of motor and drive. Reduce the torque boost amount. |
| nHE | Over Heat | There is a problem with the cooling system. The drive has been used for a longer time than the replacement period of cooling fan. Ambient temperature is high. | Check whether there is a foreign substance in the vent such as the air inlet and outlet. Replace the drive cooling fan. Keep the temperature around the drive below $50^{\circ} \mathrm{C}$. |
| NEC | Over Current2 | The drive output wiring is short-circuited. There is a problem in the drive power semiconductor (IGBT). | Investigate the drive output terminal wiring. The drive cannot be operated. Contact the nearest service center. |
| mit | NTC Open | Ambient temperature is too low. There is a problem in the temperature sensor inside the drive. | Operate the drive at a place where ambient temperature is above $-10^{\circ} \mathrm{C}$. Contact the nearest service center. |
| FRn | FAN Lock | Foreign substances have entered into the drive vent where the fan is located. <br> Consider replacing the drive cooling fan. | Check the air inlet and outlet. Replace the drive cooling fan. |
| FRn | IP66 FANTTip | The fan connector is not connected. Consider replacing the drive cooling fan. | Connect the fan connector. Replace the drive cooling fan. |

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## Keypad Functions (continued)

An example of changing the acceleration time from 5.9 second to 16.0 second:


- Indicate the first code information of the operation group.
- Press the UP key ( $\mathbf{A}$ )

1 Flikering when modifying a parameter is for asking whether you are going to enter the value. When pressing the enter key (ENT) at this step, the input is completed. If you do not want to enter the modified value, you can press the lett, right, up or down keys ( $\mathbf{(})(\mathbf{v})(\mathbf{U}) \mid \mathbf{v})$ except the enter key (ENT) in the ON condtion to cancel the input.

How to Move between Codes in the operation group



Common Drive Setup Parameters

| Group Name | Description <br> See drive manual for complete configuration capabilities | Default Value | Value <br> Range | New Value |
| :---: | :---: | :---: | :---: | :---: |
|  | Operation Group (use ^ or v arrows keys) best to begin from Hz displayed |  |  |  |
| 0.00 | Frequency speed reference on keypad ( 0.00 before a new value is entered) | 0.00 | Min/Max |  |
| ACC | Accel Time in seconds | 20.0 | 0-600.0 |  |
| dEC | Decel Time in seconds | 30.0 | 0-600.0 |  |
| dru | Command Source: $\mathbf{0}=$ Keypad; $\mathbf{1}=$ FX/RX1; $\mathbf{2}=$ FX/RX2; $\mathbf{3}=$ Int 485; $\mathbf{4}=$ Field bus | 1 | 0-5 |  |
|  | FX/RX are hardwire terminal blocks for external switch connections |  |  |  |
| Frq | Frequency Setting Method: $\mathbf{0}=$ Keypad1; $\mathbf{2}=\mathrm{V} 1 ; \mathbf{4}=\mathrm{V} 2 ; \mathbf{5}=\mathrm{I} 2 ; \mathbf{6}=\mathrm{Int485;} \mathbf{8}=$ FldBus | 0 | 0-16 |  |
| drC | Forward or Reverse control: F = Forward ; $\mathbf{r}=$ Reverse | F | F-r |  |
| dr | Drive Group (use < or > arrows keys) best to begin from Hz displayed |  |  |  |
| dr09 | Control Mode: 0 = V/F; $\mathbf{2}=$ Slip Comp; $4=$ IM Sensorless; $\mathbf{6}=$ PM Sensorless | 0 | 0-6 |  |
| dr14 | Motor HP size |  | .5-30 |  |
| dr15 | Torque Boost: $\mathbf{0}=$ Manual ; $\mathbf{1}=$ Auto $\mathbf{1 ; ~} \mathbf{2}=$ Auto 2 | 0 |  |  |
| dr18 | Base Frequency: | 60.00 | $30-400 \mathrm{~Hz}$ |  |
| dr19 | Start frequency | 0.50 | $0-10.00 \mathrm{~Hz}$ |  |
| dr20 | Maximum frequency: Range of 40.00 to 400.00 Hz | 60.00 | $40-400.00 \mathrm{~Hz}$ |  |
| dr21 | $\mathrm{Hz} / \mathrm{RPM}$ Select: $\mathbf{0}=\mathrm{Hz}$ Display and $\mathbf{1}=$ RPM Display | 0 | 0-1 |  |
| dr85 | Parameter Read |  |  |  |
| dr86 | Parameter Write |  |  |  |
| dr89 | Changed Parameters: $\mathbf{0}=\mathrm{No} ; \mathbf{1}=\mathrm{Yes}$ |  |  |  |
| dr90 | ESC Key functions: $\mathbf{0}=$ Return; $\mathbf{1}=\mathrm{JOG} ; \mathbf{2}=$ Local $/$ Remote | 2 | 0-2 |  |
| dr92 | Parameter Save: $\mathbf{0}=$ No; $\mathbf{1}=$ Yes | 0 | 0-1 |  |
| dr93 | Parameter initialize: $\mathbf{0}=\mathrm{No} ; \mathbf{1}=\mathrm{All} \mathrm{Grp} ; \mathbf{2}=\mathrm{Dr} ; \mathbf{3}=\mathrm{bA} ; \mathbf{4}=\mathrm{Ad} ; \mathbf{5}=\mathrm{Cn} ; \mathbf{6}=\mathrm{In} ; \mathbf{7}=\mathrm{OU}$ | 0 | 0-16 |  |
|  | Factory default controlled by dr93 |  |  |  |
| XX | Basic Group |  |  |  |
| ba4 | Command Aux Src: $\mathbf{0}=$ Keypad; $\mathbf{1}=\mathrm{Rx} / \mathrm{Rx}-1 ; \mathbf{2}=\mathrm{Fx} / \mathrm{Rx} 2 ; 3=$ Int 485 | 1 | 0-4 |  |
| ba5 | Freq 2nd Source: $\mathbf{0}=$ Keypad 1; $\mathbf{2}=\mathrm{V} 1 ; \mathbf{4}=\mathrm{V} 2 ; \mathbf{5}=\mathrm{I} 2 ; 9=\mathrm{Int} 485$ | 0 | 0-16 |  |
| bA7 | V/F Pattern: $\mathbf{0}=$ Linear; $\mathbf{1}=$ Square; $\mathbf{2}=$ User V/F; $\mathbf{3}=$ Square 2 | 0 | 0-3 |  |
| bA9 | Time scale for Ramp: $\mathbf{0}=0.01 \mathrm{sec} ; \mathbf{1}=0.1 \mathrm{sec} ; \mathbf{2}=1 \mathrm{sec}$ | 0 | 0-2 |  |
| bA10 | Base frequency: $\mathbf{0}=60 \mathrm{~Hz} ; \mathbf{1}=50 \mathrm{~Hz}$ (input power freq) | 0 | 60/50 Hz |  |
| bA11 | Motor pole number (total poles - NOT pole pairs) | 4 | 2~48 |  |
| bA13 | Motor nameplate Full Load Amps |  |  |  |
| bA14 | Motor No Load Current in Amps (typical value of 20-40\% of FLA) |  |  |  |
| bA15 | Motor rated voltage: VFD model specific |  | 230/460V |  |
| bA19 | VFD input power voltage |  | 230/460V |  |
| bA20 | Auto tuning: $\mathbf{0}=$ None; $\mathbf{1}=$ All Rotation; $\mathbf{2}=$ All Static; $\mathbf{3}=$ Rotate Lsigma; $\mathbf{6}=$ Static | 0 | 0~6 |  |
| Ad | Advanced Group |  |  |  |
| Ad1 | Acc Pattern: 0 Linear and $\mathbf{1}=\mathrm{S}$-Curve | 0 | 0-1 |  |
| Ad2 | Decel Pattern: $\mathbf{0}=$ Linear and $\mathbf{1}=\mathrm{s}$-Curve | 0 | 0-1 |  |
| Ad8 | Stop mode: $\mathbf{0}$ = Decel; $\mathbf{1}=$ DC Brake; $\mathbf{2}=$ Free Run; $\mathbf{3}=$ Resv; $\mathbf{4}=$ Power braking | 0 | 0-4 |  |
| Ad9 | Run Prevent: $\mathbf{0}=$ None; $\mathbf{1}=$ FWD Prevent; $\mathbf{2}=$ REV Prevent | 0 | 0-2 |  |
| Ad24 | Frequency limit: $\mathbf{0}=$ No and $\mathbf{1}=$ Yes | 0 | 0-1 |  |
| Ad25 | Frequency low limit: 0.0 to high limit | 0.50 | 0-400 Hz |  |
| Ad26 | Frequency high limit: minimum frequency to maximum frequency | 60.00 | $0.1-400 \mathrm{~Hz}$ |  |
| Ad64 | Cooling fan control: $\mathbf{0}=$ During Run; $\mathbf{1}=$ Always On; $\mathbf{2}=$ Temp Control | 0 | 0-2 |  |
| Ad74 | Regen Avoidance Select: $\mathbf{0}=$ NO; $\mathbf{1}=$ YES | 0 | 0-1 |  |
| Ad75 | Regen Avoidance Level: DC bus voltage level | 700 | 300-800 |  |
|  | 240 v AC Line (range 335-350vDC) or 480 v AC Line (range 690-715vDC) |  |  |  |
| Ad76 | Comp Frequency Limit: usually good to set at 60.00 Hz Max | 1.00 | $0-60.00 \mathrm{~Hz}$ |  |
| Ad77 | Regen Avoidance P Gain: Range of 0.0 to 100.0\% | 50 | 0.0-100.0\% |  |
| Ad78 | Regen Avoidance I Gain: Range of 20 to 30,000 mili-seconds | 500 | 20-30000ms |  |
| Ad80 | Fire Mode Select: $\mathbf{0}=$ None; $\mathbf{1}=$ Fire Mode; $\mathbf{2}=$ Fire Mode Test | 0 | 0-2 |  |

Note: Shaded areas above denote most frequently used parameters

Common Drive Setup Parameters (continued)

| Group Name | Description <br> See drive manual for complete configuration capabilities | Default Value | Value <br> Range | New Value |
| :---: | :---: | :---: | :---: | :---: |
|  | Control Group |  |  |  |
| Cn04 | Carrier Frequency Select in kHz | 2 or 3 kHz | $1.0-15.0 \mathrm{kHz}$ |  |
| Cn70 | Speed Search modes: $\mathbf{0}=$ Flying Start-1; $\mathbf{1}=$ Flying Start-2 | 1 |  |  |
| Cn71 | Speed Search: affects restart after power interruption: Also Ad10 $=1$ | b0000 |  |  |
|  | Input Terminal Group |  |  |  |
|  | Input selections are typically assignable for digital inputs P1 thru P5 |  |  |  |
| In65 | P1 Define Digital input 1: $\mathbf{0}=$ None; $\mathbf{1}=\mathrm{FX} ; \mathbf{2}=\mathrm{RX} ; \mathbf{3}=$ RST; $\mathbf{4}=$ Ext Trip; $\mathbf{5}=\mathrm{BX} ; \mathbf{6}=\mathrm{Jog}$ | 1 | 0-52 |  |
| In66 | P2 Define Digital input 2:7 Speed L; $\mathbf{8}=$ Speed $M ; 9=$ Speed $H ; 13=$ Run Enable | 2 | 0-52 |  |
| In67 | P3 Define Digital input 3: $\mathbf{1 4}=3$-wire; $\mathbf{1 5}=2$ nd Source; $\mathbf{1 7}=$ Up; $\mathbf{1 8}=$ Down | 5 | 0-52 |  |
| In68 | P4 Define Digital input 4: $\mathbf{2 3}=$ Open Loop; $\mathbf{2 6 = 2 n d ~ M o t o r ; ~} \mathbf{3 4}=$ Pre-Excite | 3 | 0-52 |  |
| In69 | P5 Define: Digital input 5: $\mathbf{3 8}$ = Timer in; $\mathbf{4 6}$ = Fwd Jog; $\mathbf{5 0}=$ User Seq; $\mathbf{5 1}=$ Fire Mode | 7 | 0-52 |  |
| In90 | Digital Input status: for troubleshooting (dependent upon NO/NC contact) | 0 | 0-1 |  |
|  | Output Terminal Group |  |  |  |
|  | Ouput selections are typically assignable for digital outputs OU31 thru OU35 |  |  |  |
| OU1 | AO1 assignment: $\mathbf{0}=$ Freq; $\mathbf{1}=$ Out Current: $\mathbf{2}=$ Out Volt; $\mathbf{3}=\mathrm{DC} \mathrm{Bus;} \mathbf{4}=\mathrm{TQ} ; \mathbf{5}=\mathrm{Pwr}$ | 0 | 0-15 |  |
| OU7 | AO2 assignment: $\mathbf{0}=$ Freq; $\mathbf{1}=$ Out Current: $\mathbf{2}=$ Out Volt; $\mathbf{3}=\mathrm{DC} \mathrm{Bus;} \mathbf{4}=\mathrm{TQ} ; \mathbf{5}=\mathrm{Pwr}$ | 0 | 0-15 |  |
| OU31 | Relay 1: $\mathbf{0}=$ None; $\mathbf{1}=$ FDT1; $\mathbf{5}=\mathrm{OL} ; \mathbf{7}=$ Under Load; $\mathbf{9}=$ Stall; $\mathbf{1 0}=\mathrm{OV} ; \mathbf{1 1}=\mathrm{UV}$ | 0 | 0~40 |  |
| OU32 | Relay 2: $\mathbf{0}=$ None; $\mathbf{1}=$ FDT1; $\mathbf{5}=\mathrm{OL} ; \mathbf{7}=$ Under Load; $\mathbf{9}=$ Stall; $\mathbf{1 0}=\mathrm{OV} ; \mathbf{1 1}=\mathrm{UV}$ | 0 | 0~40 |  |
| OU33 | Q1 Open Collector Output Define: $\mathbf{0}=$ None; $\mathbf{1 4 = R u n ; ~} \mathbf{2 2}=$ Ready | 14 | 0~40 |  |
| OU34 | Relay 3: $\mathbf{0}=$ None; $\mathbf{1}=$ FDT1; $\mathbf{5}=\mathrm{OL} ; \mathbf{7}=$ Under Load; $\mathbf{9}=$ Stall; $\mathbf{1 0}=\mathrm{OV} ; \mathbf{1 1}=\mathrm{UV}$ | 0 | 0~40 |  |
| OU35 | Relay 4: $\mathbf{0}=$ None; $\mathbf{1}=$ FDT1; $\mathbf{5}=\mathrm{OL} ; \mathbf{7}=$ Under Load; $\mathbf{9}=$ Stall; $\mathbf{1 0}=\mathrm{OV} ; \mathbf{1 1}=\mathrm{UV}$ | 0 | 0~40 |  |
| OU41 | Digital Output status: troubleshoot: $\mathbf{0}=$ None; $\mathbf{1}=$ FDT-1; $\mathbf{2}=$ FDT2; $\mathbf{3}=$ FDT3; $\mathbf{4}=$ FDT4 | 0 | 00-11 bit |  |
| Cm | Communication Group |  |  |  |
| AP | Application Group |  |  |  |
| AP1 | App Mode: $\mathbf{0}=$ None; $\mathbf{1}=$ Reserved; $\mathbf{2}=$ Process PID | 0 | 0-2 |  |
| AP16 | PID Output | 0.00 | PID |  |
| AP17 | PID Reference Value | 0.00 | PID |  |
| AP18 | PID Feedback Value | 0.00 | PID |  |
| AP19 | PID Reference Setpoint | 50.00 | \% |  |
| AP20 | PID Reference Source: $\mathbf{0}=$ Keypad; $\mathbf{1}=\mathrm{V} 1 ; \mathbf{3}=\mathrm{V} 2 ; 4=\mathrm{I} 2 ; \mathbf{5}=\mathrm{Int} 485$ | 0 | 0-15 |  |
| AP21 | PID F/B Source: $\mathbf{0}=\mathrm{V} 1 ; \mathbf{2}=\mathrm{V} 2 ; 3=\mathrm{I} 2 ; 4=\mathrm{Int} 485$; | 0 | 0-14 |  |
| AP22 | PID P-Gain | 50.0 | \% |  |
| AP23 | PID I-Time | 10 sec | 0-200.0 sec |  |
| AP29 | PID Limit Hi | 60.00 Hz | -/+ 300.00 Hz |  |
| AP30 | PID Limit Low | $-60.00 \mathrm{~Hz}$ | -/+ 300.00 Hz |  |
| AP37 | PID Sleep detection time in seconds | 60.0 | Sec |  |
| AP38 | PID Sleep frequency in Hz | 0.00 | Hz |  |
| AP39 | PID Wake-up level in \% | 35 | \% |  |
|  | Protection Group |  |  |  |
| Pr4 | Load Duty: $\mathbf{0}$ = Normal Duty ; $\mathbf{1}=$ Heavy Duty | 1 | 0-1 |  |
| Pr5 | Input/output open phase protection: Bit low = Off ; Bit High = ON (see manual) | 0 | 0-1 |  |
| Pr6 | Open-phase input voltage band: adjustable (see manual) | 40 | 1-100V |  |
| Pr8 | Auto Restart: $\mathbf{0}=\mathrm{No}$; $\mathbf{1}=$ Yes | 0 | 0-1 |  |
| Pr 9 | Retry Number | 0 | 0-10 |  |
| Pr10 | Auto Restart time in seconds | 0.0 | 0-60 |  |
| Pr20 | Overload Trip Select: $\mathbf{0}=$ None; $\mathbf{1}=$ Free-Run; $\mathbf{2}=$ Decel | 0 | 0-2 |  |
| Pr21 | Overload Trip Level | 180 | 30-200\% |  |
| Pr22 | Overload Trip Time | 60 sec | 0-60 sec |  |
| Pr90 | Warning Information |  |  |  |
| Pr91 | Fault history 1 - $\mathrm{nOn}=$ None or No fault recorded |  |  |  |
| Pr92 | Fault history 2 |  |  |  |
| Pr93 | Fault history 3 |  |  |  |
| Pr94 | Fault history 4 |  |  |  |
| Pr95 | Fault history 5 |  |  |  |
| Pr96 | Fault history deletion: $\mathbf{0}=$ No; $\mathbf{1}=$ Yes (clears recorded faults in Pr91-Pr95) | 0 | 0~1 |  |

Note: Shaded areas above denote most frequently used parameters

