Frequently Asked Questions

General

Q: I did not receive an Installation and Operation Manual with my ASD. How can I get one?

A: The *Q9 ASD Quick Start Guide* and the *Q9 ASD Installation and Operation Manual* can be downloaded from our website at www.toshiba.com/ind. To request a hard-copy of either document contact the Toshiba Customer Support Center or your local Toshiba distributor.

Q: Does Toshiba offer training courses?

A: Yes. Training courses are offered at TIC headquarters in Houston, Texas. There are two types of training — maintenance and repair (nominal fee), and applications (free). Our instructors have years of hands-on experience in their respective fields and are continually being trained on new products. Students will gain valuable experience on the equipment and troubleshoot real faults that may be incurred during normal ASD setup, operation, and maintenance. For a listing of upcoming training courses or to register, visit our website at www.toshiba.com/ind and click on the training tab.

Q: Where can I find additional information about Toshiba International Corporation (TIC) and TIC products?

A: Additional information can be found on our website, www.toshiba.com/ind. You may also contact TIC for additional information by writing to 13131 West Little York Rd., Houston, Texas, 77041, via telephone at (713) 466-0277, or via fax at (713) 937-9349.

Application Specific

Q: Who is considered qualified personnel?

A: A qualified person is one who has the skills and knowledge about the construction, installation, operation, and maintenance of the equipment and has received safety training on the hazards involved. Qualified personnel are able to recognize and properly address hazards associated with the application of motor-driven equipment, and are trained to safely energize, de-energize and ground said equipment, to safely lockout/tagout circuits and equipment, and clear faults in accordance with established safety practices.

Q: What do I do if my motor is rotating in the wrong direction?

A: Qualified personnel should reverse any two of the three ASD output power leads (U/T1, V/T2, or W/T3) connected to the motor.

Q: For safety and application-specific reasons I need to remotely mount the ASD. How do I accomplish this?

A: Select a mounting location that is easily accessible by the user and mark the location of the screw holes. After drilling the screw holes, attach and secure the Electronic Operator Interface (EOI) to the front side of the mounting location. Connect the extension cable. For information on required hardware or for instructions on remote mounting using a Remote Mounting Kit, consult the *Q9 ASD Installation and Operation Manual*. If further assistance is required, contact the Toshiba Customer Support Center.

Q: I followed all of the instructions but my motor will not run. What now?

A: Ensure that the input power to the ASD is connected and that the voltage at R/L1, S/L2, and T/L3 are as specified for your ASD. Ensure that the terminals of the terminal board are configured correctly for your application. Perform a Reset (to factory default settings). Ensure that the Local/Remote key is as required for your application and that you have provided a run command. If further assistance is required, contact the Toshiba Customer Support Center.

Q9 ASD Simple Start Guide

The Q9 ASD Simple Start Guide provides instructions on installation and operating procedures only.
For additional information regarding your new Q9 ASD, consult the *Q9 ASD Installation and Operation Manual*.

DO NOT attempt to install or operate the Q9 ASD until you have read and understood all of the user directions contained in this guide, and the product safety information contained in the *Q9 ASD Installation and Operation Manual*. Equipment warning labels provide useful information and indicate an imminently hazardous situation that may result in serious injury, severe property and equipment damage, or loss of life if safe procedures are not followed. Installation and operation shall be performed by qualified personnel only.

TOSHIBA
Leading Innovation

Q9 ASD

TOSHIBA

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Simple Start Guide

Q9 ASD Simple Start Guide

1. Receipt & Identification

Q9 ASD Nameplate

TRANSISTOR INVERTER VT130Q9U4025		
	INPUT	OUTPUT
U (V-)	3PH 380/480	3PH 380/480
F (Hz)	50/60	0/500
I (A)	5.1	3.6 (CF 4 kHz)

Inspect the equipment for damage that may have occurred during shipping.

DO NOT install or energize equipment that has been damaged.

Ensure that the rated capacity and model number on the nameplate conform to order specifications.

Use proper lifting techniques when moving the Q9 ASD.

Contact your Toshiba Sales Representative to report discrepancies or for assistance if required.

2. Mounting

Only qualified personnel should install this equipment.

The installation of the equipment should conform to the 2008 National Electrical Code (NEC) Article 110, OSHA, as well as any other applicable national, regional, or industry codes and standards.

Installation practices shall conform to the latest revision of the NFPA 70E Electrical Safety Requirements for Employee Workplace.

It is the responsibility of the Q9 ASD installer/maintenance personnel to ensure that the ASD is installed in an enclosure that will protect personnel against electric shock.

Location

Select a mounting location that is easily accessible and has adequate working space. Proper illumination is required for making inspections, adjustments, and performing equipment maintenance.

DO NOT mount the Q9 ASD in a location that would produce catastrophic results if it were to fall from its mounting location (equipment damage and/or injury to personnel).

Avoid installation in direct sunlight or in areas where vibration, heat, humidity, dust, fibers, metal particles, explosive/corrosive mists or gases, sources of electrical noise are present, or where it would be exposed to harmful liquids, solvents, or other fluids.

Temperature

The ambient operating temperature rating is 14° to 104° F (-10° to 40° C).

Ventilation

Install the ASD in an upright position and in a well-ventilated area.

When installing adjacent ASDs horizontally, Toshiba recommends at least 5 cm of space between ASDs. However, if the top cover is removed from each ASD then horizontally-mounted ASDs may be installed side-by-side with no space in between the adjacent ASDs.

For 230-volt ASDs, a minimum of 10 cm of space is required above and below adjacent ASDs and any obstruction. For 460-volt ASDs, this value is increased to 30 cm.

Lead Length

The table below lists the recommended maximum lead lengths for the listed motor voltages. Lead lengths from the ASD to the motor in excess of those listed below may require filters to be added to the output of the ASD. Excessive lead lengths may adversely affect the performance of the motor. Exceeding the peak voltage rating or the allowable thermal rise time of the motor insulation will reduce the life expectancy of the motor.

Contact the Toshiba Customer Support Center for application assistance when using lead lengths in excess of those listed.

Lead Length Specifications

Model	PWM Carrier Frequency	NEMA MG1 Part 31 Compliant Motors[2]	NEMA MG1 Part 30 Compliant Motors[2]
230-Volt	All	1000 feet	450 feet
460-Volt	≤ 5 kHz	600 feet	200 feet
	> 5 kHz	300 feet	100 feet

For enclosure dimensions, mounting hole dimensions, current/voltage specifications, and cable/terminal specifications consult the *Q9 ASD Quick Start Guide*.

3. Connectivity

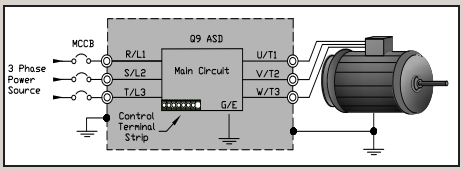
DANGER

Contact With Energized Wiring Will Cause Severe Injury Or Loss Of Life.

When using an ASD output disconnect, the ASD and the motor **MUST** be stopped before the disconnect is either opened or closed. Closing the output disconnect while the 3-phase output of the ASD is active may result in equipment damage or injury to personnel.

De-energize and lockout/tagout the main power, control power, and instrumentation connections before connecting or disconnecting the power wiring to the equipment or opening the enclosure door.

3-Phase Input/Output Connections



Connect the 3-phase input power to the ASD to terminals **R/L1**, **S/L2**, and **T/L3**. Connect the 3-phase output power from terminals **U/T1**, **V/T2**, and **W/T3** to the motor. Ensure that all wiring is performed in accordance with national, state, and local electrical codes.

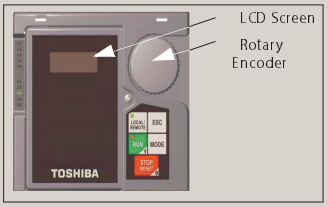
Install a circuit disconnecting device and branch circuit protection in accordance with the fault current settings of the ASD and the 2008 NEC Article 430.

Before turning on the ASD ensure that:

The enclosure door is closed or reattached, and secure. Terminals **R/L1**, **S/L2**, and **T/L3** are connected to the input power and terminals **U/T1**, **V/T2**, and **W/T3** are connected to the motor. The 3-phase input voltage is as specified and there are no shorts and all grounds are secure.

4. Programming

Electronic Operator Interface

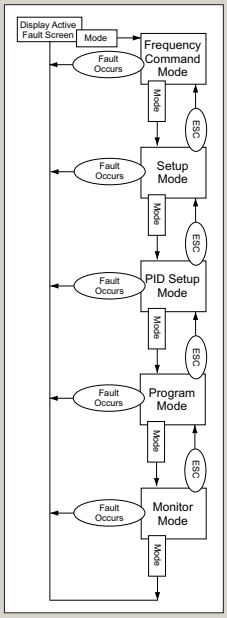


The operating parameters displayed on the LCD screen may be viewed, or selected and changed using the **Electronic Operator Interface** (EOI). To change a setting turn the **Rotary Encoder** to highlight the desired **Primary Menu** item (repeat for **Sub Menu** items as required). Select the item to be changed and press the **Rotary Encoder** to enter the **Edit** mode (dark background/light text) — the encoder acts as the enter key. Set the parameter to the new value. To exit the setting without saving the change press the **ESC** key while the parameter is in the **Edit** mode. To accept the change press the **Rotary Encoder**.

Menu Options

The **Mode** key accesses the five primary modes of the Q9 ASD: The **Frequency Command** mode, the **Setup** mode, the **PID Setup** mode, the **Program** mode, and the **Monitor** mode. From either mode, press the **Mode** key to loop through to the other four modes. Press the **ESC** key from any mode to return to the previous mode until reaching the **Frequency Command** mode. Further **ESC** entries are ignored.

The **Alarm** or **Fault** information will be displayed in the event of an active **Alarm** or **Fault**. Alarm text will be displayed on the **Frequency Command** screen when active. **Fault** information will be displayed via a **Fault** screen. See the *Q9 ASD Installation and Operation Manual* for additional information on Alarms and Faults.



Direct Access to Parameters

The Q9 ASD has the ability to allow the user direct access to the motor control functions. There are two ways in which the motor monitoring/control parameters may be accessed for modification: each parameter may be viewed, or selected and changed via Program ⇒ **Applicable Menu Path** or by entering the parameter number of the setting at the **Direct Access Menu** via Program ⇒ Direct Access ⇒ **Applicable Parameter Number**.

Programming (Continued)

Discrete Terminal Settings

The default terminal settings may be changed by entering the **Direct Access Number** of the parameter or via the **Program** Menu.

The discrete terminal may be programmed to any of the functions listed in the *Q9 ASD Installation and Operation Manual*.

For a complete listing of discrete and analog inputs/outputs, see the *Q9 ASD Installation and Operation Manual*.

Discrete Terminal Names

Direct Access Number	Terminal	Default (Where Programmable)
F114	RES	Reset
F111	F	Forward Run
F112	R	Reverse Run
F115	S1	Fire Speed N.O.
F116	S2	Preset Speed 2
F117	S3	Damper Feedback N.O.
F118	S4	EOFF N.O.
F113	ST	Standby
—	FP	Frequency Pulse
—	+SU	References CC
—	CC	Control Common

Changed Parameters (Search)

A listing of all parameters that have been changed from the factory default settings may be viewed sequentially by accessing the **Search** screen via Program ⇒ **Search**.

From the **Search** screen, press the **Rotary Encoder** to start the **Search** function. Once started, the system automatically scrolls through all of the system parameters and halts once reaching a changed parameter. Press the **Mode** key when finished searching or when halted at a changed parameter to return the system to the primary menu.

Command Mode

The **Command** mode selection establishes the primary source of the command input for the ASD. The source of the Command control signal must be established for normal operation. The source of the Command control signal may be selected by the F003 setting, placing the EOI in the **Local** mode, or placing an item from the list below in the Override mode via communications.

Possible Command signal source selections include the following:

- Terminal Block (Default)
- Panel Keypad Option
- RS485 (2-Wire)
- RS485 (4-Wire)
- Communication Option Board

Command Mode Screen

F003
Terminal Block

Frequency Mode

The **Frequency Mode 1** setting establishes the user-selected source of the frequency-control input for the ASD. The source of the Frequency control signal must be established for normal operation.The source of the Frequency control signal may be selected by the F004 setting, placing the EOI in the **Local** mode, or placing an item from the list below in the **Override** mode via communications.

The signal source selected here is used for speed control unless the **Reference Priority Selection** parameters are configured to switch this setting automatically or if the **Override** feature is enabled.

Possible Command signal source selections include the following:

- V/I
- RR
- RX
- Panel Keypad Option
- RS485 (2-Wire)
- RS485 (4-Wire)
- Communication Option Board

Frequency Mode Screen

F004
RR

Command and Frequency control may be carried out using any one of several control methods or combinations thereof. In the event that multiple control commands are received, the signal sources are assigned priority levels.

For additional information on **Command** mode and **Frequency** mode control, and **Override** operation, consult the *Q9 ASD Installation and Operation Manual*.

5. Run

Local

The **Local** mode allows the **Command** and **Frequency** control functions to be carried out via the **EOI**.

To run the motor perform the following:

1. Press the **Mode** key until the **Frequency Command** screen is displayed.
2. Press the **Local/Remote** key to enter the **Local** mode (green LED illuminates).
3. Turn the **Rotary Encoder** until the desired **Frequency Command** value is displayed.
4. Press the **Run** key and the motor will run at the **Frequency Command** value (while running the **Run** LED will illuminate red). Press the **Stop/Reset** to stop the motor.

Remote

The **Remote** mode allows control of the ASD via the **Command** mode (F003) and the **Frequency** mode (F004).

The **Terminal Board** is used in the following example to show **Remote** mode operation:

To run the motor perform the following.

1. Press the **Mode** key until the **PID Setup** screen is displayed.
2. Select PID Setup ⇒ Command Mode ⇒ **Terminal Block**.
3. Select PID Setup ⇒ Frequency Mode 1 ⇒ **RR**.
4. Select Program ⇒ **Input Terminals** to verify the following discrete terminal assignments:
   - **F111** — F (Forward Run)
   - **F112** — R (Reverse Run)
   - **F113** — ST (Standby)
   - **F114** — RES (Reset)
5. Activate the **ST** terminal and provide a **Run** command.
6. Apply a positive voltage across **RR** and **CC**.

For complete instructions on the **Command** and **Frequency** control functions consult the *Q9 ASD Installation and Operation Manual*.

PID Setup

The **PID Setup** (Proportional-Integral-Derivative) mode is comprised of parameter settings that are specific to the **PID** operating mode.

PID is a closed-loop control technique that seeks error minimization by reacting to three values: one that is proportional to the error, one that is representative of the error, and one that is representative of the rate of change of the error. It is used to correct for differences between the measure process variable and the desired setpoint.

In the setup example below, the transducer providing the system feedback is powered by P24 of the ASD.

To set up a PID loop perform the following:

1. Program a **RUN** command (see section 5).
2. Connect the 2-wire transducer to terminals **P24** and **V/I**.
3. Connect a jumper between the **CC** and **IICC** to make the **V/I** terminal non-isolated.
4. Use **F201-F204** to scale the **V/I** analog input. Ensure that for a 4-20 mA signal, **F201** is set to 20. All other scaling parameters should be set to the default values.
5. Ensure the **F359** is **Enabled** (setting 1). This enables Process PID.
6. Ensure that for a 4-20 mA signal, that **F360** is set to **V/I** (selection 1).
7. Ensure that the **Frequency Command** is set to **Panel Keypad** (selection 4). This will be the source of the set point.
8. Calculate the desired set point using the formula below.

Formula: $\dfrac{\text{Desired Setpoint Units}}{(\text{Units at 20 mA}) - (\text{Units at 4 mA})}$ X Upper Limit = Setpoint

Example: $\dfrac{60\ \text{PSI}}{(300\ \text{PSI}) - (0\ \text{PSI})}$ X 60 Hz = 12 Hz

A set point of 12 Hz would be set for the Frequency Command

9. Press the **ESC** key until the **Frequency Command** screen is displayed.
10. Use the **Rotary Encoder** to scroll until the LCD displays the desired set point.

See the **PID Setup Parameters** on the next page for additional programming parameters.

Q9 ASD Simple Start Guide

PID Setup (Continued)

The **PID Setup** quick-access items are listed below.

PID Setup Parameters

PID Setup Parameter	Direct Access Number	PID Setup Parameter	Direct Access Number
Command Mode	F003	PID Feedback Delay Filter	F361
Frequency Mode	F004	PID Feedback Proportional (P) Gain	F362
Acceleration Time 1	F009	PID Feedback Integral (I) Gain	F363
Deceleration Time 1	F010	PID Deviation Upper-Limit	F364
Upper-Limit Frequency	F012	PID Deviation Lower-Limit	F365
Lower-Limit Frequency	F013	PID Feedback Differential (D) Gain	F366
V/I Reference 1	F201	Process Upper-Limit	F367
V/I Frequency 1	F202	Process Lower-Limit	F368
V/I Reference 2	F203	PID Control Wait Time	F369
V/I Frequency 2	F204	PID Output Upper-Limit	F370
Low Output Disable Time	F256	PID Output Lower-Limit	F371
PID Control Switching	F359	Process Increasing Rate	F372
PID Feedback Selection	F360	Process Decreasing Rate	F373

Communications

For safety and application-specific reasons, some ASD installations will warrant that the operator not be in the vicinity during operation or that the ASD control be executed remotely.

Prior to installation, ensure that the ASD has CPU version 340 or higher (Program ⇒ Utility Group ⇒ CPU Version). Contact the Toshiba Customer Support Center for application assistance if required.

BACnet® Option

The **BACnet®** communication card is an option unit that is mounted internal to the ASD and is used to facilitate communication with the host via the BACnet® MS/TP network.

Using the **BACnet®** communication card, the ASD may be monitored and controlled remotely.

To operate the ASD with the optional communication card, perform the following:

1. Program the **Command Mode** (F003) and **Frequency Mode 1** (F004) settings to **Communication Option Board**.
2. Locate the **DIP** switch on the circuit board and program the MAC address. The MAC address must be unique — to operate properly, the address cannot match any other address on the network. The **DIP** switch is on once it has been flipped to the lower position.
3. Ensure that the **Network Baudrate** (F831) setting is set to the factory default setting (0000).
4. Ensure that the **Station Address Monitor** (F853) setting (read-only) coincides with the previously programmed MAC address.
5. Calculate and program the **Instance Number** (F833) setting using the formula below.

$$\textbf{Formula:}\quad \frac{\text{Instance Number} - \text{F834}}{1000} = \text{F833}$$

6. Program the **Instance Number** (F834) setting — to operate properly, the setting cannot match any other address on the network.
7. Program the **Max Master** (F835) setting — to operate properly, the setting must be greater than or equal to the total number of network devices present.

The green LED indicates that communication has been established between the **BACnet®** network and the option card. If the **BACnet®** communication card is programmed improperly, the 2.2 LED located on the left side of the option board will be flashing red.

For additional information on the **BACnet®** Option, consult the *BACnet® Option Instruction Manual*.

Communications (Continued)

Metasys® N2 Option

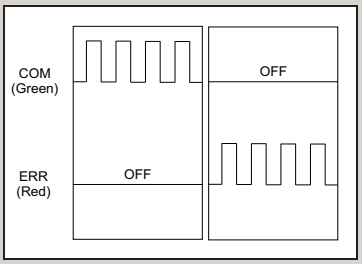
The **Metasys® N2** communication card is an option unit that is mounted internal to the ASD and is used to facilitate communication with the host via the **Metasys® N2** network.

Using the **Metasys® N2** communication card, the Q9 ASD may be monitored and controlled remotely.

To operate the ASD with the optional communication card, perform the following:

1. Program the **Command Mode** (F003) and **Frequency Mode 1** (F004) settings to **Communication Option Board**.
2. Locate the **DIP** switch on the circuit board and program the MAC address. The MAC address must be unique — to operate properly, the address cannot match any other address on the network. he **DIP** switch is on once it has been flipped to the lower position.
3. Ensure that the **Network Baudrate** (F831) setting is set to the factory default setting (9600 bps).
4. Ensure that the **Station Address Monitor** (F853) setting (read-only) coincides with the previously programmed MAC address.

LED Indicator



The **Metasys® N2** communication card has two LEDs; the **COM** LED and the **ERR** LED. If the communication card is programmed properly, the **COM** LED located on the left side of the option board will be flashing green. If the **Metasys® N2** communication card is programmed improperly, the **ERR** LED located on the left side of the option board will be flashing red.

For additional information on the **Metasys® N2** Option, consult the *Metasys® N2 Option Instruction Manual*.

Power

Cycle the power to the Q9 ASD after making changes to any of the communication parameters listed in the applicable instruction manual — once the power is cycled, any changes are saved.

If the ASD fails to communicate after properly programming the required parameters and cycling the power to the ASD, contact the Toshiba Customer Support Center for additional assistance.

Additional Information

Factory Default

Parameter settings may be returned to factory default values via the **Type Reset** menu, Program ⇒ Utility Group ⇒ Type Reset ⇒ **Reset to Factory Settings.**

A listing of all parameters that have been changed from the factory default settings may be viewed sequentially via the **Search** menu, Program ⇒ **Search.** Press the Rotary Encoder to start the **Search** function. The system automatically scrolls through all of the system parameters and halts once reaching a changed parameter.

Once stopped at a changed parameter, use the **Rotary Encoder** to scroll either forward or reverse. Press the **Rotary Encoder** to enter the **Edit** mode (parameter title flashes). Turn the **Rotary Encoder** to change the setting. Press the **Mode** key to exit the **Search** function without saving the change, or press the **Rotary Encoder** to accept and save the new setting.

Save User Settings

A profile of an existing setup may be saved and re-applied when required by using the **Save User Settings** feature. This function is carried out via Program ⇒ Utility Group ⇒ Type Reset ⇒ **Save User Settings**. With the initial setup saved, troubleshooting and diagnostics may be performed and the starting setup may be re-applied via Program ⇒ Utility Group ⇒ Type Reset ⇒ **Restore User Settings**.

For a more in-depth description of the many features of the Q9 ASD discussed in this guide, consult the *Q9 ASD Installation and Operation Manual*.

The Customer Support Center is open from 8 a.m. – 5 p.m. (CST), Monday – Friday. The Center's toll free number is (800) 231-1412. For after-hours support follow the directions in the outgoing message when calling.