STEP 5 ☐ Install the 24 V Transducer Power Supply (continued)

5.6 Installation Procedure

5.7 Shut off power to the drive. Wait at least five minutes after confirming the DC bus voltage is safe.

On **IP20/NEMA 1, UL Type 1** models, loosen the screw that fastens the front cover in place and remove the front cover. This drive front cover will be replaced by the 24V Power Supply cover. Cover removal varies depending on drive size.

On **IP66/NEMA 4X, UL Type 4X** models, loosen the 4 bolts that attach the enclosure front cover in place, gently move the front cover away from the enclosure, press firmly on the digital operator cable connector release tab to disconnect the cable from port CN1 on the drive, then remove the front cover. Refer to ***Table 1.3*** for installation bolt size.

Table 1.2 Remove the Drive or Enclosure Front Cover

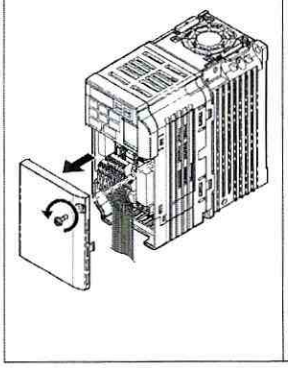
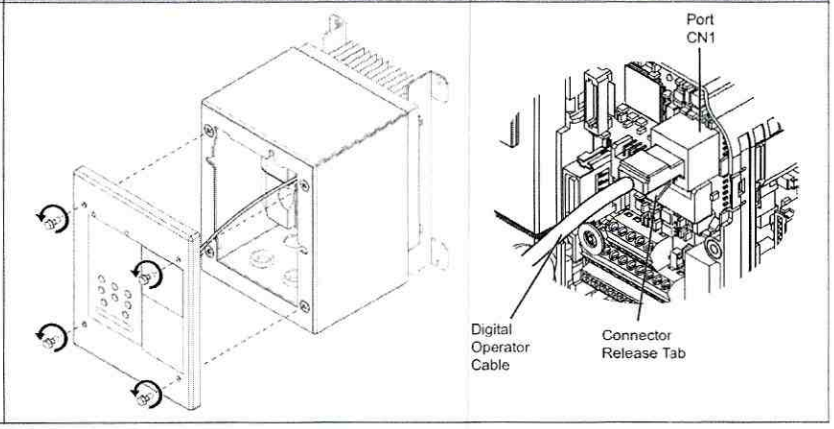
IP20/NEMA 1, UL Type 1	IP66/NEMA 4X, UL Type 4X
	

Table 1.3 IP66/NEMA 4X, UL Type 4X Enclosure Front Cover Installation Bolt Size

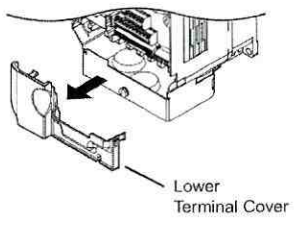
Voltage Class	Drive Model	Installation Bolt Size
Single-Phase 200 V Class	BV0001G to BV0012G	M5
Three-Phase 200 V Class	2V0001G to 2V0020G	M5
	2V0030G to 2V0069G	M6
Three-Phase 400 V Class	4V0001G to 4V0011G	M5
	4V0018G to 4V0038G	M6

5.8 On **IP20/NEMA 1, UL Type 1** enclosure models, loosen the screw on the front of the bottom cover and remove it from the drive. All models except 2V0006F require removing a plastic lower terminal cover prior to removing the bottom cover.

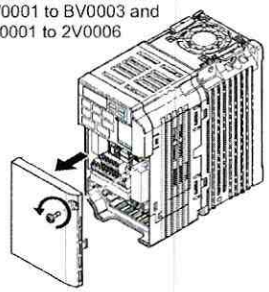
On **IP66/NEMA 4X, UL Type 4X**enclosure models, remove the lower terminal cover (if provided) from the drive.

The lower terminal cover is not present on certain models.

Models **With** Lower Terminal Cover



Models **Without** Lower Terminal Cover: BV0001 to BV0003 and 2V0001 to 2V0006



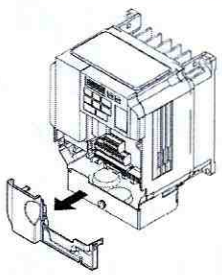
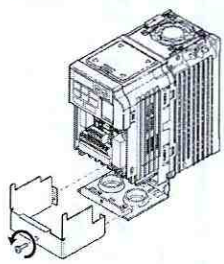
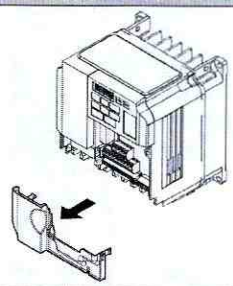
STEP 5 ☐ Install the 24 V Transducer Power Supply (continued)

Note: The lower terminal cover is required for secure mounting of the 24V Power Supply on the models shown in ***Table 1.4***. Contact your Yaskawa representative for ordering if you have a model listed in ***Table 1.4*** and the lower terminal cover is not present on your drive.

Table 1.4 Lower Terminal Cover Part Number by Model

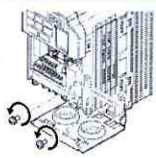
Drive Model	Terminal Cover Part Number
BV0006☐ and BV0010☐ 2V0010☐ and 2V0012☐ 4V0002☐ to 4V0009☐	CVST31300
BV0012☐ 2V0020☐ 4V0011☐	CVST31301
Other models	Not required

Table 1.5 Remove the Bottom Cover and Lower Terminal Cover

IP20/NEMA 1, UL Type 1		IP66/NEMA 4X, UL Type 4X
Lower Terminal Cover on All Models Except Models: BV0001 to BV0003 2V0001 to 2V0006	**Bottom Cover on All Models**	**Terminal Cover on Models BV0006G to BV0010G 2V0010G to 2V0020G 4V0002G to 4V0011G**
		

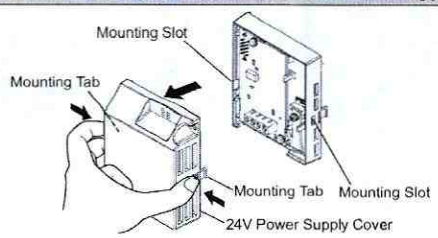
5.9 On IP20/NEMA 1, UL Type 1 enclosure models, loosen the screws attaching the NEMA 1, UL Type 1 conduit bracket to the drive to allow the bracket to swing out to provide easier access to the ground screw. Do not remove the screws.

Table 1.6 Loosen Conduit Bracket Screws

IP20/NEMA 1, UL Type 1	IP66/NEMA 4X, UL Type 4X
	Not applicable.

5.10 Remove the 24V Power Supply cover.

Table 1.7 Remove 24V Power Supply Cover

IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X


STEP 5

☐ Install the 24 V Transducer Power Supply (continued)

5.11 Select one of the four ground wires packaged with the 24V Power Supply unit and attach the ground wire to the drive.

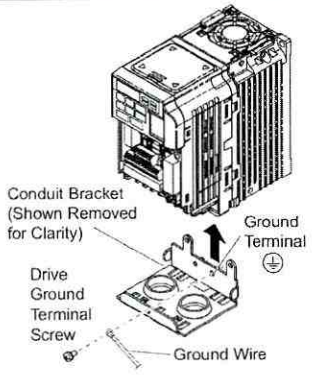
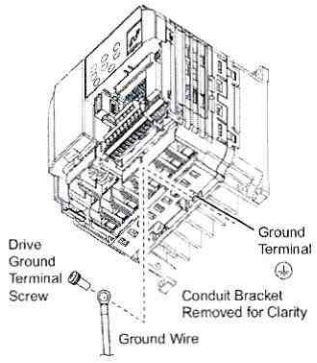
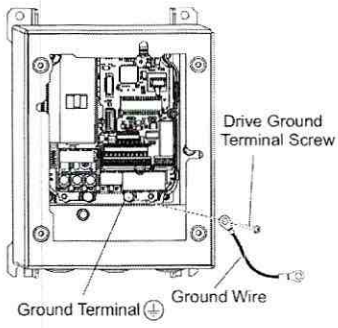
Select the correct ground wire shown in ***Figure 1.5*** by first removing the drive ground terminal screw as shown in ***Table 1.8***. Yaskawa recommends using a long Phillips screwdriver with a magnetic tip to aid in keeping the screw captive during removal and installation.

Test fit the screw (size M3.5 to M6) into each of the four ground wire drive-side ring lugs prior to installation. Ground wire selection varies by drive model.

With the appropriate screw removed, attach the drive-side of the ground wire to the drive ground terminal and tighten all loosened screws.

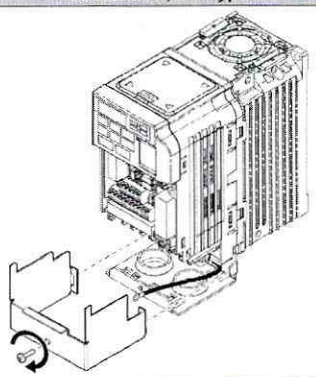
Figure 1.5 Ground Wire Selections

Table 1.8 Drive Ground Terminal and Screw Location

IP20/NEMA 1, UL Type 1		IP66/NEMA 4X, UL Type 4X
Models BV0001 to BV0003 2V0001 to 2V0006	**All Other Models**	
		

5.12 Reattach the bottom terminal cover.

Table 1.9 Reattach Bottom Terminal Cover

IP20/NEMA 1, UL Type 1	IP66/NEMA 4X, UL Type 4X
	Not applicable.

STEP 5

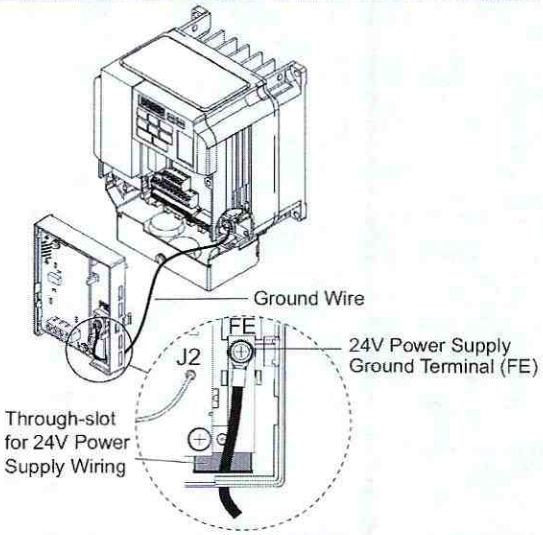
☐ Install the 24 V Transducer Power Supply (continued)

5.13 Connect the ground wire to the 24V Power Supply at ground terminal FE.

Route the free end of the ground wire to the front of the 24V Power Supply via the through-slot as shown in ***Table 1.10*** and connect the ground wire. Tighten the screw to 0.5 ~ 0.6 Nm or (4.4 ~ 5.3 in lbs) using an M3 Phillips screwdriver.

Table 1.10 Connect Ground Wire to 24V Power Supply

IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X

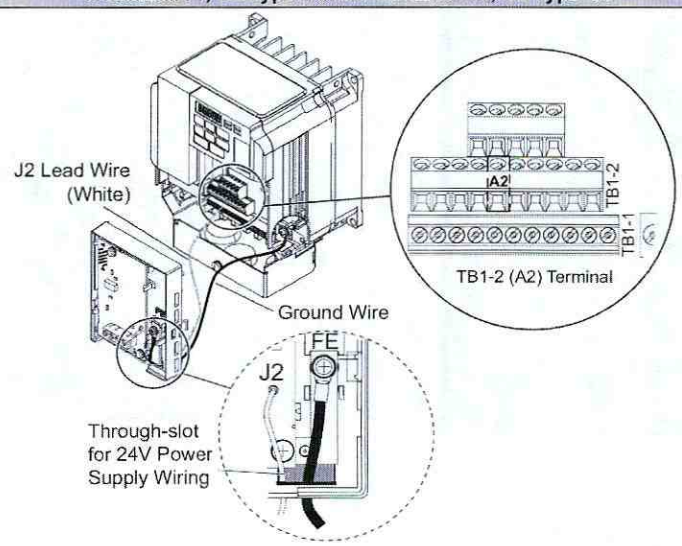


5.14 Connect the white J2 lead wire to terminal A2 on drive terminal block TB1-2.

Route the free end of the J2 wire to the A2 terminal on the drive via the through-slot on the 24V Power supply as shown in ***Table 1.11***.

Table 1.11 Connect J2 Lead Wire to Drive

IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X

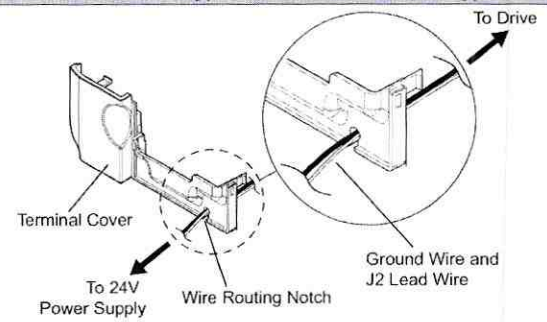


STEP 5

☐ Install the 24 V Transducer Power Supply (continued)

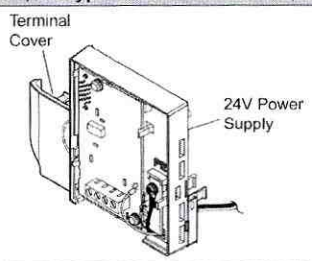
5.15 On models BV0006☐ to BV0018☐, 2V0010☐ to 2V0020☐, and 4V0002☐ to 4V0011☐, insert the ground wire and J2 lead wire into the terminal cover wire notch.

Table 1.12 Insert Wires Into Routing Notch

IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X


After inserting the ground wire and J2 lead wire into the notch, attach the terminal cover to the 24V Power Supply.

Table 1.13 Connect Terminal Cover to 24V Power Supply

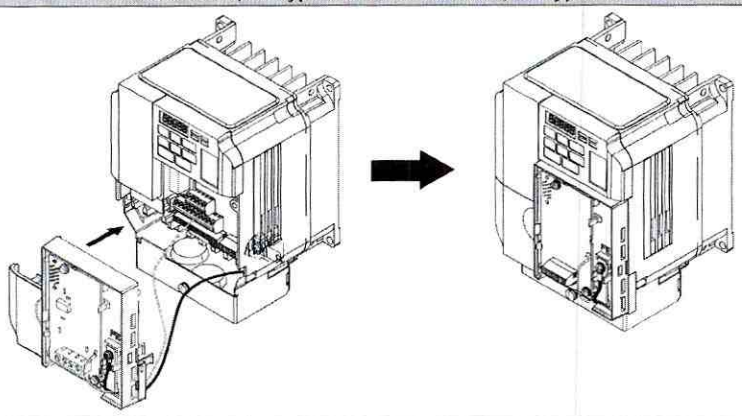
IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X


5.16 Attach the 24V Power Supply or 24V Power Supply/Terminal Cover combination to the drive.

Properly seat the tabs on the left and right sides of the 24V Power Supply unit into the drive case mounting slots and snap into place.

NOTICE: *Damage to Equipment. Take proper precautions when attaching the 24V Power Supply to the drive so that no cables are pinched between the 24V Power Supply and the drive. Failure to comply may result in damage to circuitry and equipment.*

Table 1.14 Attach 24V Power Supply to Drive

IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X


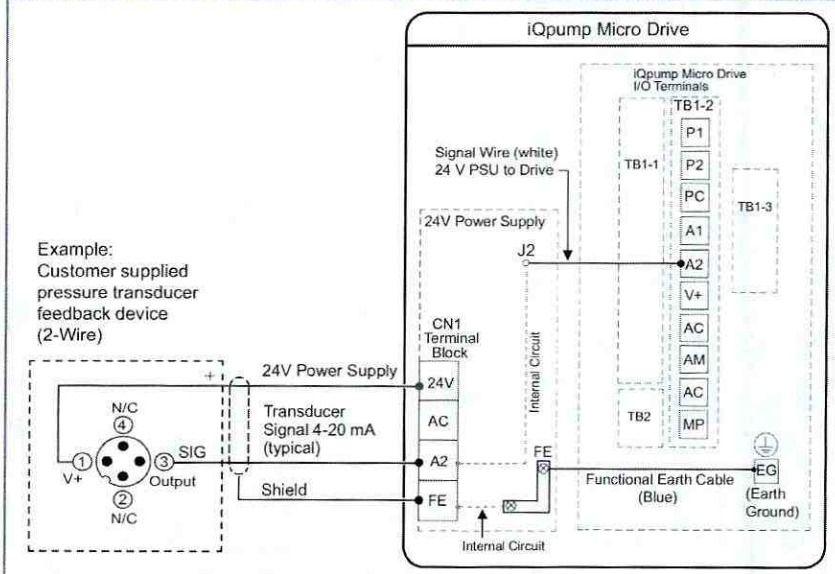
STEP 5

☐ Install the 24 V Transducer Power Supply (continued)

5.17 Connect wiring from customer-supplied transducer to 24V Power Supply.

Refer to Figure 1.6 Transducer (2-Wire) connection or Figure 1.7 Transducer (3-Wire) connection based on the application.

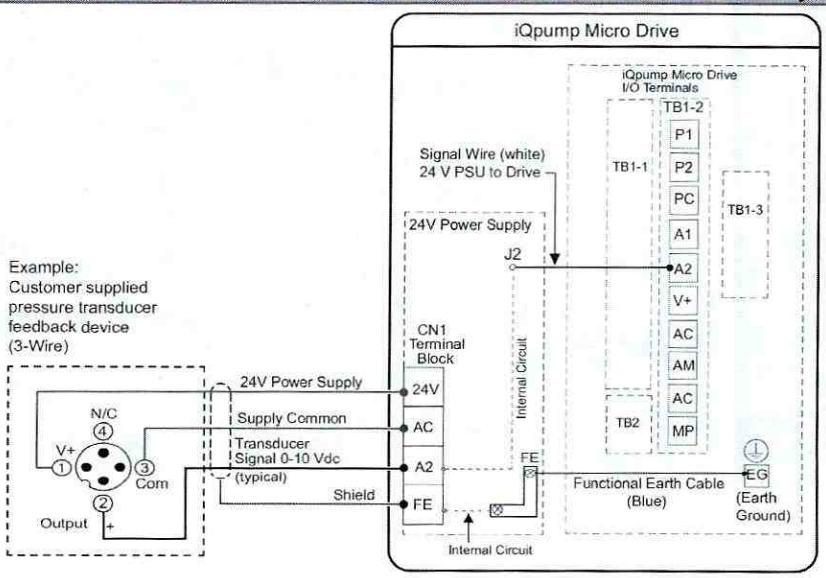
Figure 1.6 (2-Wire) 4 to 20 mA Transducer



Note: Transducer wire colors and numbering may vary depending on feedback device used, consult feedback device manual.

Figure 1.7 (3-Wire) 0 to 10 V Transducer

Note: Set DIP switch S1 located on drive to V position for use with 0 to 10V transducer.

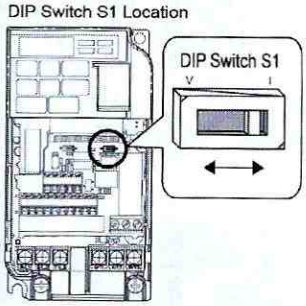


Setting DIP Switch S1 for Terminal A2 Signal Type Selection

Terminal A2: DIP Switch S1 Signal Type Selection

Setting Value	Description
V (left position)	Voltage input (0 to 10 V)
I (right position)	Current input (default setting) (4 to 20 mA or 0 to 20 mA)

DIP Switch S1 Location



Parameter H3-09 Details

No.	Parameter Name
H3-09	Frequency ref. (current) terminal **A2** signal level selection

Description
Selects the signal level for terminal A2. 0: 0 to +10 V, unipolar input (with lower limit) 1: 0 to +10 V, bipolar input (no lower limit) 2: 4 to 20 mA 3: 0 to 20 mA

Note: Refer to the iQpump Micro User Manual, (No. TOEPYAIQPM03) to program the iQpump Micro drive for network communication if required.

STEP 5

☐ Install the 24 V Transducer Power Supply (continued)

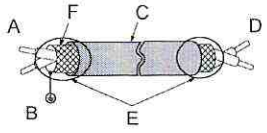
5.18 (continued)

Select appropriate transducer wire type and size from ***Table 1.15***. For simpler and more reliable wiring, you may choose to crimp ferrules to the wire ends. Refer to ***Figure 1.9*** and ***Table 1.16*** for ferrule terminal types and sizes.

Table 1.15 24V Power Supply Wire Size and Torque Specifications

Terminal	Screw Size	Tightening Torque N•m (in-lbs)	Bare Wire Terminal		Ferrule-Type Terminal		
			Applic. wire size mm² (AWG)	Recomm. mm² (AWG)	Applic. wire size mm² (AWG)	Recomm. mm² (AWG)	Wire Type
24V, AC, A2, FE	M3	0.5 to 0.6 (4.4 to 5.3)	Stranded: 0.25 to 1.5 (24 to 16) Single: 0.25 to 1.5 (24 to 16)	0.75 (18)	0.25 to 1.0 (24 to 17)	0.5 (20)	Shielded line, etc.

5.19 Prepare the ends of the transducer wires as shown in ***Figure 1.8***.



A – Drive side
B – Connect shield to FE ground terminal of drive.
C – Insulation
D – Transducer side
E – Shield sheath (Insulate with tape)
F – Shield

Figure 1.8 Preparing the Ends of Shielded Cables

NOTICE: *Insulate shields with tape or shrink tubing to prevent contact with other signal lines and equipment. Improper wiring practices could result in drive or equipment malfunction due to short circuit.*

NOTICE: *Connect the shield of shielded cable to the appropriate ground terminal. Improper equipment grounding could result in drive or equipment malfunction or nuisance trips.*

5.20 If desired, select the correct ferrule-type wire termination.

Crimp a ferrule to signal wiring to improve wiring simplicity and reliability. Use CRIMPFOX 6, a crimping tool manufactured by PHOENIX CONTACT.

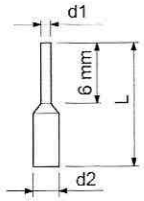


Figure 1.9 Ferrule Dimensions

Table 1.16 Ferrule Terminal Types and Sizes

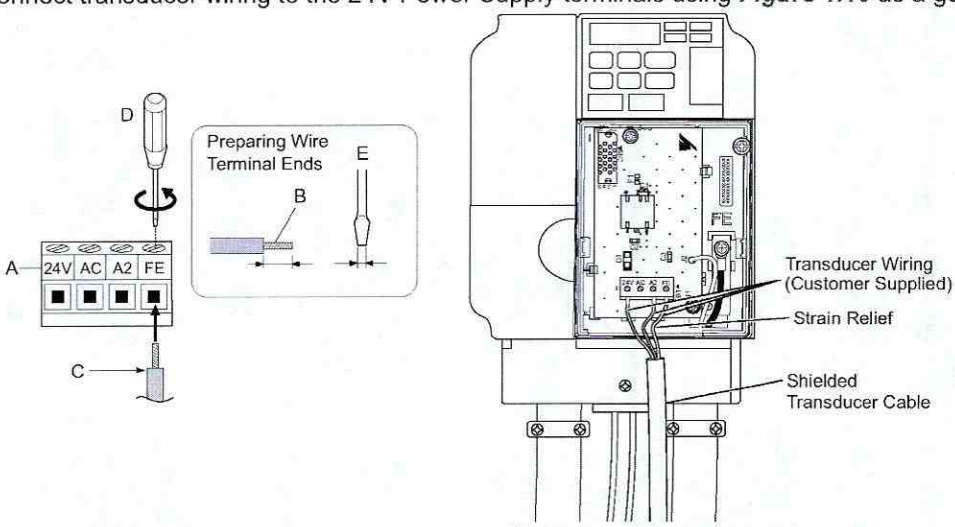
Size mm² (AWG)	Type	L (mm)	d1 (mm)	d2 (mm)	Manufacturer
0.25 (24)	AI 0.25-6YE	10.5	0.8	2.0	PHOENIX CONTACT
0.34 (22)	AI 0.34-6TQ	10.5	0.8	2.0	
0.5 (20)	AI 0.5-6WH	12	1.1	2.5	
0.75 (18)	AI 0.75-6GY	12	1.3	2.8	
1.0	AI 1-6RD	12	1.5	3.0	

Note: Do not route shielded cable through bottom conduit bracket cable glands on IP20/NEMA 1, UL Type 1 enclosures.

STEP 5

☐ Install the 24 V Transducer Power Supply (continued)

5.21 Connect transducer wiring to the 24V Power Supply terminals using ***Figure 1.10*** as a guide.



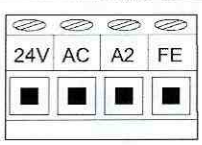
A – Terminal block CN1
B – Avoid fraying wire strands when stripping insulation from wire. Strip length 5.5 mm.
C – Single wire or stranded wire
D – Loosen screw to insert wire.
E – Blade depth of 0.4 mm or less Blade width of 2.5 mm or less

Figure 1.10 24V Power Supply Wiring Guide

NOTICE: *Separate transducer wiring from main circuit wiring (terminals R/L1, S/L2, T/L3, B1, B2, U/T1, V/T2, W/T3, ⊖, ⊕1, ⊕2) and other high-power lines. Improper wiring practices could result in drive malfunction due to electrical interference.*

NOTICE: *Damage to Equipment. Do not tighten screws beyond the specified tightening torque. Failure to comply may damage the terminal block.* ***Refer to 24V Power Supply Wire Size and Torque Specifications on page 13*** *for details.*

Table 1.17 24V Power Supply Terminal Block CN1

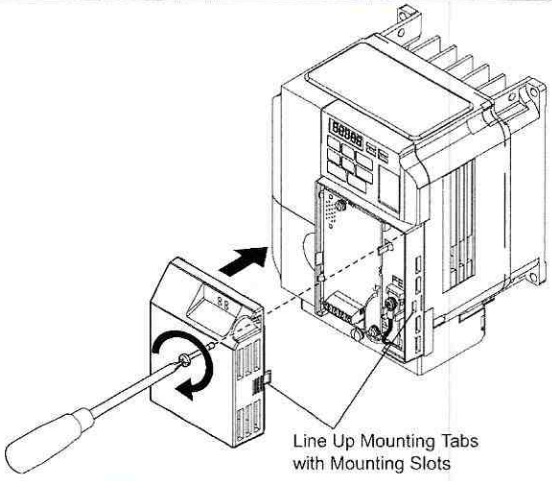
CN1 Terminal Block	Terminal No.	Terminal Name (Function)	Function (Signal Level) Default Setting
	24V	Tranducer Power Supply	+20V to +24V Vdc 30 mA
	AC	Power Supply Common	0 Vdc
	A2	Analog input	4-20 mA, 0-20 mA, 0-10 Vdc
	FE	Functional Earth Ground for Shielded Connection	⏚

STEP 5

☐ Install the 24 V Transducer Power Supply (continued)

5.22 Attach the 24V Power Supply cover by aligning the tabs with the mounting slots, seat the front cover into place, and tighten the screw on the front.

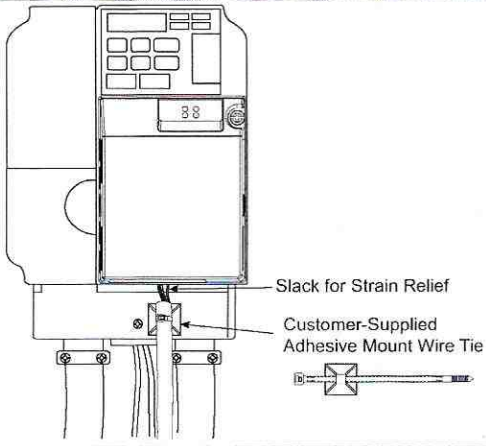
Table 1.18 Attach the 24V Power Supply Cover

IP20/NEMA 1, UL Type 1 and IP66/NEMA 4X, UL Type 4X


NOTICE: *Damage to Equipment. Take proper precautions when wiring the 24V Power Supply unit so that the front covers will easily fit back onto the drive. Make sure no cables are pinched between the front covers and the drive when replacing the cover. Failure to comply may result in damage to circuitry and equipment.*

5.23 Secure the shielded cable with a customer-supplied adhesive mount wire tie positioned on the lower drive cover to complete the installation procedure for IP20/NEMA 1, UL Type 1 enclosures.

Table 1.19 Secure the Shielded Cable

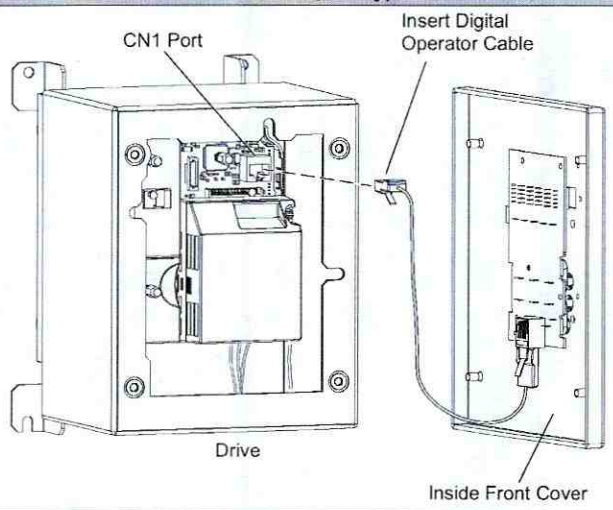
IP20/NEMA 1, UL Type 1	IP66/NEMA 4X, UL Type 4X
	Not applicable.

STEP 5

☐ Install the 24 V Transducer Power Supply (continued)

5.24 On IP66/NEMA 4X, UL Type 4X models, insert the digital operator cable from the front cover into port CN1 on the drive.

Table 1.20 Insert Digital Operator Cable

IP20/NEMA 1, UL Type 1	IP66/NEMA 4X, UL Type 4X
Not applicable.	

5.25 To complete the installation procedure on IP66/NEMA 4X, UL Type 4X enclosures, reattach the front cover of the drive enclosure. Refer to ***Table 1.22*** for tightening torque specifications.

NOTICE: *Damage to Equipment. Take proper precautions when wiring the 24V Power Supply unit so that the front covers will easily fit back onto the drive. Make sure no cables are pinched between the front covers and the drive when replacing the cover. Failure to comply may result in damage to circuitry and equipment.*

Table 1.21 Attach Enclosure Front Cover

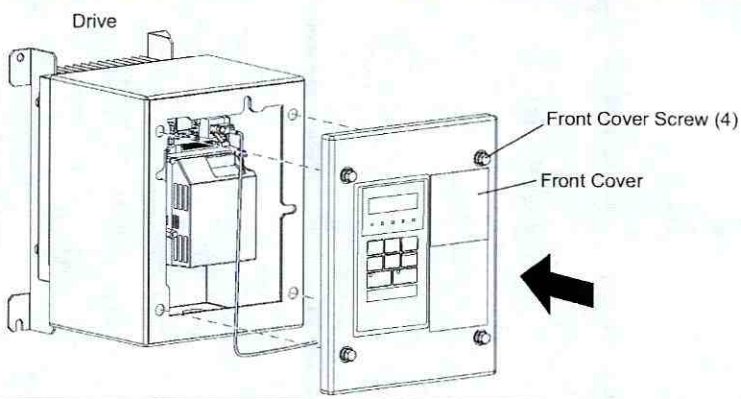
IP20/NEMA 1, UL Type 1	IP66/NEMA 4X, UL Type 4X
Not applicable.	

Table 1.22 IP66/NEMA 4X, UL Type 4X Enclosure Front Cover Installation Bolt Size and Tightening Torque

Voltage Class	Drive Model	Installation Screw Size	Tightening Torque N•m (lb-in)
Single-Phase 200 V Class	BV0001G to BV0012G	M5	2.0 to 2.5 (17.7 to 22.1)
Three-Phase 200 V Class	2V0001G to 2V0020G	M5	2.0 to 2.5 (17.7 to 22.1)
	2V0030G to 2V0069G	M6	5.4 to 6.0 (47.8 to 53)
Three-Phase 400 V Class	4V0001G to 4V0011G	M5	2.0 to 2.5 (17.7 to 22.1)
	4V0018G to 4V0038G	M6	5.4 to 6.0 (47.8 to 53)

STEP 6

☐ Prepare to Use the Digital Operator

6.1 The iQpump Micro is supplied with a standard 7-segment red color LED digital operator for basic use. This Quick Start Procedure is provided for use with both standard or optional JVOP-183 digital

JVOP-183 Description (optional)

The (optional) JVOP-183 LCD (Model: UOP000016) digital operator; provides Real-time clock, HOA, LCD keypad display, 5 lines x 16 characters, backlit, 8 languages, Copy function. Mounts to RJ-45 keypad port.

The optional JVOP-183;

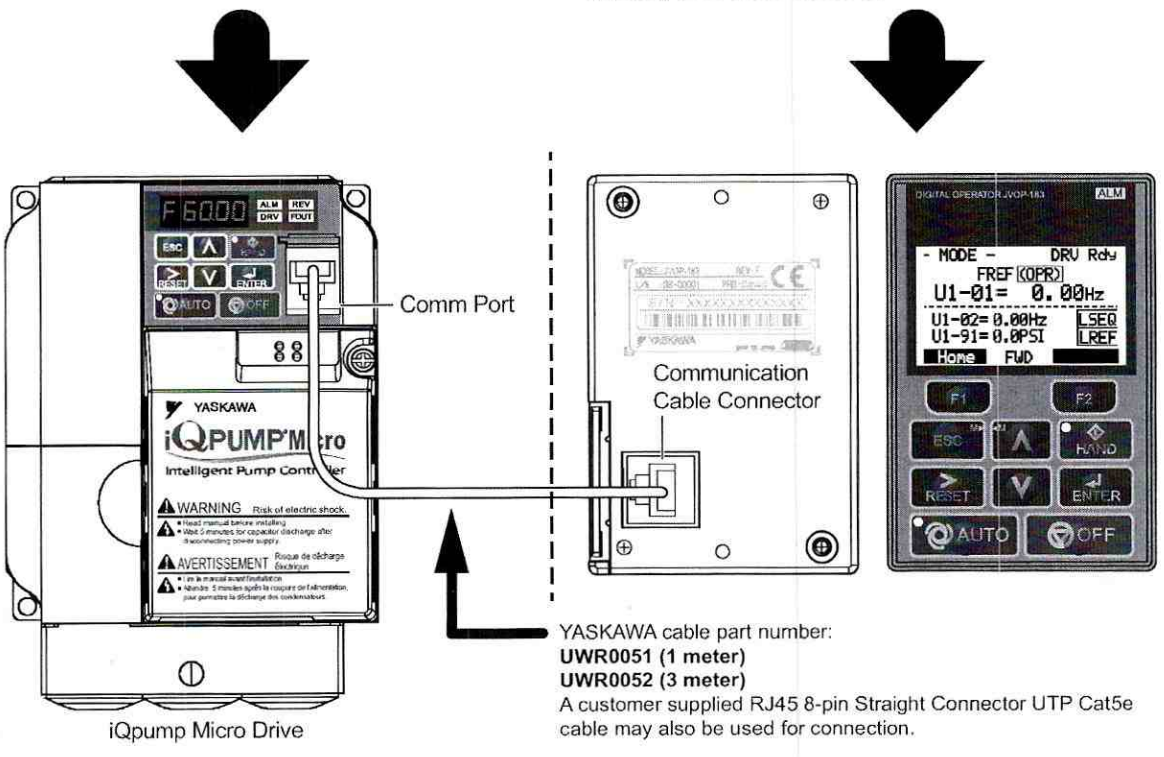
- simplifies iQpump Micro programming
- provides enhanced unit user interface
- allows operation of the iQpump Micro up to 3 meters away
- and can display information in 8 languages.

Additionally the JVOP-183 simplifies the task of interfacing with the iQpump Micro to;

- read or modify unit parameters
- read and copy unit parameter settings to another iQpump Micro
- operate the unit.
- monitor unit operation status.

7-Segment LED Digital Operator (standard)

JVOP-183 Digital Operator (optional) Model No. UOP000016



iQpump Micro Drive

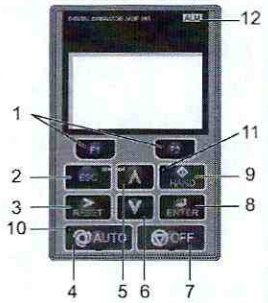
YASKAWA cable part number:
UWR0051 (1 meter)
UWR0052 (3 meter)
A customer supplied RJ45 8-pin Straight Connector UTP Cat5e cable may also be used for connection.

Refer to this URL for keypad mounting kit information:
https://www.yaskawa.com/pycprd/products/specialty-pump-drives/drives/iqpump-micro/tab1/link10

STEP 6

☐ JVOP-183 HOA Keypad Tutorial (Optional)

6.2 Review this tutorial if using the JVOP-183 operator.



No.	Display	Key or Indicator Name	Function
1	F1 / F2	Function F1 (RLY)	Selects Drive Test Mode Note: Applies specifically to drives configured with 3-contactor. Pressing the F1 (RLY) key places the drive in Drive Test Mode. Power is applied to the drive in the bypass mode.
		Function F2 (BYP/DRV)	Toggles selection between Bypass Mode and Drive Mode.
2	ESC	ESC	• Returns to the previous display. • Moves the cursor one space to the left. • In Drive Mode, repeatedly pressing this button will return to the Frequency Reference display. • In Bypass Mode, repeatedly pressing this button will return to the UB-01 "Bypass Current" display. • During parameter entry, allows aborting the current edited value and exits the parameter editing mode.
3	RESET	RESET	• Moves the cursor to the right. • Resets the bypass or drive to clear a fault situation • Certain drive conditions may require pressing the OFF key before the RESET key will clear a fault..
4	AUTO	AUTO	Selects AUTO mode.
5	∧	Up Arrow	Scrolls up to display the next item, selects parameter numbers, and increments setting values.
6	∨	Down Arrow	Scrolls down to display the previous item, selects parameter numbers, and decrements setting values.
7	OFF	OFF Key	If the drive was operating the motor, the motor will stop according to the stopping method selected in b1-03. If the bypass was operating the motor, the bypass contactor opens and the motor coasts to a stop.
8	ENTER	ENTER	• Enters parameter values and settings. • Selects a menu item to move between displays.
9	HAND	HAND	Selects HAND mode.
10	AUTO	AUTO Light	Lit or flashing while the drive is in AUTO mode.
11	HAND	HAND Light	Lit while the drive is in HAND mode.
12	ALM	ALARM Light	• Flashing: Indicates Alarm (minor fault) • Solid: Indicates Fault (major fault)

STEP 7

☐ Adjust and Monitor iQpump Micro Settings

7.1 Access the Parameter Menu and Change Parameter Values. DO NOT RUN THE MOTOR. Ensure all protective covers are installed and power is turned on.

LED Digital Operator (Standard)

iQpump Micro digital operator power-up state →

Press V two times until the digital operator shows the parameter menu (PAr) then press ENTER.

Select Parameter Menu

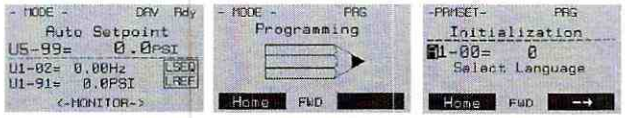
Press RESET to select the digit you would like to change. Next use ∧ and V to select the parameter group, sub-group or number.

Select Parameter

Modify the parameter value using ∧ and V and press ENTER to save the new value.

LCD Digital Operator (Optional JVOP-183)

Press V two times until the digital operator shows the parameter menu.



2X V → ENTER → RESET

RESET 2X →

Increase/Decrease Selection | Go to Next Digit | Increase/Decrease Selection

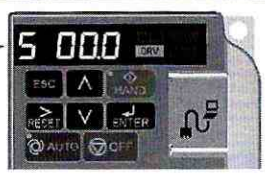
ENTER → ∧ V → ENTER

Switch to Edit Mode | Modify Value | Save New Value

Hold ESC button for 3 sec. to go back to the main menu.

Monitor Motor Frequency and Current (Standard)

iQpump Micro digital operator power-up state →



Press ∧ until the **FOUT** LED turns on. The display now shows the actual drive output frequency in Hz.

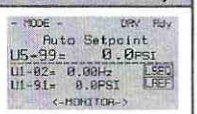
Output Frequency

Pressing ∧ again will show the motor output current. The 'A' behind the value means 'Amps'.

Motor Current

Monitor Motor Frequency and Current (Optional JVOP-183)

iQpump Micro digital operator power-up state →

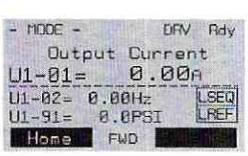


Output Frequency and Transducer Feedback can be monitored simultaneously. Use F1 and F2 to select monitor signals.

Press ESC ∧ simultaneously shows the monitor menu.

Press ENTER to access monitor menu.

Use ∧ V to select monitor.



Motor Current

Refer to the iQpump Micro User Manual, (Document No. TOEPYAIQPM03) to access additional drive monitors

STEP 8

☐ Application Specific Setup

8.1 Configure the iQpump Micro for a dedicated pump application. DO NOT RUN THE MOTOR. Ensure all protective covers are installed and power is turned on.

Available iQpump Micro Application Macro Settings using parameter A1-03 :

- 6008 Constant Pressure Mode (PSI) [Factory Default] **Note: Do not change unless pump application differs from default.**
- 6009 Pump Down Level Mode (Ft)
- 7770 General Purpose Mode
- 7771 Submersible Motor GP Mode

8.2 Select Application Macro Parameter A1-03

LED Digital Operator (Standard)

Press V two times until the digital operator shows the parameter menu.

2X V → ENTER → 2X RESET

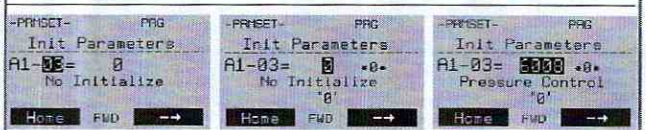
Inc./Dec. Selection → Switch to Edit Mode → Select Application

Press ENTER to select.

LCD Digital Operator (Optional JVOP-183)

Press V two times until the digital operator shows the parameter menu.

2X V → ENTER → 2X RESET Select Digit



Inc./Dec. Selection → Switch to Edit Mode → Select Application

Press ENTER to select.

Enter Application Parameters (Standard)

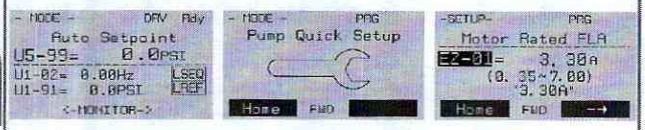
Hold ESC button for 3 sec. to go back to the main menu.

3X V → ENTER → Select Parameter.

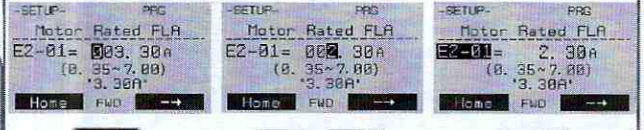
ENTER → Switch to Edit Mode → Modify Value → ENTER Save New Value

Enter Application Parameters (Optional JVOP-183)

Hold ESC button for 3 sec. to go back to the main menu.



3X V → ENTER → Select Parameter.



ENTER → Switch to Edit Mode → Modify Value → ENTER Save New Value

Go Back to Main Menu (Standard)

Hold ESC button for 3 sec. to go back to the main menu.

Go Back to Main Menu (Optional JVOP-183)

Hold ESC button for 3 sec. to go back to the main menu.

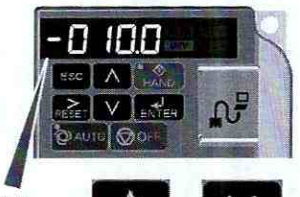
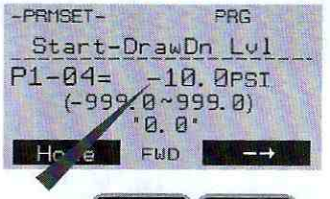
STEP 9

☐ Parameter Overview-Quick Setting Menu (Simplex)

Step. Task	Parameter	Name	Description/Menu Access	Default Value
9.1 Read-only parameter. It cannot be modified. Factory set to (0: Pressure control)	A1-06	Application Preset	Displays selected applications, see Step 5. Quick Setting	Factory set to (0: Pressure control). Dependent on Initialization Mode
9.2 Set to the motor nameplate full load amps Set service factor amps (SFA). for submersible motors use	E2-01	Motor Rated Current	Motor nameplate full load amps. Quick Setting	Drive Size Dependent
9.3 Enter '4' for an 1800 RPM motor and '2' for a 3600 RPM motor. Confirm number of poles: • 2 Pole Motor = 3600 RPM • 4 Pole Motor = 1800 RPM • 6 Pole Motor = 1200 RPM • 8 Pole Motor = 900 RPM	E2-04	Number of Motor Poles	Sets the number of motor poles. Number of motor poles is used to show the correct motor RPM on the display Quick Setting	2
9.4 System Scaling: Enter feedback device maximum: Example: Enter 200 for pressure transducer with a maximum of 200 PSI at 20mA. Confirm feedback device scaling. (See Illustration 1)	P1-03	Feedback Device Scaling	Sets the scaling of feedback device in user-set units. Quick Setting	145.0
9.5 Set to system pressure	Q1-01	PID Controller Setpoint 1	Sets the PID Setpoint when b1-01 is set to 0. Quick Setting	0.0
9.6 Choose one of two types of Start Level programming: 1. Program the Start Level as an Absolute OR 2. Program the Start Level as a Delta Level from the System Setpoint	P1-04	Start / Drawn Down Level	The system starts when the feedback level drops below the start level for the time set in P1-05 (default 1 sec). This level also specifies the wakeup level when the drive is in Sleep Mode. When this parameter is set to a negative value, the feedback level must drop that amount below the setpoint. Setting this parameter to 0.0 disables the function. When P1-01, Pump Mode, is set to 3 (MEMOBUS network), this function is active only on the first drive in the network. Quick Setting	0.0 PSI

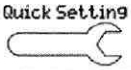
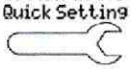
STEP 9

☐ Parameter Overview-Quick Setting Menu (Simplex) continued.

Step. Task	Parameter	Name	Description/Menu Access	Default Value
9.7 Program the Start Level as an Absolute Value. Start / Draw Down Level must be programmed to a positive value for the Start / Draw Down Level to be an absolute value. Example: Start / Draw Down Level P1-04 set to 50 PSI and delay time P1-05 set to 5 sec. Result: Pump system will start when the pressure drops below 50 PSI for 5 sec. **OR** Program the Start Level as a Delta Level from the System Setpoint Start / Draw Down Level must be programmed to a negative value for the Start Level to be a delta value from the setpoint. Example: Start / Draw Down Level P1-04 set to –10 PSI with a system setpoint of 50 PSI and delay time P1-05 set to 5 sec. Result: Pump system will start when the pressure drops below 40 PSI (50 - 10) for 5 sec.		**Important! It is mandatory to program the Start / Draw Down Level in order to use the sleep function.** **LED Digital Operator (Standard)**  Use ∧ ∨ to change the sign **LCD Digital Operator (Optional JVOP-183)**  Use ∧ ∨ to change the sign		
9.8 Set Minimum Pump Frequency to the value at which the pump enters a no-flow condition.	P1-06	Minimum Pump Speed	Minimum speed (Hz) for pump motor operation. Quick Setting	40.0 Hz
9.9 Recommended for use when the Start/Stop command is from the digital operator **WARNING!** Sudden Movement Hazard. If the drive is powered down while running, it will automatically initiate an internal Run command upon power-up.	P4-10	AUTO Mode Operator Run Power Down Storage	Stores the run status in the AUTO mode when operating from digital operator (b1-02=0). 0: Disabled 1: Enabled	0: Disabled
Optional step: HAND key on digital operator.	P5-04	HAND Key Function Selection	Enables or disables the HAND key on the digital operator. 0: Disabled 1: Enabled	1: Enabled

STEP 10

☐ iQpump Micro Parameters - Advanced Settings

Task	Parameter	Name	Description/Menu Access	Default Value
10.1 **NOTICE:** Setting value may cause PID control loop instability if misadjusted.	b5-03	Integral Time Setting (I)	Sets the integral time for the PID controller. Decrease integral time to make iQpumpMicro more responsive. Quick Setting 	3.0 sec.
10.2 **NOTE**: Disable parameter b5-12 if a transducer is not installed.	b5-12	Feedback Loss 4 to 20 mA Detection Selection	Performs a 4 to 20 mA wire break detection on the analog input that is programmed for PID feedback. Terminal TB1-1 A2 (typical) 0: Disabled, continue running, no message is displayed 1: Alarm, display warning on the digital operator when the feedback device fails or is disconnected. 2: Fault, stop the pump system when the feedback fails or is disconnected 3: Run at the setting value of parameter Quick Setting 	2 (Fault)
10.3 Adjust depending on system performance	C1-01	Acceleration Time 1	Sets the time to accelerate the pump motor from zero to maximum speed. NOTE: The factory default with Thrust Mode enabled is 12.0 sec, 20.0 sec when disabled.	20.0 sec. See Note
	C1-02	Deceleration Time 1	Sets the time to decelerate the pump motor from maximum speed to zero. NOTE: The factory default with Thrust Mode enabled is 5.0 sec, 10.0 sec when disabled.	10.0 sec. See Note
10.5 Refer to L5 parameter group. The number of restart attempts is set by L5-01. Configurable iQpump Micro System Protection Faults for Auto-restart: - Low Level Feedback - High Level Feedback - Transducer Loss - Not Maintaining Setpoint - Loss of Prime - Pump Over Cycle.	L5-01	Number of Restart Attempts	Sets the number of times the drive may attempt to restart after these faults occur: – oC-Overcurrent – GF-Ground Fault – LF-Output Phase Loss – PF-Input Phase Loss – oL2-iQpumpMicro Overload – oL1-Motor Overload – oL3/4-Overtorque – DC Bus Fuse Blown – Uv1-DC Bus Undervoltage – ov-DC Bus Overvoltage – oH1-Overheat	5
10.6 P1-06 should be set to the level at which the pump produces minimum pressure even at zero flow. Example: Base pump motor speed is 3600 RPM, minimum speed is 2400 RPM. Set minimum pump frequency to 40.0 Hz. (2400 ÷ 3600 x 60 Hz=40Hz)	P1-06	Minimum Pump Speed	Minimum frequency at which the drive will run. Applies to both HAND and AUTO modes. NOTE: For minimum pump frequency, the drive will use the highest setting from among P1-06, P4-12 (Thrust Bearing Frequency), or d2-02 (Reference Lower Limit)	40.0 Hz

STEP 10

☐ iQpump Micro Parameters - Advanced Settings (continued)

Task	Parameter	Name	Description/Menu Access	Default Value
10.7 Adjust according to system requirements.	P2-03	Sleep Delay Time	Sets the delay time before the drive enters Sleep Mode when the selected signal level (P2-01) falls below the specified sleep level (P2-02).	5 sec.
10.8 Primarily used for submersible pumps. Program P4-12 = 0.0 Hz to disable function when iQpump Micro is used with a centrifugal pump.	P4-12	Thrust Bearing Frequency	Sets the frequency reference used when the thrust bearing function is active. The drive will accelerate to this frequency in the time set to P4-11. The drive will decelerate from the frequency in the time set to P4-13.	30.0 Hz
10.9 Set the amount of time for the drive to delay starting if a Run command is present at power-up. Note: Utility Star Delay is active when P4-10 is enabled (1) and operation (start/stop) is from the digital operator.	P4-17	Utility Start Delay	Sets the amount of time that the drive will delay starting if a Run command is present at power-up. When P1-01, Pump Mode, is set to 3 (MEMOBUS network), the drive is unavailable to the network (Pump Off Network) when the function is active. The iQpump Micro waits the time specified in P4-11 before auto operation becomes active when utility power is restored and P4-10 is enabled (1).	0.2 Min Setting this parameter to 0.0 disables the function.

STEP 11

☐ Fine-tune Settings for Pumping Application

11.1 SYSTEM FEEDBACK UNIT / FEEDBACK DEVICE SCALING

P1-02 Feedback Unit

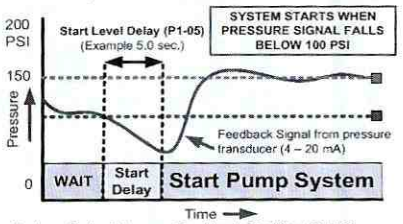
0: No Unit
1: PSI: lb.SqrInch
2: Pa: Pascals
3: Bar
4: WC: Inch Water
5: "Hg: Inch Mercury
6: ft: Feet
7: m: meters
8: °F:DegFarenheit
9: °C:DegCelsius
10: %: Percent

P1-03 = 200.0 PSI Feedback Scaling

Feedback Maximum

11.2 START / DRAW DOWN LEVEL

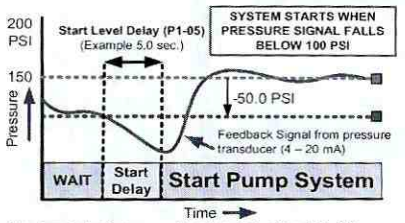
Example: Absolute Level (Positive Start Level)



System Setpoint (Example 150.0 PSI)
Feedback Scaling (P1-03) (Example 200.0 PSI)
System Units (P1-02) (Example PSI)
Start / Draw Down Level (P1-04) (Example 100.0 PSI)

START / DRAW DOWN LEVEL

Example: Delta Level (Negative Start Level)

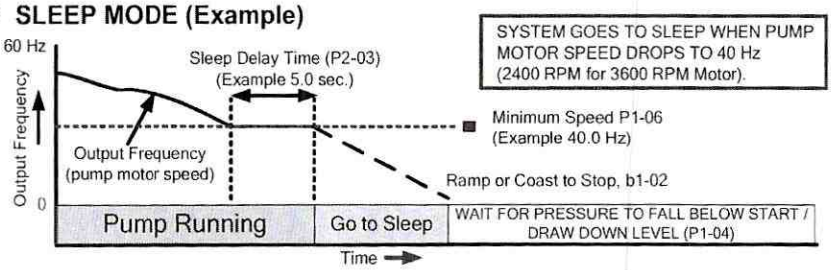


System Setpoint (Example 150.0 PSI)
Feedback Scaling (P1-03) (Example 200.0 PSI)
System Units (P1-02) (Example PSI)
Start / Draw Down Level (P1-04) (Example -50.0 PSI, (150.0 – 50.0)

STEP 11

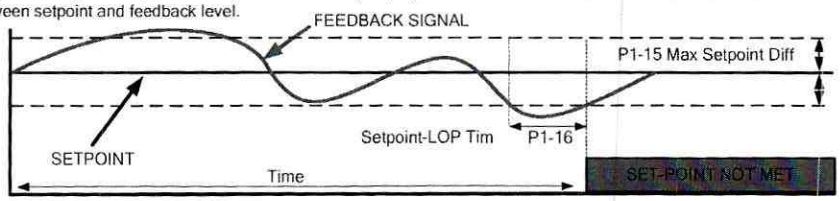
☐ Fine-tune Settings for Pumping Application (continued)

11.3 SLEEP MODE (Example)



11.4 PUMP SYSTEM FAULT SETUP

The iQpump Micro can display a 'Setpoint Not Met' fault when the iQpump Micro is unable to maintain the programmed system setpoint due a problem with the pump system. Set P1-15 to the maximum allowed difference between setpoint and feedback level.

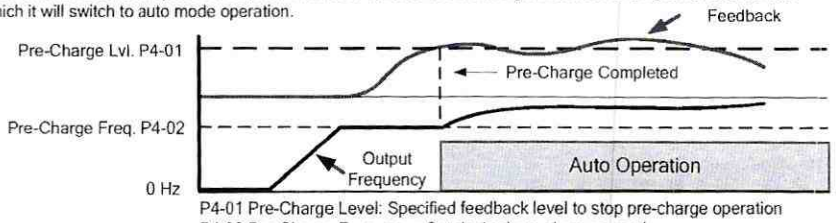


11.5 LOW/HIGH FEEDBACK LEVEL DETECTION

The iQpump Micro continuously monitors the system feedback signal. Set the low feedback level parameter P1-08 to the minimum feedback level allowed for your system to display a 'Low Feedback' fault. Set the high feedback level parameter P1-11 to the maximum feedback level allowed to display a 'High Feedback' fault.

11.6 PRE-CHARGE OPERATION

This function is used when the pump system requires a pre-charge before normal operation. Upon start the iQpump Micro will run at a fixed speed for a specified time or until the feedback signal reaches a programmed level after which it will switch to auto mode operation.

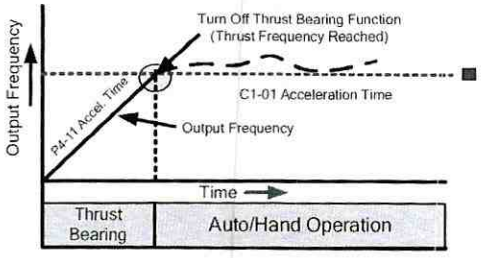


P4-01 Pre-Charge Level: Specified feedback level to stop pre-charge operation
P4-02 Pre-Charge Frequency: Set desired pre-charge speed
P4-03 Pre-Charge Time: Specified maximum pre-charge operation time

11.7 THRUST BEARING - SUBMERSIBLE MOTORS

The factory recommends using the Thrust Bearing function to prevent excess motor wear when using a submersible motor in combination with the iQpump Micro. Enter the minimum motor frequency in parameter P4-11 to enable this function. Example: Minimum motor speed 1800 RPM, 1800 RPM ÷ 3600 RPM x 60.0 Hz = 30.0 Hz

Thrust Acceleration Time P4-11 (Example 1.0 sec.) DEFAULT SETTING
Thrust Bearing Frequency P4-12 (Example 30.0 Hz)



11.8 AUTO OPERATION - POWER DOWN STORAGE

Allows the iQpump Micro to automatically start after power failure when operated from the digital operator. This function is recommended when operating the iQpump Micro in remote/unmanned areas.
Use parameter P4-10 to enable this function.

WARNING! Stay Clear- Equipment starts automatically. An internal run command will automatically occur on power-up if the iQpump Micro is powered down while running.

STEP 12

☐ Verify Pump Rotation and Transducer Feedback

12.1 Check the motor for proper direction and operation.

This test is performed solely from the digital operator. Apply power to the iQpump Micro after electrical connections are terminated and protective covers are installed. At this point, DO NOT RUN THE MOTOR, The digital operator should display as shown in Figure 3.

LED Digital Operator (Standard)

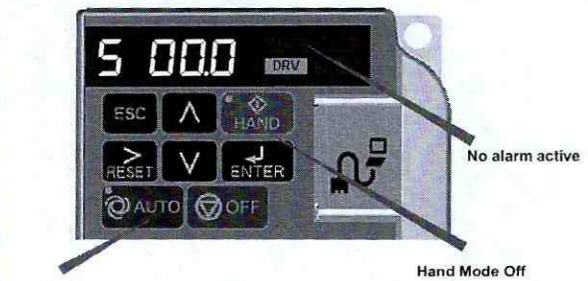


Figure 3: LED Digital Operator (Standard)

LCD Digital Operator (Optional JVOP-183)

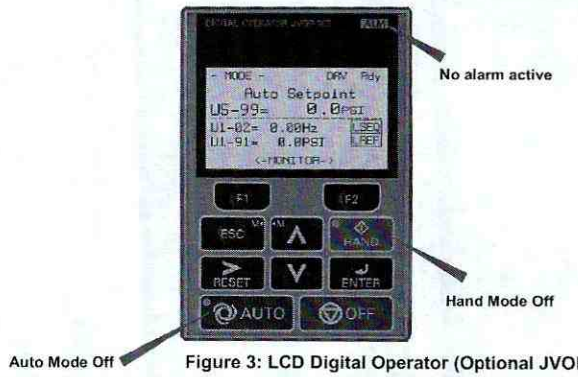


Figure 3: LCD Digital Operator (Optional JVOP-183)

12.2 Motor Rotation Test (Standard)

Press HAND on the digital operator; the display should read

and the **HAND** ● LED should be ***ON***.

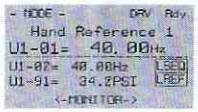
The motor should be operating in the correct direction of pump.

Press OFF on the digital operator; the display should read as in Figure 3.

Press ENTER to access Hand Speed. Use ∧ ∨ RESET to change HAND Speed value. Press ENTER to save value.

12.2 Motor Rotation Test (Optional JVOP-183)

Press HAND on the Digital Operator; the display should read



and the **HAND** ● LED should be ***ON***.

The motor should now be operating at in the correct direction of pump.

Press OFF

Press ENTER to access HAND Speed. Use ∧ ∨ RESET to change HAND Speed value. Press ENTER to save value.

NOTE: If the motor direction is not correct, de-energize the iQpump Micro and follow instructions below.

WARNING! Hazardous Voltage. Contact may cause electric shock or burn. Turn-off and lock-out system and facility power before servicing. After the power has been turned OFF, wait at least five minutes until the charge indicator extinguishes completely before touching any wiring, circuit boards or components.

Digital operator turned off.

Refer to ***STEP 3,*** exchange any **two** of the **three** output leads to the motor (U/T1, V/T2 and W/T3). Recheck motor direction after the wiring change.

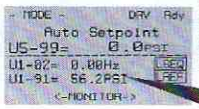
Digital operator turned off.

12.3 Feedback Signal Check (Standard)

Verify the transducer feedback signal level on the digital operator display matches a mechanical pressure gauge.

From HOME screen, press ∧ to access "FEEdb" screen. "FEEdb" will display for 2 seconds, then automatically change to display the feedback signal level.

12.3 Feedback Signal Check (Optional JVOP-183)



Refer to parameter P1-02 and P1-03, if the feedback device scaling or system units are incorrect.

STEP 13

☐ AUTO Mode Operation

13.1 AUTO Mode

The iQpump Micro is operated in AUTO mode by performing the following tasks: Program all parameters

- Verify motor rotation direction
- Auto Mode: Select the **Reference source** setting in parameter b1-01
- Auto Mode: Select the **Run source** setting in parameter b1-02 (Refer to STEP 4)

LED Digital Operator (Standard)	LCD Digital Operator (Optional JVOP-183)

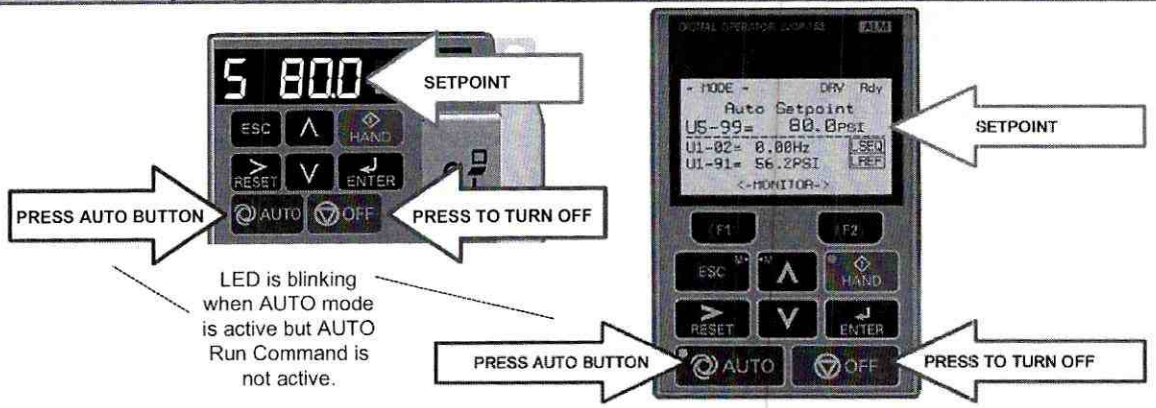


Figure 4: Digital Operator

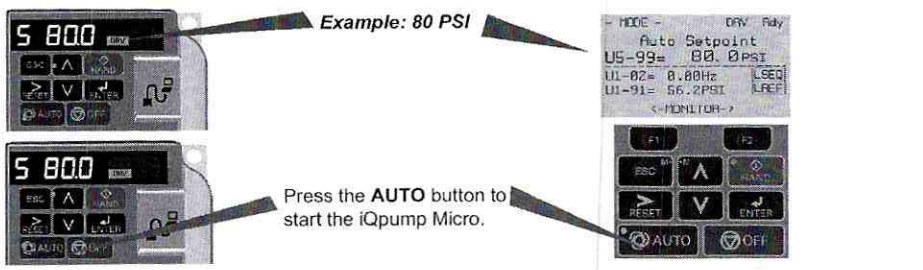
Press the **AUTO** button to place the iQpump Micro into AUTO mode.

The AUTO mode will start and stop based on the Run Source Selection setting parameter b1-02. (Refer to Step 3) The Reference Source Selection parameter b1-01 setting configures the AUTO mode reference source.

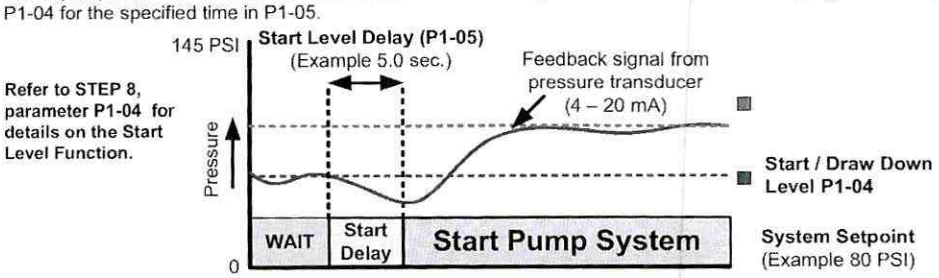
13.2 Set System Setpoint

LED Digital Operator (Standard)	LCD Digital Operator (Optional JVOP-183)

Press ENTER to access or modify the system setpoint in parameter Q1-01 within the iQpump Micro Quick Setup Menu. iQpump Micro Quick Setup Menu. Use RESET to select the digit and ∧ ∨. Next press ENTER to store setpoint. Next press ENTER to store setpoint. Next, press F1 to return to the main menu (LCD Digital Operator)



The iQpump Micro starts in AUTO Mode when the feedback signal level falls below the level programmed in parameter P1-04 for the specified time in P1-05.



STEP 14

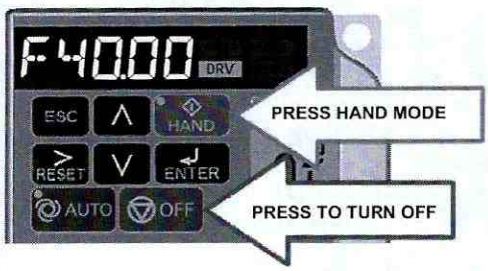
☐ Hand Mode Operation

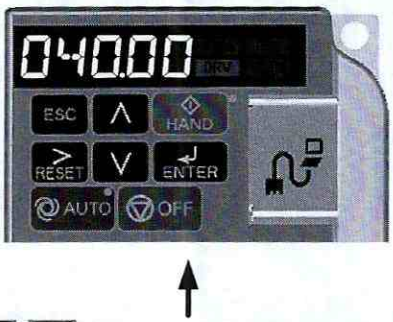
14.1 HAND Mode

The iQpump Micro is operated in HAND mode by performing the following tasks:

- Program all parameters
- Verify motor rotation direction

LED Digital Operator (Standard)





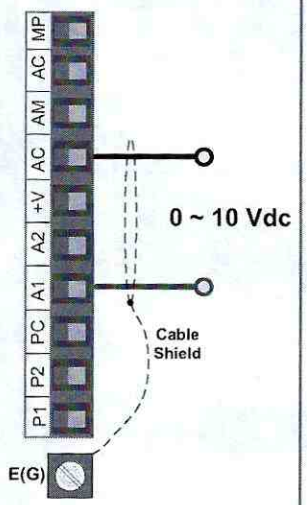
Press ENTER to access HAND Speed. Use ∧ ∨ RESET to change HAND Speed value.

Press ENTER to save value.

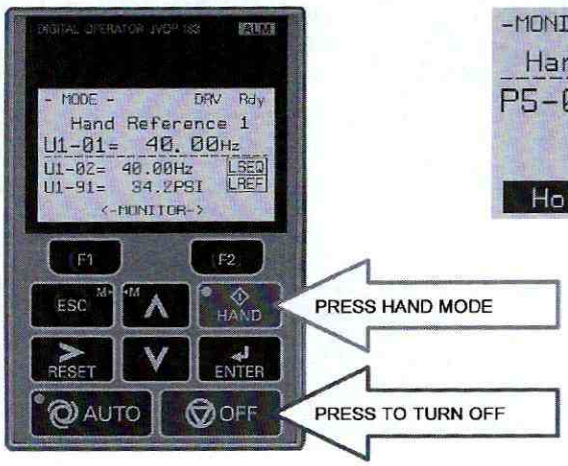
Hand Speed Reference from Analog Input (0 to 10 Vdc)

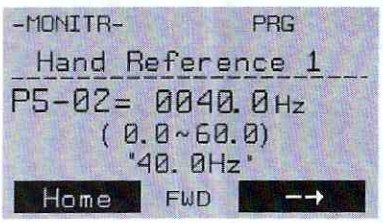
Set parameter P5-01 'HAND Mode Ref.' to '0' to adjust the hand mode reference from an external 0 – 10V signal connected to terminals TB1-1, A1 and AC.

0 to 10 Vdc Connection



LCD Digital Operator (Optional JVOP-183)





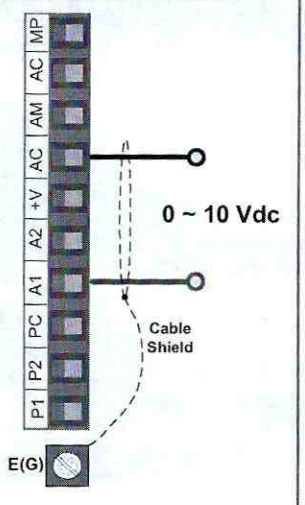
Press ENTER to access HAND Speed. Use ∧ ∨ RESET to change HAND Speed value.

Press ENTER to save value.

Hand Speed Reference from Analog Input (0 to 10 Vdc)

Set parameter P5-01 'HAND Mode Ref.' to '0' to adjust the hand mode reference from an external 0 – 10V signal connected to terminals TB1-1, A1 and AC.

0 to 10 Vdc Connection



STEP 15

☐ Configure Sleep and Anti-No-Flow (ANF)

15.1 Sleep and Anti-No-Flow (ANF Detection) (Parameters P2-23, P2-24, P2-25)

Note: Ensure the pump system is regulating pressure/flow satisfactory while operating under normal running conditions prior to adjusting Anti-No-Flow operation.

15.2 Verify No-flow/Sleep Operation

a. Continue to **STEP 16.3** below if pump operation is stable.
b. Disable Anti-No-Flow function if pump operation is unstable.
   - Set parameter P2-23 = 0.00% and adjust PI control parameters b5-02 and b5-03 to stabilize pump system.
   - Refer to the iQpump Micro User Manual (Document No.TOEPYAIQPM03) for additional information.
c. Re-enable the Anti-No-Flow function by setting P2-23 to 0.40% and continue to Step 1 to verify no-flow/sleep operation once the system is stable.

15.3 Verify the system holds pressure by creating a no-flow situation (e.g. close off discharge valve).

15.4 Press the OFF button on the digital operator, wait 1 minute until system stabilizes and verify system pressure feedback using parameter U1-91. Adjust P2-25 to the actual delta pressure drop plus 1 PSI if the pressure drops more than 3 PSI (use Monitor U1-91).

Example: Setpoint is 80 PSI, pressure feedback U1-91 shows 76 PSI, P2-25 should be 4 + 1 or 5 PSI.

Note: This value should always be more than the P1-04 Start Level. If not, the system pressure is not holding and must be corrected or the pump system will continue to cycle on and off.

15.5 Operate the system in normal AUTO operation with flow. Observe monitor U1-99 "ANF Timer" and verify the value is increments and resets to zero continuously. If the value holds at 10 sec. (P2-24) increase P2-24 "Anti-No-Flow Detection Time" by increments of 5 seconds. Repeat Step 3 each time P2-24 is adjusted.

15.6 Create a no-flow situation (e.g. close discharge valve). Use monitor U1-99 "ANF Timer" to verify the value is increments and holds at the P2-24 time (value set in Step 3). Once the Anti-No-Flow timer expires, the speed will reduce gradually until reaching minimum pump speed (P1-06) where it will hold for 5 seconds according to P2-03, before going to sleep.

15.7 Operate the system in normal AUTO operation and verify sleep and wake-up functions satisfactory.

NOTES:

NOTES:

This Page Intentionally Blank

i

iQpump Micro Quick Start Guide

i.1 PREFACE....38
i.2 RECEIVING....46
i.3 MECHANICAL INSTALLATION....48
i.4 ELECTRICAL INSTALLATION....51
i.5 MAIN CIRCUIT WIRING....55
i.6 START-UP PROGRAMMING AND OPERATION....67
i.7 TROUBLESHOOTING....87
i.8 DRIVE SPECIFICATIONS....97
i.9 PARAMETER TABLE....100
i.10 STANDARDS COMPLIANCE....112

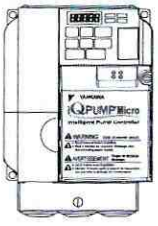
i.1 Preface

Yaskawa manufactures products used as components in a wide variety of industrial systems and equipment. The selection and application of Yaskawa products remain the responsibility of the equipment manufacturer or end user. Yaskawa accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any Yaskawa product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and fail safely under all circumstances. All systems or equipment designed to incorporate a product manufactured by Yaskawa must be supplied to the end user with appropriate warnings and instructions as to the safe use and operation of that part. Any warnings provided by Yaskawa must be promptly provided to the end user. Yaskawa offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the Yaskawa manual. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED. Yaskawa assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.

This manual is designed to ensure correct and suitable application of drives. Read this manual before attempting to install, operate, maintain, or inspect a drive and keep it in a safe, convenient location for future reference. Be sure you understand all precautions and safety information before attempting application.

◆ Applicable Documentation

The following manuals are available for iQpump Micro drives:

	iQpump Micro Quick Start Procedure (TOEPYAIQPM01)
	This sheet is packaged together with the drive and contains a step-by-step guide to enable the user to properly wire the drive and motor and connect the 24 V power supply.
	iQpump Micro AC Drive Quick Start Guide (TOEPYAIQPM02)
	Read this guide first. This guide is packaged together with the product and contains basic information required to install and wire the drive. It also gives an overview of fault diagnostics, maintenance, and parameter settings. The purpose of this guide is to prepare the drive for basic operation. The most recent version of this manual is available for download on our documentation website, www.yaskawa.com.
	iQpump Micro AC Drive User Manual (TOEPYAIQPM04)
	This manual provides detailed information on parameter settings, fault diagnostics, and drive functions. Use this manual to expand drive functionality and to take advantage of higher performance features. The most recent version of this manual is available for download on our documentation website, www.yaskawa.com.

◆ Supplemental Safety Information

General Precautions

- The diagrams in this manual may be indicated without covers or safety shields to show details. Replace the covers or shields before operating the drive and run the drive according to the instructions described in this manual.
- Any illustrations, photographs, or examples used in this manual are provided as examples only and may not apply to all products to which this manual is applicable.
- The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual.
- When ordering a new copy of the manual due to damage or loss, contact your Yaskawa representative or the nearest Yaskawa sales office and provide the manual number shown on the front cover.
- If nameplate becomes worn or damaged, order a replacement from your Yaskawa representative or the nearest Yaskawa sales office.

⚠ WARNING

Read and understand this manual before installing, operating or servicing this drive. The drive must be installed according to this manual and local codes.

The following conventions are used to indicate safety messages in this manual. Failure to heed these messages could result in serious or fatal injury or damage to the products or to related equipment and systems.

⚠ DANGER

Indicates a hazardous situation, which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation, which, if not avoided, could result in death or serious injury.

WARNING! *may also be indicated by a bold key word embedded in the text followed by an italicized safety message.*

⚠ CAUTION

Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

CAUTION! *may also be indicated by a bold key word embedded in the text followed by an italicized safety message.*

NOTICE

Indicates a property damage message.

NOTICE: *may also be indicated by a bold key word embedded in the text followed by an italicized safety message.*

◆ Safety Messages

⚠ DANGER

Heed the safety messages in this manual.

Failure to comply will result in death or serious injury.

The operating company is responsible for any injuries or equipment damage resulting from failure to heed the warnings in this manual.

Electrical Shock Hazard

Before servicing, disconnect all power to the equipment.

The internal capacitor remains charged even after the power supply is turned off. The charge indicator LED will extinguish when the DC bus voltage is below 50 Vdc. To prevent electric shock, wait for at least the time specified on the warning label, once all indicators are OFF, measure for unsafe voltages to confirm the drive is safe prior to servicing.

Failure to comply will result in death or serious injury.

⚠ WARNING

Sudden Movement Hazard

System may start unexpectedly upon application of power, resulting in death or serious injury.

Clear all personnel from the drive, motor and machine area before applying power. Secure covers, couplings, shaft keys and machine loads before applying power to the drive.

Electrical Shock Hazard

Do not attempt to modify or alter the drive in any way not explained in this manual.

Failure to comply could result in death or serious injury.

Yaskawa is not responsible for any modification of the product made by the user. This product must not be modified.

Do not allow unqualified personnel to use equipment.

Failure to comply could result in death or serious injury.

Installation, maintenance, inspection, and service must be performed only by authorized personnel familiar with installation, adjustment and maintenance of AC drives.

⚠ WARNING

Do not remove covers or touch circuit boards while the power is on.

Failure to comply could result in death or serious injury.

Make sure the protective earthing conductor complies with technical standards and local safety regulations.

Always use appropriate equipment for Ground Fault Circuit Interrupters (GFCIs).

The drive can cause a residual current with a DC component in the protective earthing conductor. Where a residual current operated protective or monitoring device is used for protection in case of direct or indirect contact, always use a type B GFCI according to IEC/EN 60755.

Fire Hazard

Do not use an improper voltage source.

Failure to comply could result in death or serious injury by fire.

Verify that the rated voltage of the drive matches the voltage of the incoming power supply before applying power.

Install adequate branch circuit protection according to applicable local codes and this Installation Manual. Failure to comply could result in fire and damage to the drive or injury to personnel.

The device is suitable for use on a circuit capable of delivering not more than 100,000 RMS symmetrical amperes, 240 Vac maximum (200 V class) and 480 Vac maximum (400 V class) when protected by branch circuit protection devices specified in this document.

Crush Hazard

Do not use this drive in lifting applications without installing external safety circuitry to prevent accidental dropping of the load.

The drive does not possess built-in load drop protection for lifting applications.

Failure to comply could result in death or serious injury from falling loads.

Install electrical and/or mechanical safety circuit mechanisms independent of drive circuitry.

⚠ CAUTION

Crush Hazard

Do not carry the drive by the front cover.

Failure to comply may result in minor or moderate injury from the main body of the drive falling.