



GX7R ASD
INSTALLATION & OPERATION MANUAL



GX7R ASD

Installation & Operation Manual

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Introduction

Congratulations on the purchase of the **GX7R Active Front End Adjustable Speed Drive!**

The **GX7R Active Front End Adjustable Speed Drive (ASD)** is a configurable solid-state AC drive that features Toshiba International Corporation's (TIC) **Vector Control** algorithm and the **Regeneration** capability.

The Regeneration capability comes into play when the motor slip is positive and the torque is negative (i.e., decelerating load or overhauling load). The properly configured ASD converts the energy produced by the negative torque of the load into 3-phase AC energy that is returned to the municipal supplier automatically.

The active front end of the **GX7R ASD** is required to support the Regeneration function and significantly contributes to the mitigation of harmonic distortion and an increased power factor.

The **GX7R ASD** is a very powerful tool, yet surprisingly simple to operate. The user-friendly **Electronic Operator Interface (EOI)** of the GX7R ASD has an easy-to-read LCD screen. The EOI provides easy access to the many monitoring and programming features of the GX7R ASD.

The **GX7R ASD** uses digitally-controlled pulse width modulation (PWM). The programmable PWM functions may be accessed via the easy-to-use menu or via the **Direct Access Numbers** (see [pg. 78](#)).

This feature, combined with Toshiba's high-performance software, delivers unparalleled motor control and reliability.

To maximize the abilities of your **GX7R ASD**, a working familiarity with this manual will be required.

This manual has been prepared for the GX7R ASD installer, user, and maintenance personnel. This manual may also be used as a reference guide or for training. With this in mind, use this manual to develop a system familiarity before attempting to install, operate, or perform any maintenance on the device.

Important Notice

The instructions contained in this manual are not intended to cover all details or variations in equipment types nor may it provide for every possible contingency concerning the installation, operations, or maintenance of this equipment. Should additional information be required, contact your Toshiba [Customer Support Center](#).

The contents of this manual shall not become a part of or modify any prior or existing agreement, commitment, or relationship. The sales contract contains the entire obligation of Toshiba International Corporation. The warranty contained in the contract between the parties is the sole warranty of Toshiba International Corporation and any statements contained herein do not create new warranties or modify the existing warranty.

Any electrical or mechanical modifications to this equipment without the prior written consent of Toshiba International Corporation may void all warranties and may void other safety certifications. Unauthorized modifications may also result in a safety hazard or equipment damage.

Misuse of this equipment could result in injury and equipment damage. In no event will Toshiba International Corporation be responsible or liable for direct, indirect, special, or consequential damage or injury that may result from the misuse of this equipment.

About This Manual

This manual was written by the Toshiba International Corporation Technical Publications Group. This group is tasked with providing technical documentation for the **GX7R Active Front End Adjustable Speed Drive**. Every effort has been made to provide accurate and concise information to you, our customer.

At Toshiba International Corporation we are continuously striving for better ways to meet the constantly changing needs of our customers. E-mail your comments, questions, or concerns about this publication to Technical-Publications-Dept@tic.toshiba.com.

Purpose and Scope of Manual

This manual provides information on how to safely install, operate, maintain, and dispose of your **GX7R Active Front End Adjustable Speed Drive**. The information provided in this manual is applicable to the **GX7R Active Front End Adjustable Speed Drive** only.

This manual provides information on the various features and functions of this powerful cost-saving device, including

- Installation,
- System operation,
- Configuration and menu options, and
- Mechanical and electrical specifications.

Included is a section on general safety instructions that describe the warning labels and symbols that are used on the device and throughout the manual. Read the manual completely before installing, operating, performing maintenance, or disposing of this equipment.

This manual and the accompanying drawings are a permanent part of the equipment and should be readily available for reference and review. Dimensions shown in the manual are in imperial units and/or the metric equivalent. Connection drawings within this document convey the typical connectivity of the GX7R ASD system and do not include every possible connection variation. See the drawings received with the system for typeform- and application-specific applicables.

Because of our commitment to continuous improvement, Toshiba International Corporation reserves the right, without prior notice, to update information, make product changes, or to discontinue any product or service identified in this publication.

Toshiba International Corporation (TIC) shall not be liable for direct, indirect, special, or consequential damages resulting from the use of the information contained within this manual.

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Contacting TIC's Customer Support Center

Toshiba International Corporation's Customer Support Center can be contacted to obtain help in resolving any Adjustable Speed Drive system problem that you may experience or to provide application information.

The Support Center is open from 8 a.m. to 5 p.m. (CST), Monday through Friday. The Center's toll free number is US (800) 231-1412/Fax (713) 937-9349 CAN (800) 872-2192 MEX 01 (800) 527-1204.

For after-hours support follow the directions of the outgoing message when calling.

You may also contact Toshiba International Corporation by writing to:

Toshiba International Corporation
13131 West Little York Road
Houston, Texas 77041-9990
Attn: ASD Product Manager.

For further information on Toshiba International Corporation's products and services, please visit our website at www.toshiba.com/tic/.

TOSHIBA INTERNATIONAL CORPORATION

GX7R Active Front End Adjustable Speed Drive

Please complete the Warranty Card supplied with the **GX7R ASD** and return it to Toshiba International Corporation by prepaid mail. This will activate the 12-month warranty from the date of installation; but, shall not exceed 18 months from the shipping date.

Complete the following information and retain for your records.

Model Number: _____

Serial Number: _____

Project Number (if applicable): _____

Date of Installation: _____

Inspected By: _____

Name of Application: _____

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General Safety Information

DO NOT attempt to install, operate, maintain, or dispose of this equipment until you have read and understood all of the product safety information and directions that are contained in this manual.

Safety Alert Symbol

The **Safety Alert Symbol** is comprised of an equilateral triangle enclosing an exclamation mark. This indicates that a potential personal injury hazard exists.



Signal Words

Listed below are the signal words that are used throughout this manual followed by their descriptions and associated symbols. When the words **DANGER**, **WARNING**, and **CAUTION** are used in this manual, they will be followed by important safety information that must be carefully followed.

The word **DANGER** preceded by the safety alert symbol indicates that an imminently hazardous situation exists that, if not avoided or if instructions are not followed precisely, will result in serious injury to personnel or loss of life.



DANGER

The word **WARNING** preceded by the safety alert symbol indicates that a potentially hazardous situation exists that, if not avoided or if instructions are not followed precisely, could result in serious injury to personnel or loss of life.



WARNING

The word **CAUTION** preceded by the safety alert symbol indicates that a potentially hazardous situation exists that, if not avoided or if instructions are not followed precisely, may result in minor or moderate injury.



CAUTION

The word **CAUTION** without the safety alert symbol indicates a potentially hazardous situation exists that, if not avoided or if instructions are not followed precisely, may result in equipment and property damage.

CAUTION

Special Symbols

To identify special hazards, other symbols may appear in conjunction with the **DANGER**, **WARNING**, and **CAUTION** signal words. These symbols indicate areas that require special and/or strict adherence to the procedures to prevent serious injury to personnel or loss of life.

Electrical Hazard Symbol

A symbol that is comprised of an equilateral triangle enclosing a lightning bolt indicates a hazard of injury from electrical shock or burn.



Explosion Hazard Symbol

A symbol that is comprised of an equilateral triangle enclosing an explosion indicates a hazard of injury from exploding parts.



Equipment Warning Labels

DO NOT attempt to install, operate, perform maintenance, or dispose of this equipment until you have read and understood all of the product labels and user directions that are contained in this manual.

Warning labels that are attached to the equipment will include the exclamation mark within a triangle.

DO NOT remove or cover any of these labels. If the labels are damaged or if additional labels are required, contact the Toshiba [Customer Support Center](#).

Labels attached to the equipment are there to provide useful information or to indicate an imminently hazardous situation that may result in serious injury, severe property and equipment damage, or loss of life if safe procedures or methods are not followed as outlined in this manual.

Qualified Personnel

Installation, operation, and maintenance shall be performed by **Qualified Personnel Only**. A Qualified Person is one that has the skills and knowledge relating to the construction, installation, operation, and maintenance of the electrical equipment and has received safety training on the hazards involved (Refer to the latest edition of NFPA 70E for additional safety requirements).

Qualified Personnel shall:

- Have carefully read the entire manual.
- Be familiar with the construction and function of the ASD, the equipment being driven, and the hazards involved.
- Be able to recognize and properly address hazards associated with the application of motor-driven equipment.
- Be trained and authorized to safely energize, de-energize, ground, lock-out/tag-out circuits and equipment, and clear faults in accordance with established safety practices.
- Be trained in the proper care and use of protective equipment such as safety shoes, rubber gloves, hard hats, safety glasses, face shields, flash clothing, etc., in accordance with established safety practices.

For further information on workplace safety, visit www.osha.gov.

Equipment Inspection

- Upon receipt of the equipment, inspect the packaging and equipment for shipping damage.
- Carefully unpack the equipment and check for parts that may have been damaged during shipping, missing parts, or concealed damage. If any discrepancies are discovered, it should be noted with the carrier prior to accepting the shipment, if possible. File a claim with the carrier if necessary and immediately notify the Toshiba [Customer Support Center](#).
- **DO NOT** install the ASD if it is damaged or if it is missing any component(s).
- Ensure that the rated capacity and the model number specified on the nameplate conform to the order specifications.
- Modification of this equipment is dangerous and is to be performed by factory trained personnel **ONLY**. When modifications are required contact the Toshiba Customer Support Center.
- Inspections may be required after moving equipment.
- Contact the Toshiba Customer Support Center to report discrepancies or for assistance if required.

Handling and Storage

- Use proper lifting techniques when moving the ASD; including properly sizing up the load, getting assistance, and using a forklift if required.
- Store in a well-ventilated location and preferably in the original packaging if the equipment will not be used upon receipt.
- The storage temperature range of the **GX7R ASD** is -14° to 104° F (-10° to 40° C).
- Store in an upright position.

Disposal

Never dispose of electrical components via incineration. Contact your state environmental agency for details on disposal of electrical components and packaging in your area.

Installation Precautions

Location and Ambient Requirements

- The TIC ASD is intended for permanent installations only.
- Installation shall conform to the **National Electrical Code (NEC) — Article 110** (*Requirements For Electrical Installations*), all regulations of the **Occupational Safety and Health Administration**, and any other applicable national, regional, or industry codes and standards.

Note: For ALL references to the National Electrical Code (NEC), see the latest release of the National Electrical Code.

- Select a mounting location that is easily accessible, has adequate personnel working space, and adequate illumination for adjustment, inspection, and maintenance of the equipment (refer to the NEC Article 110-13).
- **DO NOT** mount the ASD in a location that would produce catastrophic results if it were to become dislodged from its mounting location (equipment damage or injury).
- **DO NOT** mount the ASD in a location that would allow it to be exposed to flammable chemicals or gases, water, solvents, explosive/corrosive mists or gases, or other fluids.
- Avoid installation in areas where vibration, heat, humidity, dust, fibers, metal particles, or sources of electrical noise are present.
- Allow proper clearance spaces for installation. Do not obstruct the ventilation openings. Refer to the section titled [Installation and Connections on pg. 14](#) for further information on ventilation requirements.
- The ambient operating temperature range of the **GX7R ASD** is 14° to 104° F (-10° to 40° C).

Note: Derate the applicable rating by one percent for each degree Celsius above the rated thermal operating capacity.

Mounting Requirements

- Only **Qualified Personnel** shall install this equipment.
- Unit is to be securely installed on the floor in an upright position in a well-ventilated area.
- As a minimum, the installation of the equipment shall conform to the **NEC — Article 110** (NEC), OSHA, as well as any other applicable national, regional, or industry codes and standards.
- Installation practices shall conform to the latest revision of NFPA 70E Electrical Safety Requirements for Employee Workplaces.

Conductor Routing and Grounding Precautions



- Use separate metal conduits for routing the input power, output power, and control circuits.
- A separate ground cable shall be run inside the conduit with the input power, output power, and control circuits.
- **DO NOT** connect **CC** to earth ground.
- Use the **CC** terminal as the return for analog input terminals **VI**, **RX**, and **RR**.
- Use the **CC** terminal as the return for output terminals **FP**, **PP**, and **P24**.
- Use the negative terminal of the **AM**, **FM**, and **II** terminals as the return for these analog I/O signals.
- Always ground the unit to prevent electrical shock and to help reduce electrical noise.
- It is the responsibility of the ASD installer/maintenance personnel to provide proper grounding and branch circuit protection in accordance with the **NEC** and any applicable local codes.

Neither Metal Conduit Nor Building Beams Are Acceptable Grounds.

Power Connections Precautions



CONTACT WITH ENERGIZED WIRING WILL CAUSE SEVERE INJURY OR LOSS OF LIFE.

- Turn off and lock-out/tag-out all power sources before connecting the power wiring to the equipment.
- Ensure that all power sources are turned off and isolated in accordance with established lock-out/tag-out procedures before connecting the 3-phase power source wiring to the ASD input terminals and connect the ASD output terminals to a motor of the correct voltage and type for the application (refer to the **NEC** Article 300 – Wiring Methods and Article 310 – Conductors For General Wiring). Size the branch circuit conductors in accordance with the **NEC** Table 310.16.
- Ensure that the 3-phase input power is **NOT** connected to the output of the ASD. This will damage the ASD and may cause injury to personnel.
- If multiple conductors are used in parallel for the input or output power, each parallel set shall have its own conduit and not share its conduit with other parallel sets (i.e., place **U1**, **V1**, **W1**, and a ground wire in one conduit and **U2**, **V2**, **W2** and a ground wire in another; refer to the **NEC** Article 300.20 and Article 310.4). National and local electrical codes shall be referenced if three or more power conductors are run in the same conduit (refer to the **NEC** Article 310 adjustment factors).

Note: *National and local codes shall be referenced when running more than three conductors in the same conduit.*

- Under no circumstances in a multiple ASD or multiple motor system configuration shall the input power or output power cables of the system ASDs or motors be routed within a shared conduit. Each ASD and each motor shall have its own conduit for input power and output power cable routing.
- Ensure that the phase sequence connection for the device is C-B-A.
- Ensure the correct direction of motor rotation in the **Bypass** mode (if applicable).
- The GX7R ASD is designed to operate on utility power **ONLY**.
- **DO NOT CONNECT THE GX7R ASD 3-PHASE INPUT TO A GENERATOR.**

Protection

- Ensure that primary protection exists for the input wiring to the equipment. This protection must be able to interrupt the fault current from the power line. The equipment may or may not be equipped with an input disconnect (option).
- All cable entry openings must be sealed to reduce the risk of entry by vermin and to allow for maximum cooling efficiency.
- If the ASD is supplied with a motor as a package, it then becomes a machine and has to meet the Essential Health and Safety Requirements of the EU Machinery Directive, 2006/42/EC. It is also a requirement that the system have an **Emergency Off** function that meets the requirements of EN ISO 13850:2008, and that any local or regional requirements must be met.
- It is the responsibility of the ASD installer/maintenance personnel to set up the **Emergency Off** braking system of the ASD. The function of the **Emergency Off** braking function is to remove output power from the ASD in the event of an emergency. A supplemental braking system may also be engaged in the event of an emergency. For further information on braking systems, see parameters [F250](#), [F304](#), and [F603](#).

Note: *A supplemental emergency stopping system should be used with the ASD. Emergency stopping should not be a task of the ASD alone.*

- Follow all warnings and precautions and do not exceed equipment ratings.

System Integration Precautions

The following precautions are provided as general guidelines for the setup of the ASD within the system.

- The TIC ASD is a general-purpose product. It is a system component only and the system design should take this into consideration. Please contact the Toshiba [Customer Support Center](#) for application-specific information or for training support.
- The TIC ASD is part of a larger system and the safe operation of the ASD will depend upon observing certain precautions and performing proper system integration.
- Improperly designed or improperly installed system interlocks may render the motor unable to start or stop on command.
- The failure of external or ancillary components may cause intermittent system operation (i.e., the system may start the motor without warning).
- A detailed system analysis and job safety analysis shall be performed by the systems designer and/or systems integrator before the installation of the ASD component. Contact the Toshiba Customer Support Center for options availability and for application-specific system integration information if required.

Personnel Protection

- Installation, operation, and maintenance shall be performed by [Qualified Personnel](#) **ONLY**.
- A thorough understanding of the ASD will be required before the installation, operation, or maintenance of the ASD.



- Rotating machinery and live conductors can be hazardous and shall not come into contact with personnel. Personnel shall be protected from all rotating machinery and electrical hazards at all times.
- Insulators, machine guards, and electrical safeguards may fail or be defeated by the purposeful or inadvertent actions of workers. Insulators, machine guards, and electrical safeguards are to be inspected (and tested where possible) at installation and periodically after installation for potential hazardous conditions.
- **DO NOT** allow personnel near rotating machinery. Warning signs to this effect must be clearly posted at or near the machinery/hazard.
- **DO NOT** allow personnel near electrical conductors. Contact with electrical conductors can be fatal. Warning signs to this effect must be clearly posted at or near the machinery/hazard.
- Personal Protection Equipment (PPE) shall be provided and used to protect the installer, user, maintenance personnel, and all employees from any hazards inherent to system operation.

System Setup Requirements



CAUTION

- When using the ASD as an integral part of a larger system, it is the responsibility of the ASD installer/maintenance personnel to ensure that there is a fail-safe in place (i.e., an arrangement designed to switch the system to a safe condition if there is a fault or failure).
- Power factor improvement capacitors or surge absorbers **MUST NOT** be installed on the three-phase output of the ASD.
- Use of the built-in system protective features is highly recommended (i.e., Emergency Off, Overload Protection, etc.).
- The operating controls and system status indicators shall be clearly readable and positioned where they may be viewed without obstruction.
- Additional warnings and notifications shall be posted at the equipment installation location as deemed required by [Qualified Personnel](#).
- System safety features shall be employed and designed into the integrated system in a manner such that system operation, even in the event of system failure, will not cause harm or result in system damage or injury to personnel (i.e., Emergency Off, Auto-Restart settings, System Interlocks, etc.).
- The programming setup and system configuration of the ASD may allow it to start the motor unexpectedly. A familiarity with the **Auto-Restart** and **Retry** settings is a requirement to use this product.
- The setup procedures included within this manual may require a **Reset** before performing the procedure. Application-specific settings may then be performed. The pre-Reset conditions may be saved (see [F007](#)).
- There may be thermal or physical properties, or ancillary devices integrated into the overall system that may allow for the ASD to start the motor without warning. Warning signs to this effect must be clearly posted at or near the machinery/hazard.
- If a secondary magnetic contactor (MC) or an ASD output disconnect is used between the ASD and the load, it should be interlocked to halt the ASD before the secondary contact opens. If the output contactor is used for bypass operation, it must be interlocked such that commercial power is never applied to the ASD output terminals (U, V, or W).
- 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.

Operational and Maintenance Precautions



- Turn off and lock-out/tag-out the main power, the control power, and instrumentation connections before inspecting or servicing the ASD, removing any enclosure panels, or connecting/disconnecting the power wiring to the equipment.
- If/when taking a live reading is required (equipment is powered), it is to be performed by **Qualified Personnel ONLY**. Proper and approved personal protection equipment is to be used by trained personnel for all electrical measurements.
- The capacitors of the ASD maintain a residual charge for a period of time after the ASD is powered off. The required time for each ASD typeform is indicated with a cabinet label and a **Charge Indicator LED** (see [Figure 1. on pg. 16](#)). Wait at least the minimum time indicated on the enclosure-mounted label and ensure that the **Charge Indicator LED** has gone out once the ASD power has been turned off before coming into contact with any circuits.
- Turn the power on only after attaching (or closing) the front cover. **DO NOT** open or remove the front cover or any of the enclosure panels of the ASD when the power is on.
- **DO NOT** attempt to disassemble, modify, or repair the ASD. Contact the Toshiba [Customer Support Center](#) for repair information.
- **DO NOT** place any objects inside of the ASD.
- If the ASD should emit smoke, or an unusual odor or sound, turn off the power immediately.

Note: *Heated precharge resistors produce a unique smell upon the initial commissioning of an ASD. This is normal and will subside upon the first few hours of ASD operation.*

- The heat sink and other components may become extremely hot to the touch. Allow the unit to cool before coming in contact with these items.
- The **Auto-Restart** and **Retry** programmable functions of the ASD may allow for the system to start or stop unexpectedly. Warning signs to this effect must be clearly posted at or near the machinery/hazard.
- Remove power from the ASD during extended periods of non-use.
- Inspect the system annually (as a minimum) for damaged or improperly functioning parts, cleanliness, and to ensure that the connectors are tightened securely. Inspect more frequently when operating in a harsh environment or when used on a high-output-demand application.

Motor Characteristics

Listed below are some variable speed AC motor control concepts with which the user of the **GX7R Adjustable Speed Drive** should become familiar.

Motor Autotuning

Motor production methods may cause minor differences in the motor operation. The negative effects of these differences may be minimized by using the **Autotune** feature of the **GX7R ASD**. **Autotuning** is a function of the GX7R ASD that measures several parameters of the connected motor and places these readings in a stored table. The software uses the information in the table to help optimize the response of the GX7R ASD to application-specific load and operational requirements. The **Autotuning** function may be enabled for automatic tuning, configured manually at [F400](#), or disabled.

The measured parameters include the rotor resistance, the stator resistance, the required excitation inductance, rotational inertia values, and leakage inductance values.

The GX7R ASD is also equipped with a factory-loaded table of motor parameters that fit several different types of motors. To use this function, disable **Autotune** and select a motor type at [F413](#).

Pulse Width Modulation Operation

The **GX7R ASD** uses a sinusoidal **Pulse Width Modulation** (PWM) control system. The output current waveform generated by the GX7R ASD approaches that of a perfect sine wave; however, the output waveform is slightly distorted. For this reason, the motor may produce more heat, noise, and vibration when operated by an GX7R ASD, rather than directly from commercial power.

Low Speed Operation

Operating a general-purpose motor at lower speeds may cause a decrease in the cooling ability of the motor. Reducing the torque requirement of the motor at lower speeds will decrease the generated heat at lower speeds.

When the motor is to be operated at low speed (less than 50% of full speed) and at the rated torque continuously, a TIC VF motor (designed for use in conjunction with an ASD) is recommended.

Overload Protection Adjustment

The **GX7R ASD** software monitors the output current of the system and determines when an overload condition occurs. The overload current level is a percentage of the rated system current. This function protects the motor from overload.

The default setting for the overload detection circuit is set to the maximum rated current of the GX7R ASD at the factory. This setting will have to be adjusted to match the rating of the motor with which the GX7R ASD is to be used. To change the overload reference level, see [Electronic Thermal Protection #1 on pg. 174](#).

Operation Above 60 Hz

A motor produces more noise and vibration when it is operated at frequencies above 60 Hz. Also, when operating a motor above 60 Hz, the rated limit of the motor or its bearings may be exceeded; this may void the motor warranty.

Contact the motor manufacturer for additional information before operating the motor above 60 Hz.

Power Factor Correction

DO NOT connect a power factor correction capacitor or surge absorber to the three-phase output of the **GX7R ASD**.

If the GX7R ASD is used with a motor that is equipped with a capacitor for power factor correction, remove the capacitor from the motor.

Connecting either of these devices to the output of the GX7R ASD may cause the GX7R ASD to malfunction and trip, or the output device may cause an over-current condition resulting in damage to the device or the GX7R ASD.

Light Load Conditions

When a motor is operated under a continuous light load (i.e., at a load of less than 50% of its rated capacity) or it drives a load which produces a very small amount of inertia, it may become unstable and produce abnormal vibration or trips because of an over-current condition. In such a case, the carrier frequency may be lowered to compensate for this undesirable condition (see Program ⇒ Special Control ⇒ [Carrier Frequency](#)).

Note: For proper operation, the carrier frequency must be 2.2 kHz or above except when operating in the **Constant Torque**, **Variable Torque**, or the **5-Point Setting** modes.

Note: See [F300](#) for more information on setting the carrier frequency for normal operation and for setting the carrier frequency above the derate threshold.

Motor/Load Combinations

When the **GX7R ASD** is used in combination with one of the following motors or loads, it may result in unstable operation.

- A motor with a rated capacity that exceeds the motor capacity recommended for the GX7R ASD.
- An explosion-proof motor.

When using the GX7R ASD with an explosion-proof motor or other special motor types, lower the carrier frequency to stabilize the operation. **DO NOT** set the carrier frequency below 2.2 kHz if operating the system in the vector control mode.

Note: For proper operation, the carrier frequency must be 2.2 kHz or above except when operating in the **Constant Torque**, **Variable Torque**, or the **5-Point Setting** modes.

- If the motor that is coupled to a load that has a large backlash or a reciprocating load, use one of the following methods to stabilize its operation.
 - Adjust the **S-pattern** acceleration/deceleration setting,
 - If in the **Vector** control mode, adjust the response time, or
 - Switch to the **Constant Torque** control mode.

Load-Produced Negative Torque

When the **GX7R ASD** is used with a load that produces negative torque (an overhauling load), the kinetic energy of the negative torque may result in an over-voltage or over-current condition. The generated surplus energy can be stored, used elsewhere, or sold back to the municipal supplier.

The GX7R ASD is designed to effortlessly provide the latter at a significant energy and cost saving.

The properly configured GX7R ASD returns the regenerated energy created by the overhauling load to the supplier automatically.

Note: *To enable the regeneration function, parameter **F305** must be set to **Disabled**. No further user intervention is required to use the regeneration function.*

GX7R ASD Characteristics

Over-Current Protection

Each **GX7R ASD** model is designed for a specified operating power range. The GX7R ASD will incur a trip if the design specifications are exceeded.

However, the GX7R ASD may be operated at 150% of the specified output-current range for a limited amount of time as indicated in the section titled [Voltage/Current Specifications on pg. 204](#). Also, the [Over-Current Stall Level](#) (see [F601](#)) may be adjusted to help with nuisance over-current trips.

When using the GX7R ASD for an application that controls a motor which is rated significantly less than the maximum current rating of the GX7R ASD, the over-current limit setting will have to be changed to match the application. See [Electronic Thermal Protection #1 on pg. 174](#) for further information on this ASD/motor configuration.

Do not use an ASD with a motor that has a power rating that is greater than the rated output of the ASD.

GX7R ASD Capacity

The **GX7R ASD** must not be used with a motor that has a significantly larger capacity, even if the motor is operated under a small load. An GX7R ASD being used in this way will be susceptible to a high-output peak current which may result in nuisance tripping.

Do not apply a level of input voltage to an GX7R ASD that is beyond that which the GX7R ASD is rated. The input voltage may be stepped down when required with the use of a step-down transformer or some other type of voltage reduction system.

Using Vector Control

Using **Vector Control** enables the system to produce very high torque over the entire operating range even at extremely low speeds. **Vector Control** may be used with or without feedback. However, using feedback increases the speed accuracy for applications requiring precise speed control. Enabling the **Automatic Energy Savings** further increases the efficiency of the **GX7R ASD** while maintaining its robust performance.

Vector Control is not capable of operating multiple motors connected in parallel.

See [V/f Pattern on pg. 83](#) for further information on using **Vector Control**.

Local/Remote Operation



CAUTION

While running in the **Local** mode at a non-zero speed, if the RJ45 connector is removed from the EOI, the **GX7R ASD** remains in the **Local** mode running at the last commanded speed even though the **Local** LED is off. The GX7R ASD output remains at the frequency of the **Frequency Command** field at the time of the disconnect for the duration of the disconnect.

To prevent this condition, before disconnecting the RJ45 connector, ensure that the GX7R ASD is off.

Installation and Connections

The **GX7R ASD** may be set up initially by performing a few simple configuration settings. To operate properly, the ASD must be connected to a power source. Connect the 3-phase AC input lines, **C-B-A**, to the **PB1** terminal block terminals **A**, **B**, and **C**, respectively.

The control terminals of the ASD may be used by connecting the terminals of the **Motoring Terminal Board** (P/N 48570) to the proper sensors or signal input sources (see the section titled [I/O and Control on pg. 20](#) and [Figure 5. on pg 24](#)).

***Note:** The optional **ASD-Multicom** boards may be used to expand the I/O functionality of the ASD. See the section titled [GX7R Optional Devices on pg. 206](#) for more information on the available options.*

***Note:** The **GX7R ASD** uses two control boards and two terminal boards; **Motoring** and **Regeneration**. Unless otherwise specified, the terms **Control Board** and **Terminal Board** refer to the **ASD Motoring Control** and the **ASD Motoring Terminal Boards**.*

The output terminals of the ASD (T1, T2, and T3) must be connected to the motor (see [Figure 18. on pg 32](#)).

As a minimum, the installation of the ASD shall conform to **Article 110** of the NEC, the **Occupational Safety and Health Administration** requirements, and to any other local and regional industry codes and standards.

The **Startup Wizard** assists with the initial configuration of the commonly used GX7R ASD parameters. See the section titled [Startup Wizard on pg. 39](#) for additional information on the **Startup Wizard**. The **Startup Wizard** is launched by configuring the system to start the wizard automatically upon a system restart.

Installation Notes



CAUTION

Do Not apply commercial power to the output terminals **T1**, **T2**, or **T3**.

If an output contactor is used for bypass operation, it must be interlocked such that commercial power is never applied to the output terminals of the ASD (T1, T2, or T3).

If a secondary magnetic contactor (MC) is used between the output of the ASD and the motor, it should be interlocked in series with the **ST – CC** connection such that the **ST – CC** connection is disconnected before the output contactor is opened.

Do Not open and then close a secondary magnetic contactor between the ASD and the motor unless the ASD is off and the motor is not rotating.

***Note:** Re-application of power via a secondary contact while the ASD is on or while the motor is still turning may cause ASD damage.*

Disconnect the ASD from the motor before megging or applying a bypass voltage to the motor.

When a brake-equipped motor is connected to the ASD, it is possible that the brake may not release at startup because of insufficient voltage. To avoid this, **Do Not** connect the brake or the brake contactor to the output of the ASD.

On some devices the **ST-to-CC** connection is further enhanced by the operation of the **MS1 AUX** relay circuit. The **MS1 AUX** relay circuit is normally open and closes the **ST-to-CC** connection (via ST1)

only after normal system power is available. The **MS1 AUX** relay circuit prohibits the **ST-to-CC** connection in the event that the **MS1** contactor fails to close during start up or if **MS1** opens while the ASD is running.

The ASD input voltage should remain within 10% of the specified input voltage. The frequency of the input power should be ± 2 Hz of the specified input frequency.

The ASD is designed to operate NEMA B motors. Consult with the Toshiba [Customer Support Center](#) before using the ASD for special applications such as with an explosion-proof motor or applications with a piston load.

Interface problems may occur when an ASD is used in conjunction with some types of process controllers. Signal isolation may be required to prevent controller and/or ASD malfunction (contact the Toshiba Customer Support Center or the process controller manufacturer for additional information about compatibility and signal isolation).

Use caution when setting the output frequency. Over speeding a motor decreases its ability to deliver torque and may result in damage to the motor and/or the driven equipment.

All GX7R ASDs are equipped with internal DC bus fuses. In the event that a DC bus fuse opens, the **Bus Fuse Open Indicator LED** of the **Gate Driver** board turns on (see [Figure 1. on pg 16](#)).

All GX7R ASDs are equipped with semiconductor fuses and a breaker.

Installing the ASD



Install the unit securely to the floor in a well ventilated area.

The process of converting AC to DC, and then back to AC produces heat. During normal ASD operation, up to 5% of the input energy to the ASD may be dissipated as heat.

Do Not operate the ASD with the enclosure door open or with any enclosure panels removed.

When performing maintenance **DO NOT** insert fingers into the holes of the enclosure.

Note: *Ensure that the ventilation openings are not obstructed.*

See [pg. 19](#) for system conductor routing applicables.

Connecting the ASD



Contact With 3-Phase Input/Output Terminals Or The 480-Volt Input May Cause An Electrical Shock Resulting In Injury Or Loss Of Life.

Refer to the section titled [Installation Precautions on pg. 4](#) and the section titled [Lead Length Specifications on pg. 19](#) before attempting to connect the ASD and the motor to electrical power.

Power Connections

See [Figure 18. on pg 32](#) for a system I/O connectivity schematic.

The 3-phase input lines connect to the **PB1** terminal block. The connection sequence is as indicated in [Figure 2. on pg 17](#) (input lines **C**, **B**, **A** to **PB1** terminals **A**, **B**, and **C**, respectively).

T1, **T2**, and **T3** are the output terminals of the ASD that connect to the motor.

Connect the input and output power lines of the ASD as shown in [Figure 2. on pg 17](#).

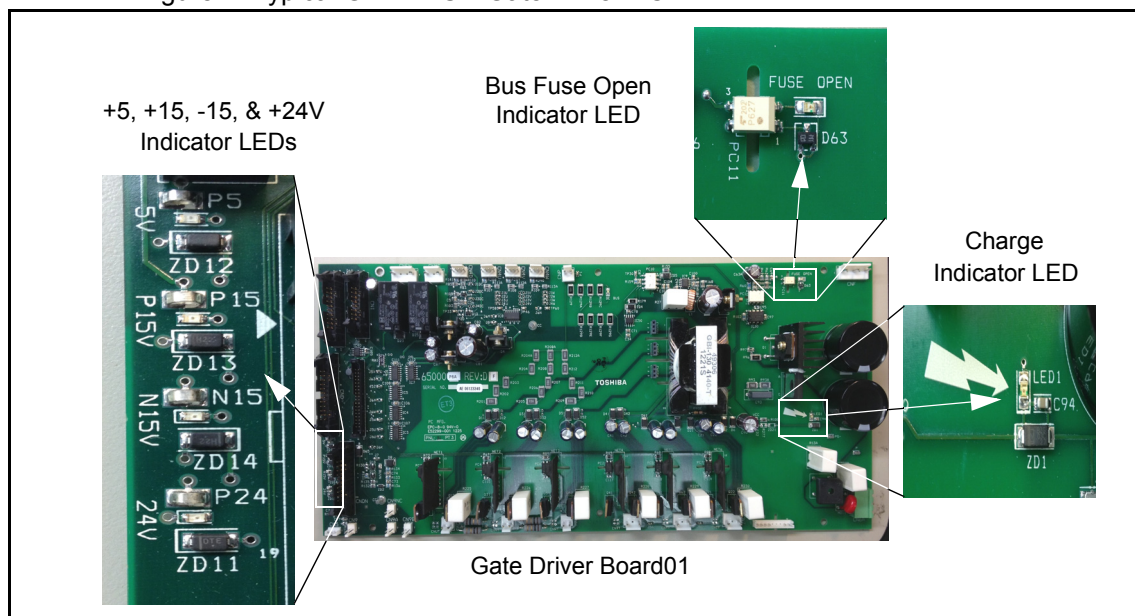
The **Charge Indicator LED** is located on the **Gate Driver Board** and provides an indication that there is a harmful voltage level present when on (see [Figure 1.](#)).

Ensure that the **Charge Indicator LED** is off before attempting to perform any maintenance on the ASD.

The **+5**, **+15**, **-15**, & **+24-Volt LEDs** are also located on the **Gate Driver Board** and are on when the proper voltages are present. The **Fuse Open Indicator LED** provides an indication that the bus fuse is open and the bus voltage is present (when on).

Caution: LED indicators are not to be used for troubleshooting.

Figure 1. Typical GX7R ASD Gate Driver PCB.



Power Connection Requirements

Connect the 3-phase input power lines of the correct voltage sequenced **C**, **B**, and **A** to the input terminals of the ASD at **PB1** terminals **A**, **B**, and **C**, respectively.

Connect the output of the ASD to the motor from the ASD terminals **T1**, **T2**, and **T3**. The input and output conductors and terminal lugs used shall be in accordance with the requirements listed in the section titled [Voltage/Current Specifications on pg. 204](#).

Install a molded case circuit breaker (MCCB) or fuse between the 3-phase power source and the ASD in accordance with the fault current setting of the ASD and the **NEC Article 430**.

The ASD is designed and tested to comply with UL Standard 508C. Modifications to the ASD system or failure to comply with the short circuit protection requirements may disqualify the UL rating.

As a minimum, the installation of the ASD shall conform to the **NEC Article 110**, the **Occupational Safety and Health Administration** requirements, and to any other local and regional industry codes and standards.

CAUTION

Note: In the event that the motor rotates in the wrong direction when powered up, reverse any two of the three ASD output power leads (*U*, *V*, or *W*) connected to the motor.

Figure 2. The GX7R ASD/Motor Typical Connection Diagram.

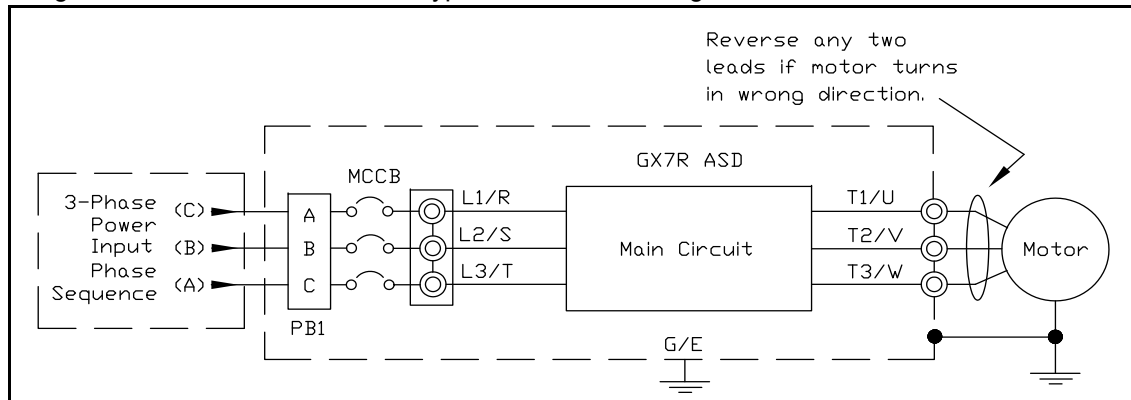
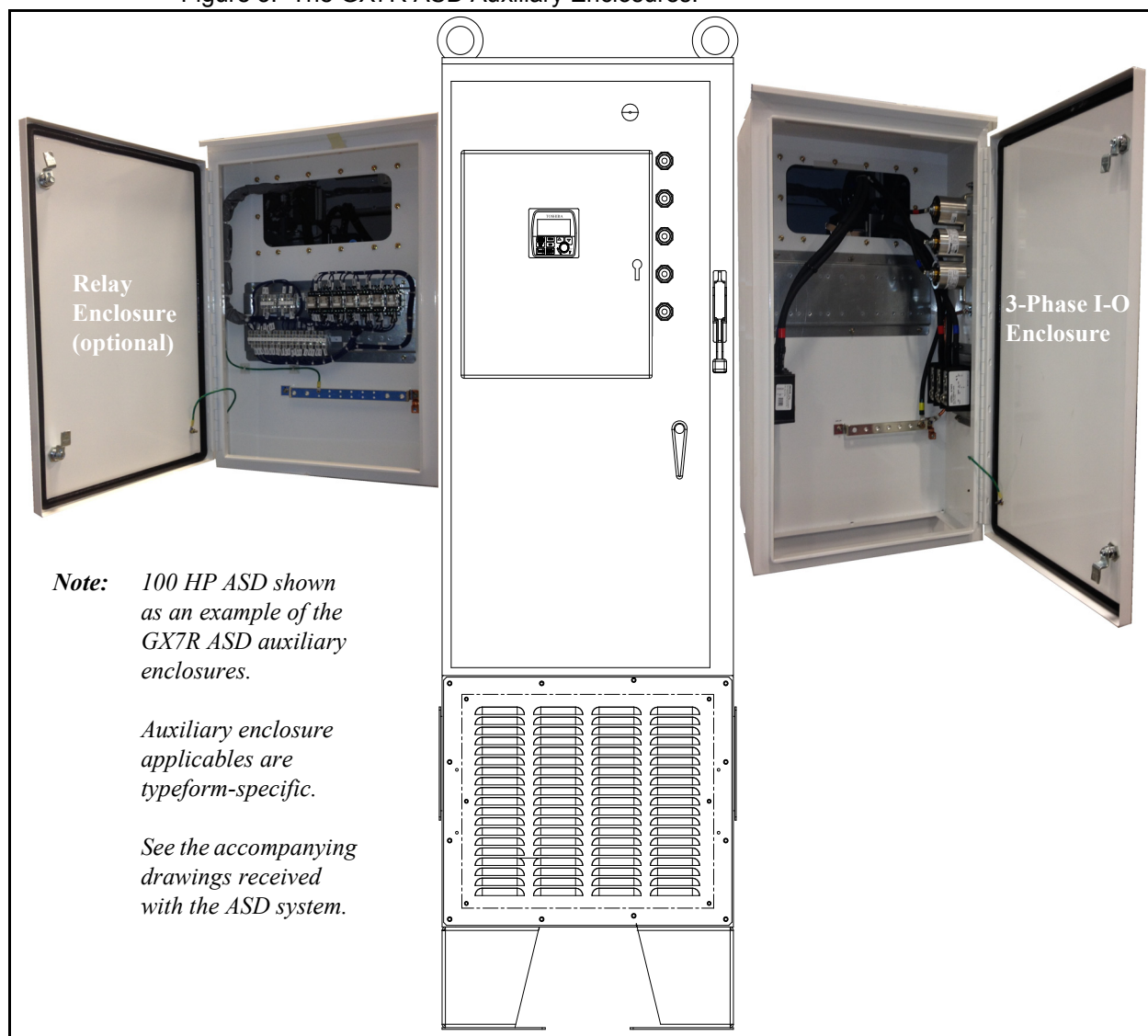


Figure 3. The GX7R ASD Auxiliary Enclosures.



System Grounding

Proper grounding helps to prevent electrical shock and to reduce electrical noise. The ASD is designed to be grounded in accordance with **Article 250** of the NEC or **Section 10/Part One** of the **Canadian Electrical Code (CEC)**.

The grounding conductor shall be sized in accordance with **Article 250-122** of the NEC or **Part One-Table 6** of the CEC.

Neither Metal Conduit Nor Building Beams Are Acceptable Grounds.

The input, output, and control lines of the system shall be run in separate metal conduits and each shall have its own ground conductor.

ASDs produce high-frequency noise — take steps to avoid the negative effects of noise. Listed below are some examples of measures that will help to combat noise problems.

- **DO NOT** install the input power and output power wires in the same duct or in parallel with each other, and do not bind them together.
- **DO NOT** install the input/output power wires and the wires of the control circuit in the same duct or in parallel with each other, and do not bind them together.
- Use shielded wires or twisted wires for the control circuits.
- Ensure that the grounding terminals (G/E) of the ASD are securely connected to ground.
- Install noise filters as required.

Lead Length Specifications

Adhere to the NEC and any local codes during the installation of ASD/Motor systems. Excessive lead lengths may adversely effect the performance of the motor. Special cables are not required. Lead lengths from the ASD to the motor in excess of those listed in [Table 1](#) may require filters to be added to the output of the ASD. [Table 1](#) lists the suggested maximum lead lengths for the listed motor voltages.

Table 1. Lead Length Specifications

AC Motor Voltage	PWM Carrier Frequency	NEMA MG1 Part 31 Compliant Motors ²	NEMA MG1 Part 30 Compliant Motors ³
460 V	≤ 5 kHz	600 ft.	200 ft.
	> 5 kHz	300 ft.	100 ft.

Note: Contact Toshiba for application assistance when using lead lengths in excess of those listed.

Exceeding the peak voltage rating or the allowable thermal rise time of the motor insulation will reduce the life expectancy of the motor.

*For proper operation, the carrier frequency must be 2.2 kHz or above except when operating in the **Constant Torque**, **Variable Torque**, or the **5-Point Setting** modes.*

I/O and Control

The GX7R ASD can be controlled by several input types and combinations thereof, as well as operate within a wide range of output frequency and voltage levels. This section discusses the ASD control methods and supported I/O functions.

The **Terminal Board** supports discrete and analog I/O functions and is shown in [Figure 5. on pg 24](#). [Table 2](#) lists the names and the default settings of the input and output terminals of the **Terminal Board**. See the section titled [Terminal Board Descriptions on pg. 21](#) for an expanded description of each terminal.

Note: Set the **Command Mode** to **Terminal Board** to use the input control lines of the **Terminal Board** for command input (Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ Terminal Board). Output lines of the **Terminal Board** need not be selected to enable the output. However, output lines may be set to a user-selected function.

[Figure 18. on pg 32](#) shows the typical connection diagram for the GX7R ASD system.

Table 2. Terminal Board Terminal Names and Functions.

Default Term. Setting	Input/Output	Default Function (also see Terminal Board Descriptions on pg. 21)	Circuit Config.
ST	Discrete Input	Standby — Multifunctional programmable discrete input. Activation required for normal ASD operation.	Figure 7. on pg 28.
RES	Connect to CC to activate (Sink mode).	Reset — Multifunctional programmable discrete input. Resets a faulted ASD.	
F		Forward — Multifunctional programmable discrete input.	
R	<i>Sink/Source Switching applies to discrete input terminals only.</i>	Reverse — Multifunctional programmable discrete input.	
S1		Preset Speed 1 — Multifunctional programmable discrete input.	
S2		Preset Speed 2 — Multifunctional programmable discrete input.	
S3		Preset Speed 3 — Multifunctional programmable discrete input.	
S4		Emergency Off — Multifunctional programmable discrete input.	
RR	Analog Input	RR — Multifunctional programmable analog input (0.0 to 10 volt input — 0 to 80 Hz output).	Figure 8. on pg 28.
RX		RX — Multifunctional programmable analog input (-10 to +10 VDC input — -80 to +80 Hz output).	Figure 9. on pg 28.
II		II — Multifunctional programmable analog input (4 [0] to 20 mADC input — 0 to 80 Hz output).	Figure 10. on pg 28
VI		VI — Multifunctional programmable analog input (0 to 10 VDC input — 0 to 80 Hz output).	
AM	Analog Output	Produces an output current that is proportional to the magnitude of the function assigned to this terminal.	Figure 15. on pg 28
FM			
OUT1 (C-A)	Switched Output	Low Frequency — Programmable contact (N.O.).	Figure 13. on pg 28
OUT2 (C-A)		Reach Frequency — Programmable contact (N.O.).	
FLA		Fault relay (N.O.).	Figure 16. on pg 28
FLB		Fault relay (N.C.).	
FLC		Fault relay (Common).	
FP	Pulsed Output	Frequency Pulse — an output pulse train that has a frequency which is based on the output frequency of the ASD.	Figure 14. on pg 28
P24	DC Output	24 VDC @ 50 mA output.	Figure 11. on pg 28
PP		10.0 VDC @ 10 mA voltage source for the external potentiometer.	Figure 12. on pg 28
CC	—	Return for analog and discrete input terminals.	DO NOT connect to Earth Gnd.

Terminal Board Descriptions

Note: The programmable terminal assignments may be accessed and changed from the default settings as mapped on [pg. 52](#) or via the **Direct Access** method: *Program* ⇒ *Direct Access* ⇒ **applicable parameter number**. See the section titled [Program Screen Menu Navigation on pg. 52](#) for the applicable **Direct Access** parameter numbers. For further information on terminal assignments and default setting changes, see the sections titled [Default Setting Changes on pg. 40](#) and [Terminal Selection on pg. 54](#).

Note: See the section titled [Cable/Terminal Specifications on pg. 205](#) for the ASD conductor and terminal electrical specifications.

ST — The default terminal assignment is the **Standby** mode controller. As the default setting, this terminal must be activated for normal system operation. The **ST** terminal is activated by connecting **CC** to this terminal (Sink mode). When deactivated, **OFF** is displayed on the LCD screen. This input terminal may be programmed to any of the functions listed in [Table 14 on pg. 194](#) (see [F113](#)).

RES — The default terminal assignment is **Reset**. As the default setting, this terminal resets any active alarms or faults. The **RES** terminal is activated by connecting **CC** to this terminal (Sink mode). A momentary connection to **CC** resets the ASD and any fault indications from the display. **Reset** is effective when faulted only. This input terminal may be programmed to any of the functions listed in [Table 14 on pg. 194](#) (see [F114](#)).

F — The default terminal assignment is **Forward** run. As the default setting, this terminal provides a forward run command. The **F** terminal is activated by connecting **CC** to this terminal (Sink mode). A connection to **CC** provides a forward run command for the duration of the activation. This input terminal may be programmed to any of the functions listed in [Table 14 on pg. 194](#) (see [F111](#)).

R — The default terminal assignment is **Reverse** run. As the default setting, this terminal provides a reverse run command. The **R** terminal is activated by connecting **CC** to this terminal (Sink mode). A connection to **CC** provides a forward run command for the duration of the activation. This input terminal may be programmed to any of the functions listed in [Table 14 on pg. 194](#) (see [F112](#)).

S1 — The default terminal assignment is **Preset Speed 1** (see [Preset Speed #1 on pg. 85](#)). As the default setting, this terminal provides a run command for the **Preset Speed 1** setting ([F118](#)). The **S1** terminal is activated by connecting **CC** to this terminal (Sink mode). A connection to **CC** provides a **Preset Speed 1** run command for the duration of the activation. This input terminal may be programmed to any of the functions listed in [Table 14 on pg. 194](#) (see [F115](#)).

S2 — The default terminal assignment is **Preset Speed 2** (see [Preset Speed #2 on pg. 85](#)). As the default setting, this terminal provides a run command for the **Preset Speed 2** setting ([F019](#)). The **S2** terminal is activated by connecting **CC** to this terminal (Sink mode). A connection to **CC** provides a **Preset Speed 2** run command for the duration of the activation. This input terminal may be programmed to any of the functions listed in [Table 14 on pg. 194](#) (see [F116](#)).

S3 — The default terminal assignment is **Preset Speed 3** (see [Preset Speed #3 on pg. 86](#)). As the default setting, this terminal provides a run command for the **Preset Speed 3** setting ([F020](#)). The **S3** terminal is activated by connecting **CC** to this terminal (Sink mode). A connection to **CC** provides a **Preset Speed 3** run command for the duration of the activation. This input terminal may be programmed to any of the functions listed in [Table 14 on pg. 194](#) (see [F117](#)).

S4 — The default terminal assignment is **Emergency Off** (see [Emergency Off Mode Settings on pg. 174](#)). As the default setting, this terminal provides a **Stop** command (terminate ASD output and decel at programmed rate) upon activation ([F021](#)). The **S4** terminal is activated by connecting **CC** to this terminal (Sink mode). A connection to **CC** provides a **Emergency Off** command and the system remains in the **Emergency Off** condition until reset. This input terminal may be programmed to any of the functions listed in [Table 14 on pg. 194](#) (see [F118](#)).

RR — The default function assigned to this terminal is **Frequency Mode 1**. The **RR** terminal accepts a 0 – 10 VDC input signal that is used to control the function assigned to this terminal. This input terminal may be programmed to control the speed or torque of the motor via an amplitude setting or regulate by setting a limit. The gain and bias of this terminal may be adjusted for application-specific suitability (see [F210](#) – [F215](#)).

RX — The default function assigned to this terminal is **Torque Command**. The **RX** terminal accepts a ± 10 VDC input signal that is used to control the function assigned to this terminal. This input terminal may be programmed to control the speed or torque of the motor via an amplitude setting or regulate by setting a limit. The gain and bias of this terminal may be adjusted for application-specific suitability (see [F216](#) – [F221](#)).

II — The **II** terminal is an isolated current input that is used to control the output speed or output torque of the ASD. Select **VI/II** at [F004](#) for speed control or select **VI/II** at [F420](#) for torque control. The **II** terminal receives a 0 – 20 mA input signal that controls the output 0.0 – **Maximum Frequency** output or the -250% – 250% torque output. Terminal scaling is accomplished via [F201](#) – [F206](#). The gain and bias of this terminal may be adjusted for application-specific suitability (see [F470](#) and [F471](#)).

***Note:** The **VI** terminal or the **II** terminal may be used to control the speed or torque of the motor, but both cannot be used simultaneously.*

VI — The **VI** terminal is an isolated voltage input that is used to control the output speed or output torque of the ASD. Select **VI/II** at [F004](#) for speed control or select **VI/II** at [F420](#) for torque control. The **VI** terminal receives a 0 – 10 VDC input signal that controls the output 0.0 – **Maximum Frequency** output or the -250% – 250% torque output. Terminal scaling is accomplished via [F201](#) – [F206](#). The gain and bias of this terminal may be adjusted for application-specific suitability (see [F470](#) and [F471](#)).

***Note:** The **VI** terminal or the **II** terminal may be used to control the speed or torque of the motor, but both cannot be used simultaneously.*

P24 — +24 VDC at 50 mA power supply for customer use.

PP — The **PP** terminal provides 10 VDC at 10 mADC (max.). This output is typically divided using a potentiometer. The tapped voltage is applied to the **RR** input to provide manual control of the **RR** programmed function.

OUT1 — This output is a form A contact. The default function assigned to this terminal is **Output Low Speed** indicator. The function as **Output Low Speed** is to open/close this contact for the duration that the ASD output frequency is at or above the user setting of parameter [F100](#). This output terminal may be programmed to provide an indication that any of the events listed in [Table 16 on pg. 199](#) is active or has taken place. This function may be used to signal external equipment or to activate a brake. The **OUT1** terminal is rated at 2 A/250 VAC and 2 A/30 VDC (see [F130](#)).

OUT2 — This output is a form A contact. The default function assigned to this terminal is **Fault** indicator. The function as **Fault (FL)** is to open/close this contact for the duration of an active fault. This output terminal may be programmed to provide an indication that any of the events listed in [Table 16 on pg. 199](#) is active or has taken place. This function may be used to signal external equipment or to activate a brake. The **OUT2** terminal is rated at 2 A/250 VAC and 2 A/30 VDC (see [F131](#)).

FP — The default function of this output terminal is to output a series of pulses at a rate that is a function of the ASD output frequency (1.0 kHz to 43.3 kHz at 50 mA max.). As the output frequency of the ASD goes up so does the **FP** output pulse rate. This terminal may be programmed to provide an output pulse rate that is proportional to the magnitude of the user-selected item of [Table 15 on pg. 198](#). For further information on this terminal, see parameter [F676](#).

AM — This output terminal produces an output current that is proportional to the output frequency of the ASD or of the magnitude of the function assigned to this terminal. The available assignments for this output terminal are listed in [Table 15 on pg. 198](#). For further information on this terminal, see [F670](#).

FM — This output terminal produces an output current that is proportional to the output frequency of the ASD or of the magnitude of the function assigned to this terminal. The available assignments for this output terminal are listed in [Table 15 on pg. 198](#). For further information on this terminal, see [F005](#).

FLA — One of two normally open contacts of a form C relay that, under user-defined conditions, connect to FLC. The FL relay is the Fault Relay by default, but may be programmed to any of the selections of [Table 16 on pg. 199](#) and may be set as **Normally Open** or **Normally Closed**. For further information on this terminal, see [F132](#) and [Figure 4](#).

FLB — One of two normally closed contacts of a form C relay that, under user-defined conditions, connect to **FLC**.

FLC — **FLC** is the common leg of a single-pole double-throw form C relay.

***Note:** The **FLA**, **FLB**, and **FLC** contacts are rated at 2A/120 VAC and 2A/30 VDC.*

Figure 4. FLA, FLB, and FLC Switching Contacts Shown in the Normal Operating Condition.

***Note:** The relay is shown in the normal operating condition. During a **faulted** condition, the relay connection is **FLC-to-FLA**.*

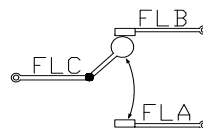
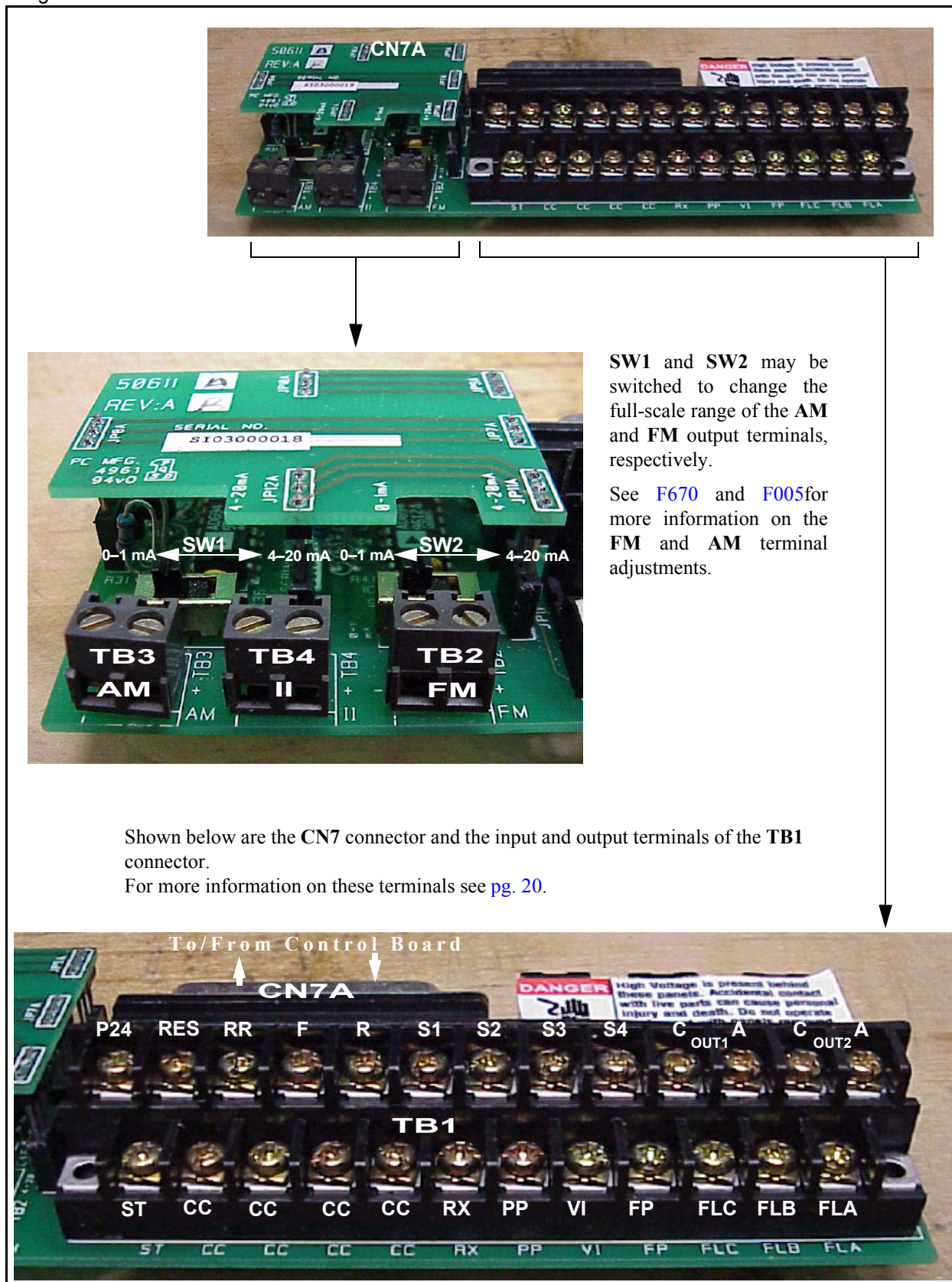


Figure 5. GX7R ASD Terminal Board.



GX7R ASD Control

Motoring Control Board

The **Motoring Control Board** (P/N 56000) serves as the primary control source for the **GX7R ASD** and receives input from the **Motoring Terminal Board** (see [Figure 5. on pg 24](#)), the Voltage Sensor Board, an Option Card, RS232/RS485 Communications, or the EOI.

Discrete input terminals may be set to activate with either a connection to **CC** (Sink) or with a 24 VDC input (Source). See [Figure 17.](#) for information on Sink/Source switching.

Half or Full duplex communications is available when using RS232/RS485 communications via the **CNU1** connector. The jumpers at the **JP1** and the **JP2** connectors may be moved from one position to the other to facilitate either half- or full-duplex operation. If no jumpers are used the system will operate in the full duplex mode.

Though multi functional, the factory default configuration of **CNU1** is to operate as the EOI-to-ASD communications connection.

For more information on the GX7R ASD communication requirements, please visit www.toshiba.com/tic to acquire a copy of the *7-Series Serial Communications User Manual*.

Click the **Tools and Resources** pull-down menu. Select **Downloads**.

Download Type = **Manuals**.

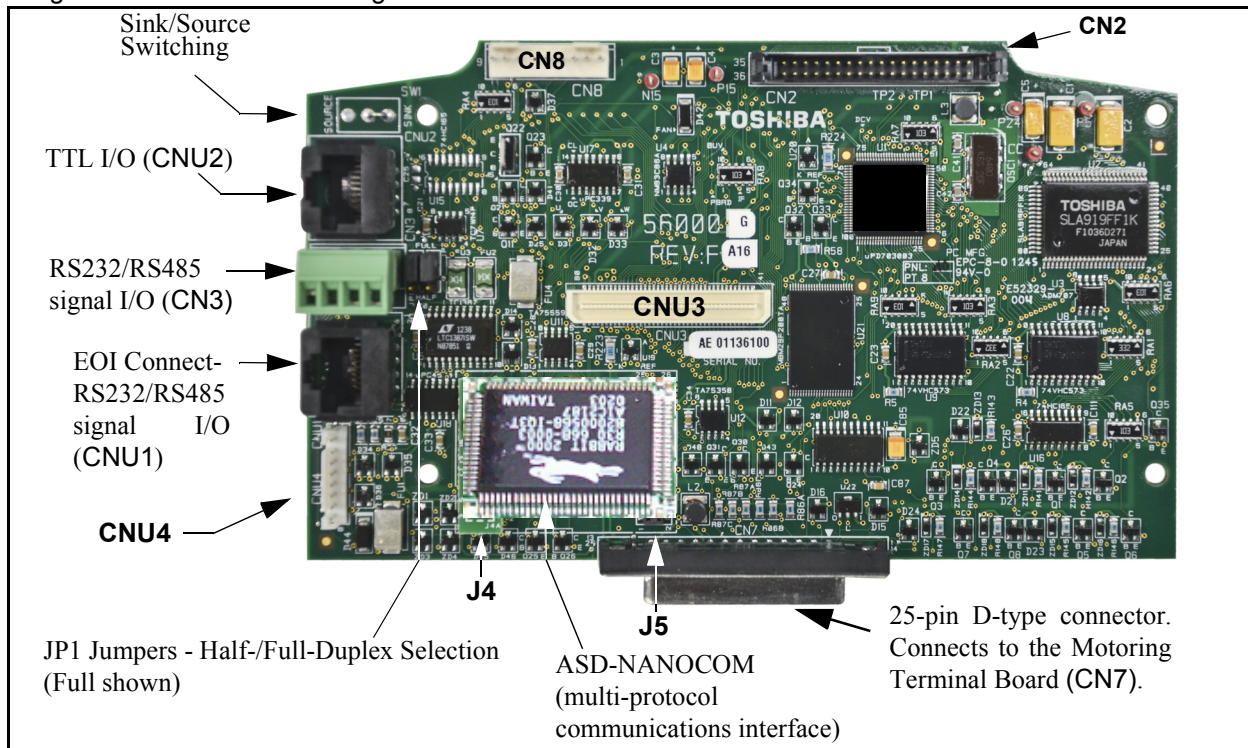
Product Family = **Adjustable Speed Drives**.

Category = **G7 Low Voltage**.

Download = **7-Series Serial Communications User Manual**.

Click **Submit**.

Figure 6. GX7R ASD Motoring Control Board.



CNU1 Pinout

Table 3. Listed below are the pinouts of the **CNU1** and **CNU1A** connectors.

Pin #	CNU1 Pinout (Control Board)	CNU1A Pinout (EOI)
1	P24	P24
2	Gnd	Gnd
3	Tx (-)	RXA
4	Rx (+)	TXA
5	Rx (-)	TXB
6	Tx (+)	RXB
7	RS232/RS485	CNU3 Pin-7
8	Gnd	Gnd

Note: For normal operation, connect CNU1 to CNU1A of the EOI. Connecting CNU1 to CNU2A of the EOI will result in a failed communications condition indicated by a continuous start-up screen display.

CN7 Pinout

Listed below are the pinouts of the CN7 connector. The CN7 connector is the 25-pin D-type connector of the **Control Board** (see [Figure 17. on pg 30](#)). CN7 connects to **CN7A** of the **Terminal Board**.

Table 4. CN7 pinout assignments — Default settings listed for the programmable terminals.

Pin Number	CN7 Pinout	Pin Number	CN7 Pinout
1	PP	14	II
2	FL	15	S1
3	VI	16	R
4	RR	17	S3
5	FM	18	S2
6	RX	19	N15
7	*FP	20	S4
8	AM	21	P15
9	OUT1	22	P24
10	OUT2	23	CC
11	ST	24	CC
12	RES	25	CC
13	F	—	—

Note: * Open collector output.

CN8 Pinout

Listed below are the pinouts of the CN8 connector on the **Motoring Control Board**.

The CN8 connector of the **Motoring Control Board** is not used with the GX7R ASD.

Table 5.

Pin Number	CNU8 Pinout
1	P15
2	N15
3	—
4	GND

I/O Circuit Configurations

Figure 7. Discrete Input.

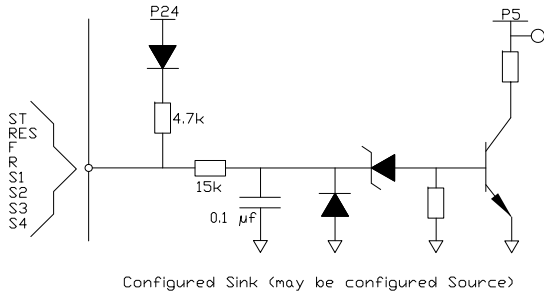


Figure 8. RR Input.

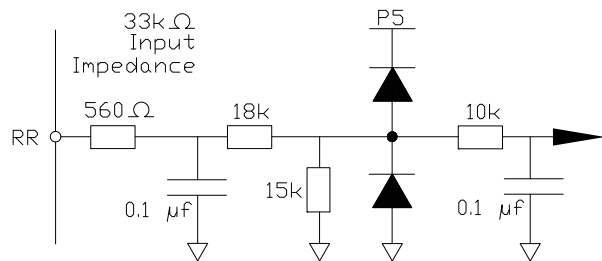


Figure 9. RX Input.

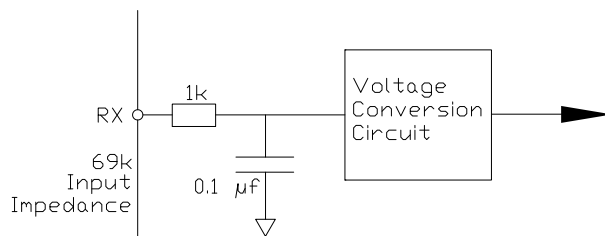


Figure 10. VI/II Input.

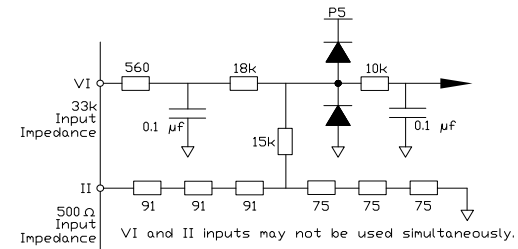


Figure 11. P24 Output.

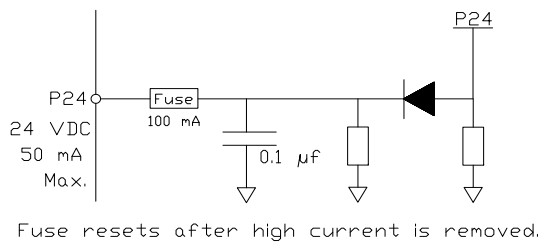


Figure 12. PP Output.

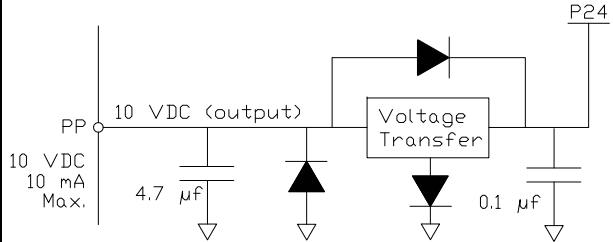


Figure 13. OUT1/OUT2 Output.

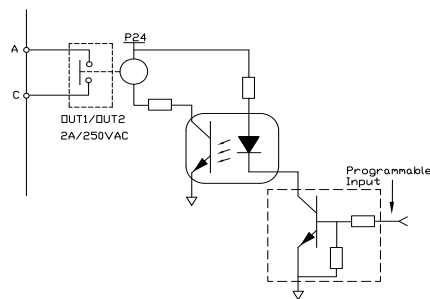


Figure 14. FP Output.

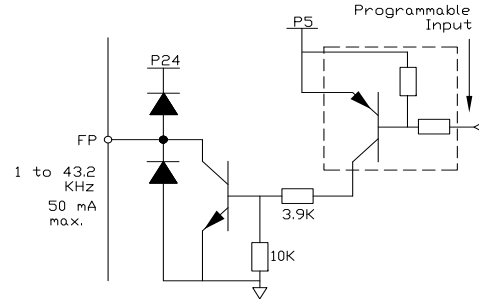


Figure 15. AM/FM Output.

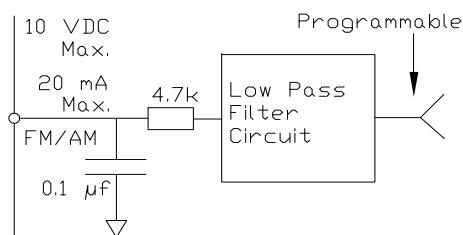
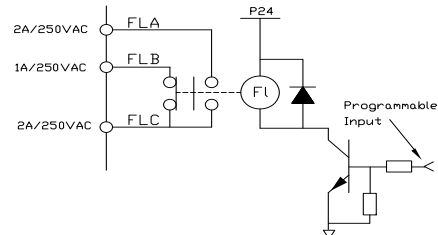


Figure 16. Fault Relay (during fault).



Regeneration Control Board/Terminal Board

The **Regeneration Control Board** (P/N 64625A) serves as the control source for the **GX7R ASD** during regeneration. Regeneration is activated during a bus overvoltage condition, as determined by the **Voltage Sensor** board.

The **Reset** button (SW4) resets a faulted ASD and is effective when faulted only.

Note: Parameter **F305** must be set to **Disabled** for the regeneration function to operate.

The **Regeneration Terminal Board** is the same PCB as the **Motoring Terminal Board** (see [Figure 5. on pg 24](#)). The **Regeneration Terminal Board** has no user-serviceable or configurable requirements and is set at the factory to the normal regeneration operating configuration.

CN8 Pinout

Listed below are the pinouts of the **CN8** connector. The **CN8** connector is used to supply power to the voltage sensor board.

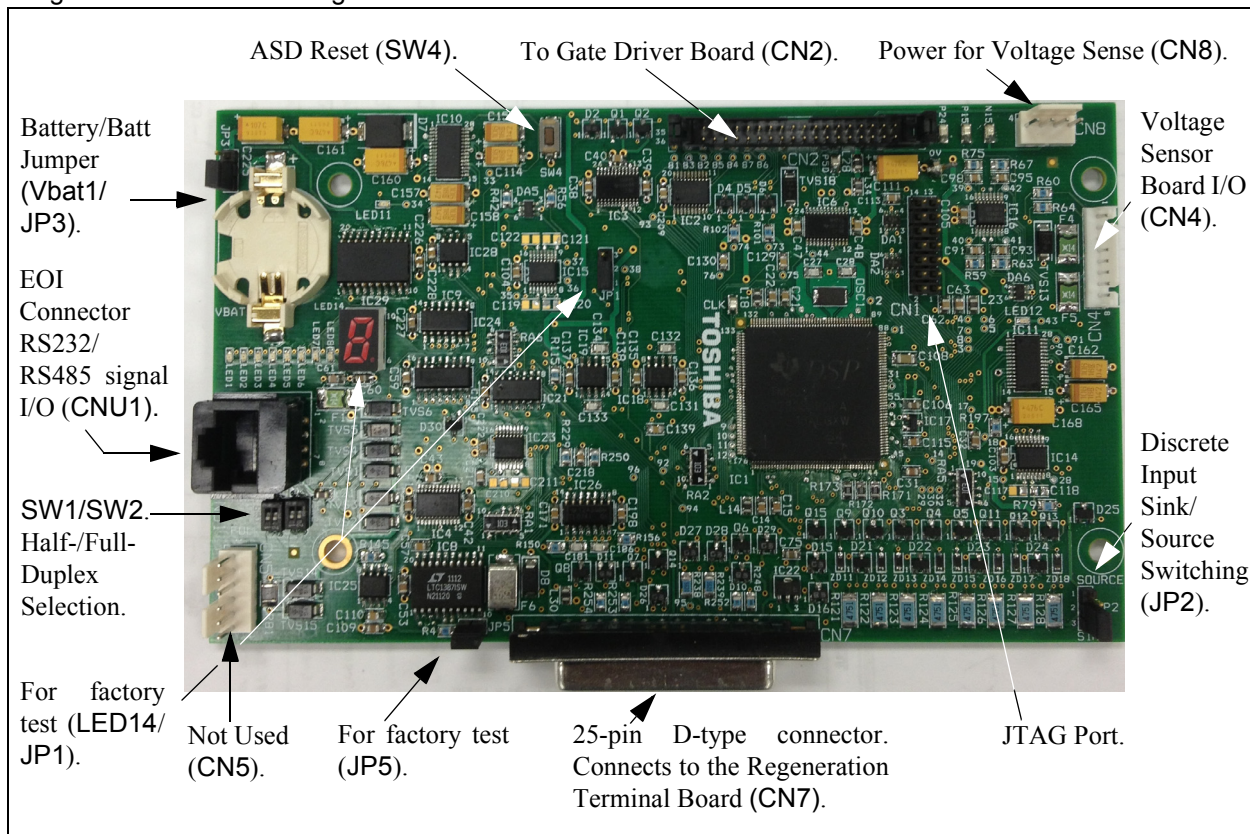
Table 6. Regeneration Control Board CN8 Connector Pinout.

Pin Number	CNU8 Pinout
1	P15
2	N15
3	—
4	GND

Note: Make no changes or connections to the **Regeneration Terminal Board**.

There are no other user-setup **Regeneration Control Board** or **Regeneration Terminal Board** functions required to carry out normal regeneration function.

Figure 17. GX7R ASD Regeneration Control Board.



Pre-Startup and Test



Perform the following checks before turning on the unit:

- **L1/R**, **L2/S**, and **L3/T** are connected to the 3-phase input power sequenced as **C-B-A**, respectively.
- **T1**, **T2**, and **T3** are connected to the motor.
- The 3-phase input voltage is within the specified tolerance.
- There are no shorts and all grounds are secured.
- Front door is closed and all enclosure panels are securely fastened.
- All personnel are clear of the area of the installation and the driven equipment.
- Start up the unit as described in the section titled [System Operation on pg. 39](#).

Save User Settings

Use the following table to record any changed parameters for future reference.

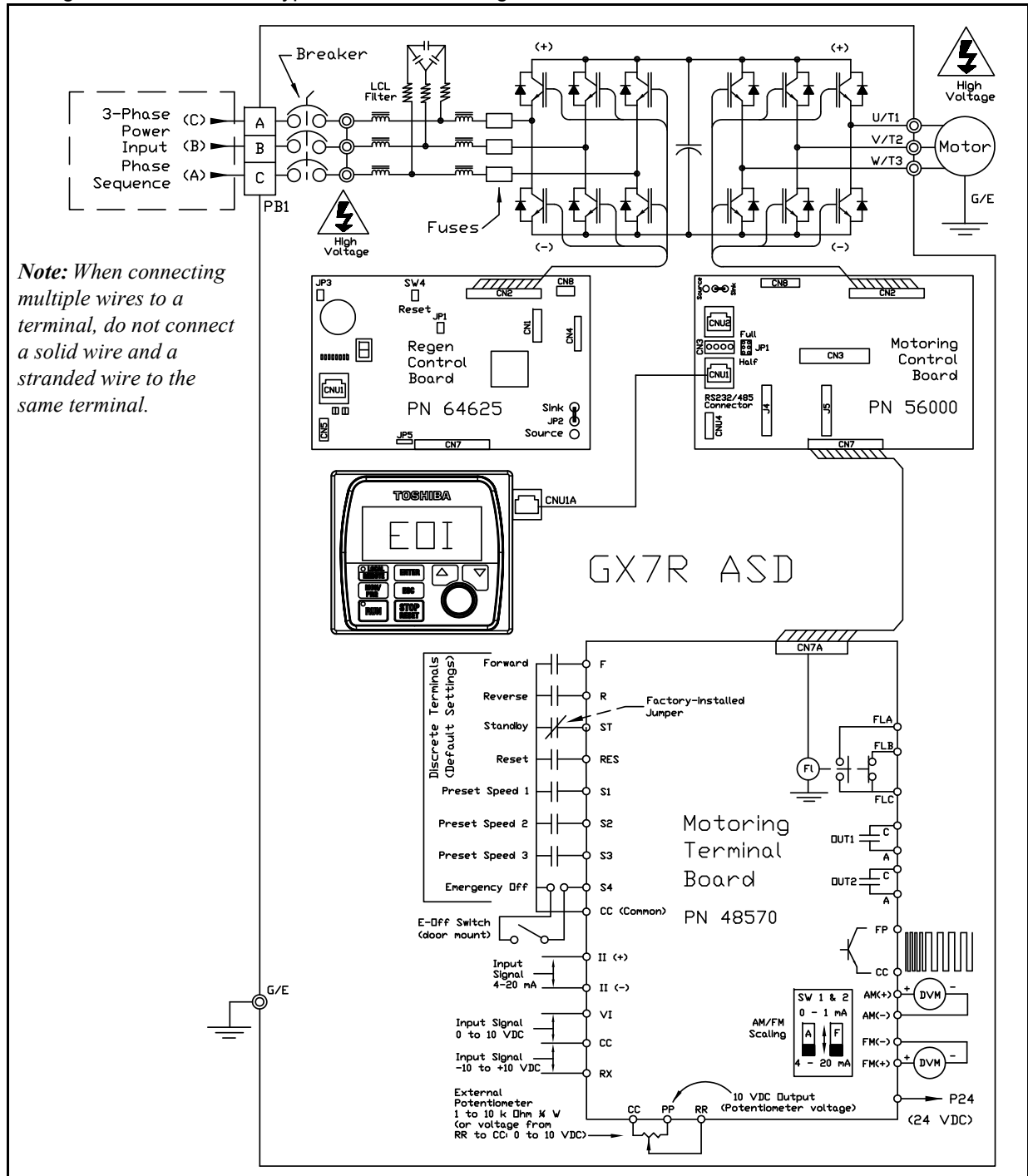
Table 7. ASD Parameter Changes by Installer/Maintenance Personnel.

ASD ID _____ Name: _____ Date: _____					Notes
Parameter Number	Parameter Name	Default or Previous Setting	New Setting	Unit of Measure	
Note: Settings may also be recorded via Program ⇒ Utilities ⇒ Type Reset ⇒ Save User Parameters .					

Typical Connection Diagram

Figure 18. GX7R ASD Typical Connection Diagram.

Note: When connecting multiple wires to a terminal, do not connect a solid wire and a stranded wire to the same terminal.



Note: The VI, RX, and RR analog input terminals are referenced to CC. The AM, FM, and II analog input terminals are referenced to the respective negative terminals. The FP, PP, and P24 output terminals are referenced to CC.

GX7R ASD EOI and Front Panel Features

The **GX7R ASD Electronic Operator Interface (EOI)** is comprised of an LCD display, two LEDs, a rotary encoder, and eight keys. These items are described below and their locations are provided in [Figure 19 on pg. 34](#).

The EOI may be mounted remotely using the optional **ASD-MTG-KIT**. Or if operating in a **NEMA 4** environment, the **ASD-EOI-N4** is best suited for this application. Each kit contains all of the hardware required to mount the EOI of the ASD remotely.

The EOI can be mounted remotely from the ASD as described in the section titled [EOI Remote Mounting on pg. 36](#). The dimensional requirements for remote mounting may also be found in this section. Using a screw length that exceeds the specified dimensions may cause deformation of the outer surface of the bezel as shown in [Figure 23 on pg. 38](#) and should be avoided.

The interface can operate up to distances of 15 feet from the ASD via the Common Serial (TTL) Port. For distances beyond 15 feet, the RS232/RS485 port is recommended.

EOI Features

LCD Display — Displays configuration information, performance data (e.g., motor frequency, bus voltage, torque, etc.), and diagnostic information.

Enter Key — Selects a menu item to be changed or accepts and records the changed data of the selected field (same as pressing the **Rotary Encoder**).

Up Key — Increases the value of the selected numerical parameter or scrolls up the menu listing (continues during press-and-hold).

Down Key — Decreases the value of the selected numerical parameter or scrolls down the menu listing (continues during press-and-hold).

Rotary Encoder — Functions as the **Up** key, the **Down** key, and the **Enter** key. Turn the **Rotary Encoder** either clockwise or counterclockwise to perform the **Up** or **Down** key functions. Press the **Rotary Encoder** to perform the **Enter** function. Simultaneously press and turn the **Rotary Encoder** to perform a user-defined function (see Program ⇒ EOI Option Setups ⇒ Preferences ⇒ [Encoder Action](#)).

ESC Key — Returns to the previous level of the menu tree, toggles between the [Panel Menu](#) and the [Frequency Command](#) screens, or cancels changes made to a field if pressed while still in the reverse video mode (dark background/light text). The three functions are menu-specific.

Stop Key — While running, issues the **Off** command (decelerates to **Stop** at the programmed rate) if pressed once while in the **Local** mode or initiates an **Emergency Off** (terminates the ASD output and applies the brake if so configured) if pressed twice quickly from the **Local** or **Remote** modes. Resets the ASD if pressed twice quickly while stopped.

Local|Remote Key — Toggles the system to and from the **Local** and **Remote** modes. The LED is on when the system is in the **Local Command** mode. The **Local** mode allows the **Command** and **Frequency** control functions to be carried out via the EOI.

The **Remote** mode enables the **Command** and **Frequency** control functions to be carried out via the **Terminal Board**, **CN8 Option** (Not Used), **RS232/RS485**, **Communication Card**, or **Pulse Input**. The selection may be made via Program ⇒ Fundamentals ⇒ Standard Mode Settings ⇒ [Command Mode](#).

The availability of the **Local** mode of operation (**Command** and **Frequency** control) may be disabled via Program ⇒ EOI Option Setups ⇒ [Local|Remote Key](#). The availability of the **Local** mode of operation may be reinstated by changing this setting or performing a **Reset** (see [F007](#)).

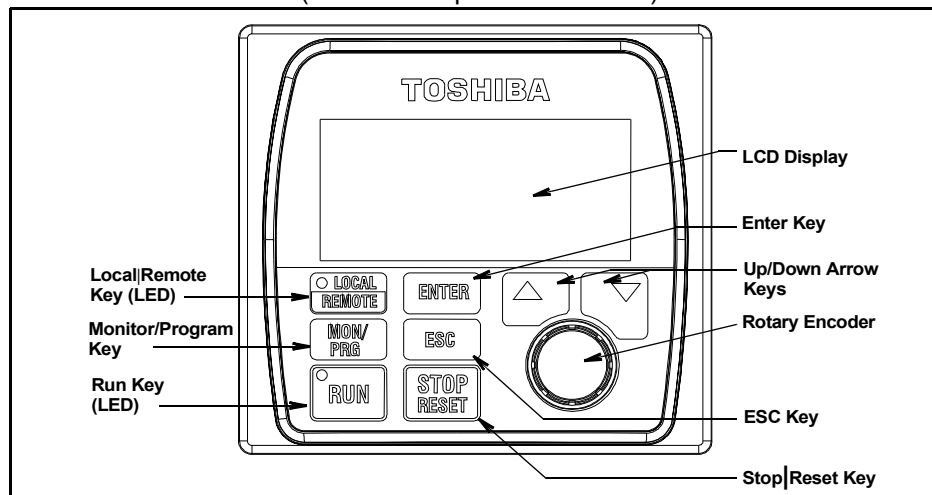
***Note:** See the section titled [Command Mode and Frequency Mode Control on pg. 42](#) for more information on system control.*

MON/PRG (Monitor/Program) — Provides a means to access the three root menus. Pressing the **MON/PRG** key repeatedly loops the system through the three root menus (see [Figure 25 on pg. 47](#)). While looping through the root menus, the **Program** menu will display the last menu screen or sub-menu item being accessed at the time that the **MON/PRG** key was pressed.

Run Key — Issues the **Run** command while in the **Local** mode.

Run Key Status LED — Illuminates green while stopped or red while running (Red = ALERT!).

Figure 19. The GX7R ASD EOI (Electronic Operator Interface).



EOI Operation

The EOI is the primary input/output device for the user. The EOI may be used to monitor system functions, input data into the system, or perform diagnostics.

Note: The **Up/Down** arrow keys and the **Enter** key may be used to perform the functions of the **Rotary Encoder**. The **Rotary Encoder** will be used in this explanation and throughout this manual for the **Up**, **Down**, and **Enter** key functions.

The software used with the **GX7R ASD** is menu driven; thus, making it a select and click environment. The operating parameters of a motor may be selected and viewed or changed using the EOI.

To change a parameter setting, go to the **Program** mode by pressing the **MON/PRG** key until the **Program** menu is displayed. Turn the **Rotary Encoder** until the desired parameter group is within the cursor block. Press the **Rotary Encoder** (repeat if there is a submenu).

Once at the desired selection, press the **Rotary Encoder**. The selection will take on the reverse video format (dark background/light text). Turn the **Rotary Encoder** to change the value of the parameter. Press the **ESC** key while the display is in the reverse video mode to exit the menu without saving the change or press the **Rotary Encoder** to accept the new setting.

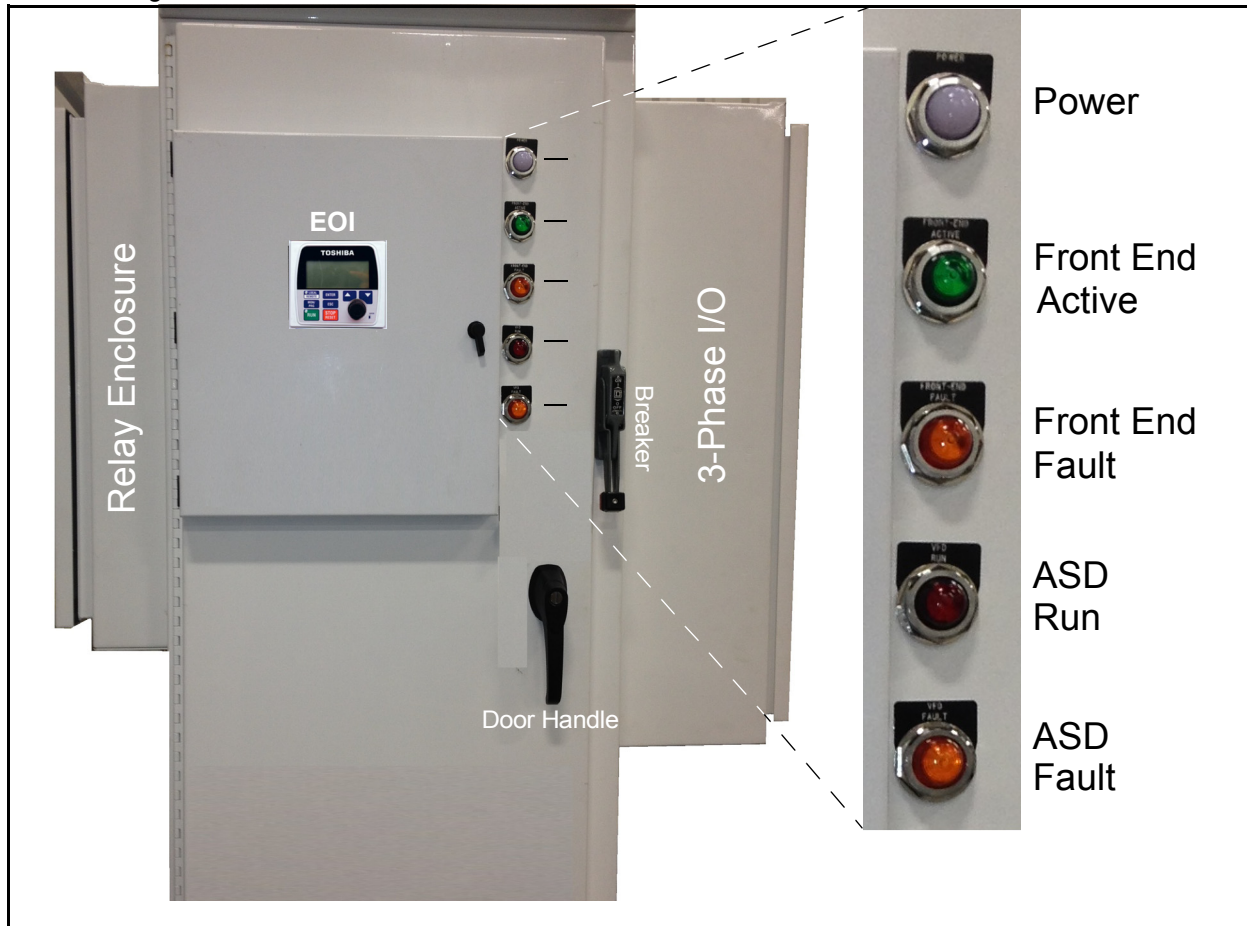
Repeated **ESC** key entries takes the menu back one level each time the **ESC** key is pressed until the root level is reached. After reaching the root level, continued **ESC** entries will toggle the system to and from the [Frequency Command](#) screen and the [Panel Menu](#).

Note: **Panel** menu changes entered here will affect EOI-controlled ASD operation only. See the section titled [Panel Menu on pg. 48](#) for further information on [Panel Menu](#) operations.

Front Panel Features

Front Panel Status Lights/User Interface

Figure 20. GX7R Front Panel.



Power

On when 120 VAC cabinet power is on.

Front End Active

Blinks at one-second interval during system initialization. On solid upon completion and an indicator that the front end is active and stabilized.

Front End Fault

Blinks at one-second interval if phase loss (R, S, or T), a miswire is detected at the 3-phase input, or a motor rotation error is detected.

Blinks at three-second interval in the event of a power supply failure.

Blinks at six-second interval in the event of an over-temperature condition.

On when the system is powered and ready for normal operation.

On during an overvoltage, overcurrent, MS1 contactor fail, or PWM short circuit condition.

On during an active regeneration fault.

ASD Run — On when ASD is running.

ASD Fault — On when ASD is faulted.

EOI Remote Mounting

The **GX7R ASD** may be controlled from a remotely-mounted EOI. For safety and application-specific reasons, some ASD installations will warrant that the operator not be in the vicinity during operation or that the EOI not be attached to the ASD housing. The EOI may be mounted either with or without the optional GX7R ASD Remote Mounting Kit (P/N ASD-MTG-KIT). The ease of installation is enhanced by the GX7R ASD Remote Mounting Kit which allows for easier cable routing and EOI placement.

The EOI can operate up to distances of 15 feet from the ASD via the Common Serial (TTL) Port. For distances beyond 15 feet, the RS232/RS485 port is recommended.

Remote mounting will also allow for multiple EOI mountings at one location if controlling and monitoring several ASDs from a central location is required.

The optional dust cover (P/N ASD-BPC) may be used to cover the front panel opening of the ASD housing after removing the EOI. An EOI extender cable is required for remote mounting. EOI extender cables are available in lengths of 7, 10, or 15 feet and may be ordered through the Toshiba [Customer Support Center](#).

Remote EOI Required Hardware

EOI Mounting Hardware

- 6-32 x 5/16" Pan Head Screw — P/N 50595 (4 ea.)
- #6 Split-Lock Washer — P/N 01884 (4 ea.)
- #6 Flat Washer — P/N 01885 (4 ea.)

Bezel Plate Mounting Hardware

- Bezel Plate — P/N 52291
- 10-32 Hex Nut — P/N 01922 (4 ea.)
- #10 Split-Lock Washer — P/N 01923 (4 ea.)
- #10 Flat Washer — P/N 01924 (4 ea.)
- Dust Cover — P/N ASD-BPC (Optional)

Extender Cables

- ASD-CAB7F: Cable, RJ45, 7 ft.
- ASD-CAB10F: Cable, RJ45, 10 ft.
- ASD-CAB15F: Cable, RJ45, 15 ft.

EOI Installation Precautions

Install the unit securely in a well ventilated area using the four mounting holes of the EOI. The ambient temperature rating for the EOI is 14° to 104° F (-10° to 40° C).

Note: Derate the applicable rating by one percent for each degree Celsius above the rated thermal operating capacity.

- Select a mounting location that is easily accessible by the user.
- Avoid installation in areas where vibration, heat, humidity, dust, metal particles, or high levels of electrical noise (EMI) are present.
- Do not install the EOI where it may be exposed to flammable chemicals or gases, water, solvents, or other fluids.
- Turn the power on only after securing all enclosure covers and/or closing the door of the ASD.

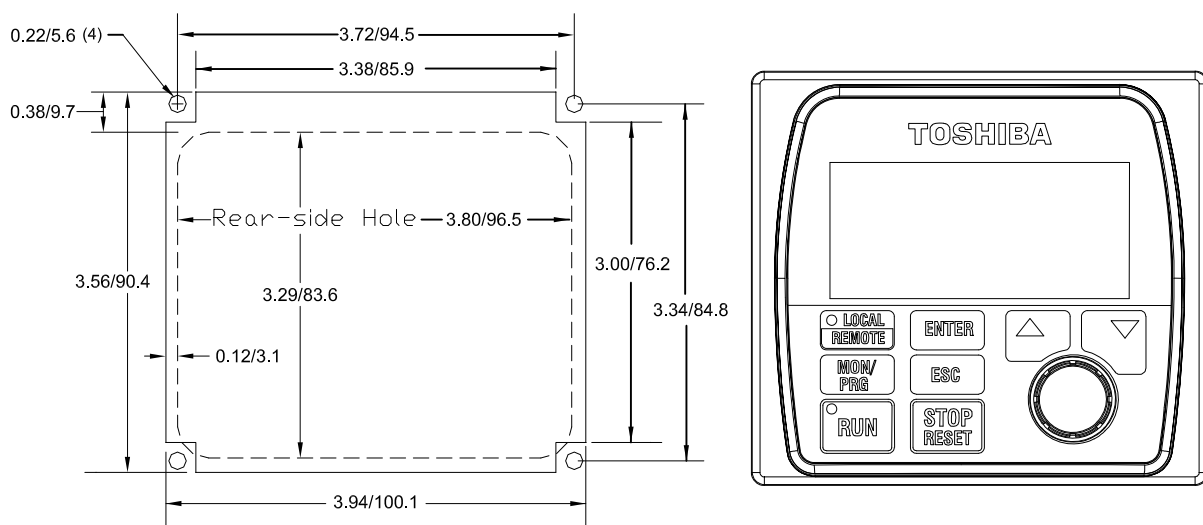
EOI Remote Mounting w/o the ASD-MTG-KIT

Note: See [Figure 21](#) for the dimensions and the item locations referenced in steps 1 through 5.

1. At the EOI mounting location, identify and mark the location of the 3.80" by 3.29" hole and the four 0.22" screw holes.
2. Cut the 3.80" by 3.29" rectangular hole.
3. Drill the four 0.22" screw holes.
4. Attach and secure the EOI to the front side of the mounting location using the four 6-32 x 5/16" pan head screws, the #6 split lock washers, and the #6 flat washers.
5. Connect the RJ-45 extension cable(s).

EOI Dimensions (mounting)

Figure 21. EOI Mounting Dimensions (inch/mm).



EOI Remote Mounting using the ASD-MTG-KIT

Note: See [Figures 22](#) and [23](#) for the dimensions and the item locations referenced in steps 1 through 6.

1. At the EOI mounting location, identify and mark the locations of the 5.00" by 4.60" hole and the four 0.34" screw holes.
2. Cut the 5.00" by 4.60" rectangular hole.
3. Drill the four 0.34" holes.
4. Attach and secure the Bezel plate to the front side of the mounting location using the four 10-32 hex nuts, #10 split lock washers, and the #10 flat washers.
5. Attach and secure the EOI to the front side of the Bezel plate using the four 6-32 x 5/16" pan head screws, #6 split lock washers, and the #6 flat washers.
6. Connect the RJ-45 extension cable(s).

EOI ASD-MTG-KIT Dimensions (mounting)

Figure 22. EOI Bezel Plate Mounting Dimensions.

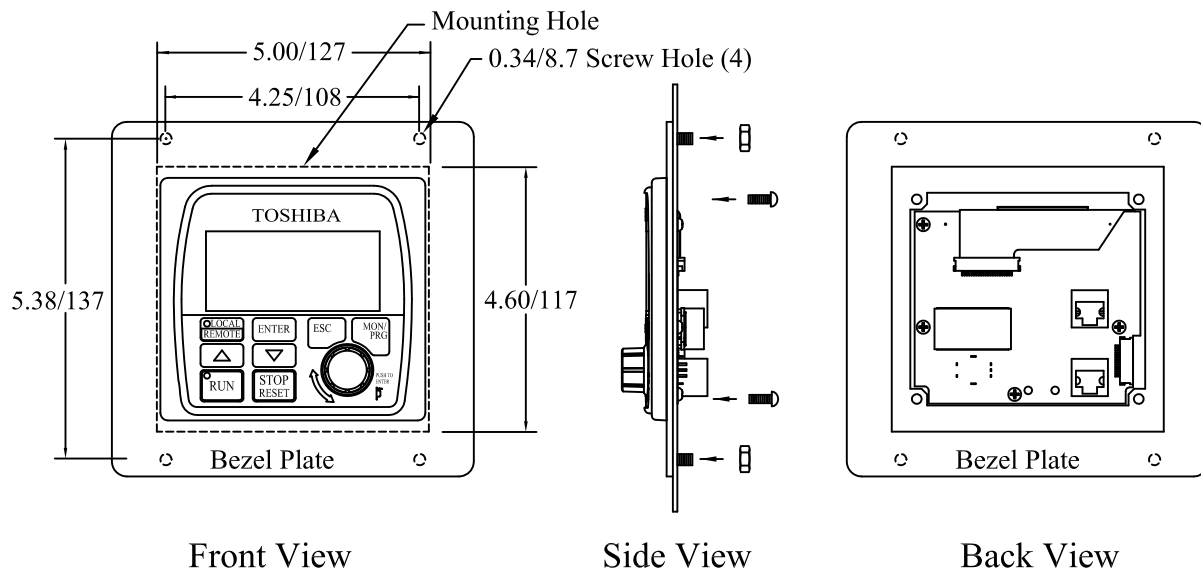
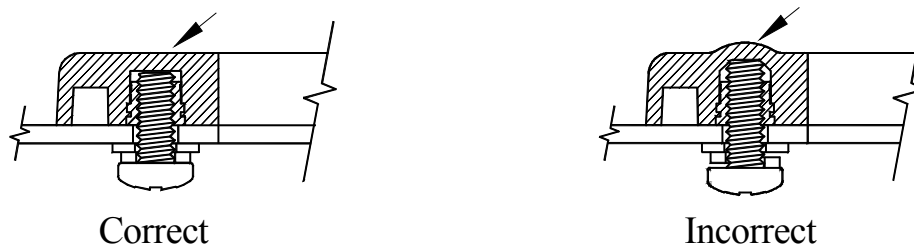


Figure 23. Screw Length Precaution.

CAUTION: Failure to use the correct hardware may result in damage to the outer surface of the EOI panel and/or improper seating of the panel to the bezel plate. Use caution when mounting the EOI assembly to ensure that the internal thread clearance is maintained.



System Operation

Start Up

Upon initial system powerup, the **GX7R ASD** runs a system initialization. During the initialization, the system checks several subsystems for functionality.

These include:

- Precharge Cycle functionality,
- **ST-to-CC** connection completion at the regeneration terminal board,
- The **Boost Voltage** function, and
- Bus voltage stabilization at 800 volts.

These checks take ten seconds to complete. Should a subsystem fail during the initialization, a **Front-End Fault** will be incurred.

Note: *The EOI displays **OFF** until the **CC-to-ST** connection is completed at the regeneration terminal board.*

Upon completion, the **Startup Wizard** begins.

Startup Wizard

The **Startup Wizard** launches without user intervention and may be run to assist the user with the initial configuration of the input power settings and the output parameters of the **GX7R ASD**.

The GX7R ASD may also be setup by directly accessing each of the individual parameters (see the section titled [Direct Access Parameter Information on pg. 78](#)). See the section titled [Default Setting Changes on pg. 40](#) for more information on changing the parameter settings.

The **Startup Wizard** is run from the Program (menu) ⇒ **Startup Wizard**.

The **Startup Wizard** queries the user for the following information:

Note: *After each entry, **Finish** may be clicked to load the **Startup Wizard** settings and exit.*

1. **Run now?** (if selected continue on to step #2)/**Run next time at power up?** (if selected go to Program screen)/**Manually configure?** (if selected click Finish ⇒ Frequency Command screen).
2. The [Voltage and Frequency Rating of the Motor](#).
3. The [Upper Limit Frequency](#).
4. The [Lower Limit Frequency](#).
5. [Adjust Accel/Decel Automatically?](#) (if **Yes**, continue from step 8).
6. The [Acceleration Time](#).
7. The [Deceleration Time](#).
8. The [Volts Per Hertz Setting](#).
9. The [Motor Current Rating](#).
10. The [Command Source](#).
11. The [Frequency Command Source](#).

Click **Finish** to load the settings of the **Startup Wizard** into the ASD. Further application-specific settings may be required.

See the section titled [Startup Wizard Requirements on pg. 65](#) for additional information on the **Startup Wizard**.

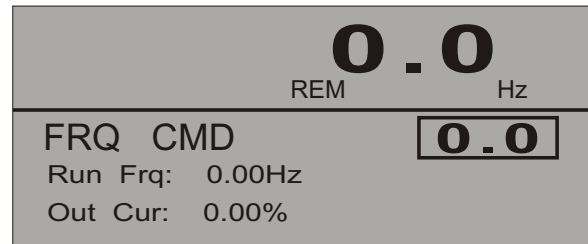
Operation (Local)

Note: See [F003](#) for information on **Remote** operation.

To turn the motor on, perform the following:

1. Press the **MON/PRG** key until the **Frequency Command** screen is displayed.
2. Press the **Local|Remote** key to enter the **Local** mode (green **Local|Remote** LED illuminates).
3. Turn the **Rotary Encoder** clockwise until the **Frequency Command** value is at the desired setting.
4. Press the **Run** key and the motor runs at the [Frequency Command](#) value.

Frequency Command Screen



Note: The speed of the motor may be changed while the motor is running by using the **Rotary Encoder** to change the **Frequency Command** value.

5. Press the **Stop|Reset** key to stop the motor.

Default Setting Changes

To change a default parameter setting, go to the root of the **Program** menu and turn the **Rotary Encoder** until the desired parameter group is within the cursor block and press the **Rotary Encoder** (repeat if there is a submenu).

Press the **Rotary Encoder** to select the default setting to be changed and the selection takes on the reverse video format (dark background, light text). Turn the **Rotary Encoder** to change the value of the parameter. Press the **ESC** key before accepting the change to exit the menu without saving the change or press the **Rotary Encoder** to accept the new setting.

For a complete listing of the **Program** mode menu options, see the section titled [Program Screen Menu Navigation on pg. 52](#). Menu items are listed and mapped for convenience. The **Direct Access Numbers** are listed where applicable.

The default settings may also be changed by entering the **Parameter Number** of the setting to be changed at the **Direct Access** menu field (Program ⇒ Direct Access ⇒ *applicable parameter number*). A listing of the **Direct Access/Parameter Numbers** and a description of the associated parameter may be found in the section titled [Direct Access Parameter Information on pg. 78](#).

A listing of all parameters that have been changed from the factory default setting may be viewed sequentially by accessing the **Changed From Default** screen (Program ⇒ Utility Parameters ⇒ Changed From Default).

Note: Parameter [F201](#) was changed to create the example shown below in [Figure 24](#).

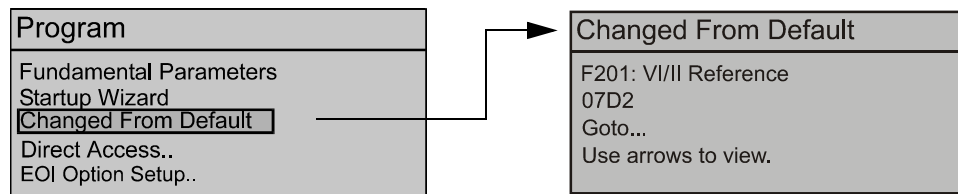
The **Changed From Default** feature allows the user to view (or change) the parameters that are different from the default or the post-reset settings. Once the **Changed From Default** screen is displayed, the system automatically scrolls through all of the system parameters and halts once reaching a changed parameter.

The **Rotary Encoder** may be clicked once clockwise to continue scrolling forward or clicked once counterclockwise to begin scrolling in reverse. With each click of the **Rotary Encoder** from a stop, the system scrolls through the parameters and stops at the next parameter that has been changed.

Pressing the **Rotary Encoder** while a changed parameter is displayed accesses the settings of the changed parameter for viewing or changing.

Pressing **ESC** while the system is performing a **Changed From Default** search terminates the search.
Pressing **ESC** when done searching (or halted at a changed parameter) returns the system to the **Program Menu**.

Figure 24. Changed From Default screen.



Command Mode and Frequency Mode Control

Command control includes instructions such as **Stop**, **Run**, **Jog**, etc. The source of the **Command** signal must be established for normal operation.

Frequency commands control the output speed of the ASD. The source of the frequency control signal must be established for normal operation.

The source of the command control and speed control may be either internal or external. Once the source signal is selected for either function, the system may be configured to use the selected signal all of the time or switch to another source under user-defined conditions.

Command and **Frequency** control may be carried out using any one of several control methods (signal sources) or combinations thereof. In the event that multiple control commands are received simultaneously, the signal sources are assigned priority levels. Typically, the control method for **Command** and **Frequency** control uses the settings of **F003** and **F004**, respectively.

Command Control (F003)

The **Command Mode** selection of **F003** establishes the primary source of the command input for the ASD. However, the **Override** feature may supersede the **F003** setting as indicated in [Table 8 on page 44](#).

Note: *Override means that a valid input from a source higher on the hierarchy is being received.*

[Table 8](#) shows the hierarchy of the control sources managed by the **Override** function. The level of the control item on the hierarchy is listed from left to right, most to least, respectively. As indicated in the table, the **F003** setting may be overridden by any of the other input sources.

Placing the EOI in the **Local** mode selects either the **RS232/RS485** or the **TTL** as the **Command Mode** control source. Once in the **Local** mode, the [LCD Port Connection](#) (Program ⇒ Communication ⇒ Communication Settings ⇒ [LCD Port Connection](#)) setting determines if the **RS232/RS485** or the **TTL** will be used for **Command** control. **Local** mode operation may be superseded by **Communications** activity.

Example: With the EOI set to **Local** and the [LCD Port Connection](#) set to **TTL**, an input signal received from the **Communication Card** or **RS232/RS485** will supersede any received **TTL** command.

The remaining control sources may be placed into the override mode using communications.

The source of the **Command** control signal may be selected by:

- The **F003** setting,
- Placing an item from the list below in the **Override** mode via communications, or
- Placing the EOI in the **Local** mode (places only the RS232/RS485 or the TTL in the Override mode).

Possible **Command** signal source selections include the following:

- Terminal Board (default),
- CN8 Option (Not Used),
- TTL,
- RS232/RS485,
- Communication Card, or

- **F003** setting (is used if no signal sources are in the Override mode).

Note: The **Terminal Board** is placed in the **Override** mode by assigning a discrete input terminal to **Terminal Command Priority** and connecting the terminal to **CC**. Upon activation (Run command required), the **Terminal Board** settings will be used for **Override Command** control (F, R, Preset Speeds, etc.).

Frequency Control (F004)

The **Frequency Mode 1** (or the Frequency Mode 2) setting establishes the user-selected source of the frequency-control input for the ASD. The signal source selected here is used for speed control unless the **Reference Priority Selection** parameter is configured to automatically switch this setting (see **F200**) or if the **Override** feature is enabled (via communications or via the Local mode operation).

Note: *Override means that a valid input from a source higher on the hierarchy is being received.*

Table 8 on page 44 shows the hierarchy of the control sources managed by the **Override** function. The level of the control item on the hierarchy is listed from left to right, most to least, respectively. As indicated in the table, the **F004** setting may be overridden by any of the other input sources.

Placing the EOI in the **Local** mode selects either the **RS232/RS485** or the **TTL** signal as the **Frequency Mode 1** control source. Once in the **Local** mode, the **LCD Port Connection** (Program ⇒ Communication ⇒ Communication Settings ⇒ **LCD Port Connection**) setting determines if the **RS232/RS485** or the **TTL** will be used for **Frequency Mode 1** control. **Local** mode operation may be superseded by **Communications** activity.

Example: With the EOI set to **Local** and the **LCD Port Connection** set to **TTL**, an input signal received from the **Communication Card** or **RS232/RS485** will supersede any received **TTL** command.

The remaining control sources may be placed into the override mode using communications.

The source of the **Frequency** control signal may be selected by:

- The **F004** setting,
- Placing an item from the list below in the **Override** mode via communications, or
- Placing the EOI in the **Local** mode (places only the RS232/RS485 or TTL in the Override mode).

Possible **Frequency** control source selections include the following:

- Communication Card,
- RS232/RS485,
- TTL,
- CN8 Option (Not Used),
- Terminal Board (default setting), or
- **F004** setting (used if no other items are in the Override mode).

Note: The **Terminal Board** is placed in the **Override** mode by assigning a discrete input terminal to **VI/II Terminal Frequency Priority** and connecting the terminal to **CC**. Upon activation, **VI/II** is used as the **Terminal Board Override** control item.

Command and Frequency Control Selections

Using [F003](#) and [F004](#), the user may select a **Command** source and a source for **Frequency** control. The default settings for **Command** and **Frequency** control are **Terminal Board** and **RR**, respectively.

To be placed into the **Override** mode, there need only be a valid signal received from one of the signal sources. If the valid signal is received via a signal source with a higher priority, it will supersede the command or frequency command received from another source.

The signal sources are continuously scanned to determine if any of the listed items are actively providing an input signal.

If no activity is detected on any of the listed signal sources, the settings of [F003](#) and [F004](#) will be used for **Command** and **Frequency** control, respectively.

Any or all of the **Command** and **Frequency** control input sources may be placed into the **Override** mode.

Placing the GX7R ASD in the **Local** mode (Local|Remote LED on) via the EOI places the **RS232/RS485** or the **TTL** control selections in the **Override** mode for **Command** and **Frequency** input. This selection is further defined by the setting of Program ⇒ Communication ⇒ Communication Settings ⇒ [LCD Port Connection](#).

The **Local|Remote** control **Override** feature for **Command** and **Frequency** (or either) may be enabled/disabled at Program ⇒ Utility Parameters ⇒ Prohibition ⇒ **Local|Remote Key Command** or **Frequency Override**.

Communications may be used to place the remaining **Command** and eligible **Frequency** control input sources in the **Override** mode. Once placed in the **Override** mode the setting is valid until it is cancelled, the power supply is turned off, or the ASD is reset.

Command and Frequency-Control Override Hierarchy

[Table 8](#) lists the input conditions and the resulting output control source selections for Command and Frequency control Override operation. The GX7R ASD reads the command registers of the listed control items from the left to the right. In the table the number 1 indicates that a valid input signal is active for that input source; X = Don't care; and 0 = Override Off.

The first item to be read that has the Override feature turned on will be used for Command or Frequency control.

Table 8. Command and Frequency Control Hierarchy.

Priority Level	1	2	3	4	5
Command/ Frequency Mode	Communication Card	RS232/ RS485	TTL	Terminal Board (Binary/BCD Input)	F003/F004
Communication Card	1	X	X	X	X
RS232/RS485	0	1	X	X	X
TTL	0	0	1	X	X
Terminal Board	0	0	0	1	X
F003/F004 Setting	0	0	0	0	F003/F004 Setting

Command Control Selections

The following is a listing and descriptions of the **Command Mode** (F003) selections (Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode).

Settings:

Terminal Board (default setting)

Allows for **Command** control input via the **Terminal Board** input terminals.

CN8 Option (Not Used)

This function is not used with the **GX7R ASD**.

TTL

Set the [LCD Port Connection](#) to **TTL** to use this feature.

RS232/RS485

Set the [LCD Port Connection](#) to **RS232/RS485** to use this feature.

Communication Card

Routes the control and monitoring I/O to CNU3 of the **Control Board** of the **GX7R ASD** (Communication Card connector).

Standard Mode
Command Mode
Use control terminal strip
Frq Mode #1:

Frequency Control Selections

The following is a listing and description of the **Frequency Mode** (F004) selections (Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode).

Settings:

VI/II

0 to 10-volt DC analog input connected to **VI** or a 4 – 20 mA (or 0 to 1 mA) DC current connected to **II** (cannot use both simultaneously).

RR (default setting)

0 to 10-volt DC analog input connected to **RR**.

RX

-10 to +10-volt DC analog input connected to **RX**.

RX2 (option)

-10 to +10-volt DC analog input connected to **RX2**.

CN8 Option (Not Used)

This function is not used with the **GX7R ASD**.

Binary/BCD Input

Allows for discrete input terminal input to control the ASD output.

TTL

To use the EOI for control requires that the [LCD Port Connection](#) be set to **TTL** to use this feature.

Standard Mode
Frq Mode #1
Use Common (TTL)

RS232/RS485

To use the EOI for control requires that the [LCD Port Connection](#) be set to **RS232/RS485** to use this feature.

Communication Card

Routes the control and monitoring I/O to CNU3 of the **Control Board** of the **GX7R ASD** (Option Card connector).

Motorized Pot

Discrete input terminals may be configured to increase or decrease the speed of the motor by momentarily connecting the assigned discrete input terminal to **CC**. See [Motorized Pot on pg. 196](#) for further information on this feature.

Pulse Input (option)

Configures the system to receive pulse input. See **PG Speed Reference Setpoint** on [pg. 122](#) for further information on this feature.

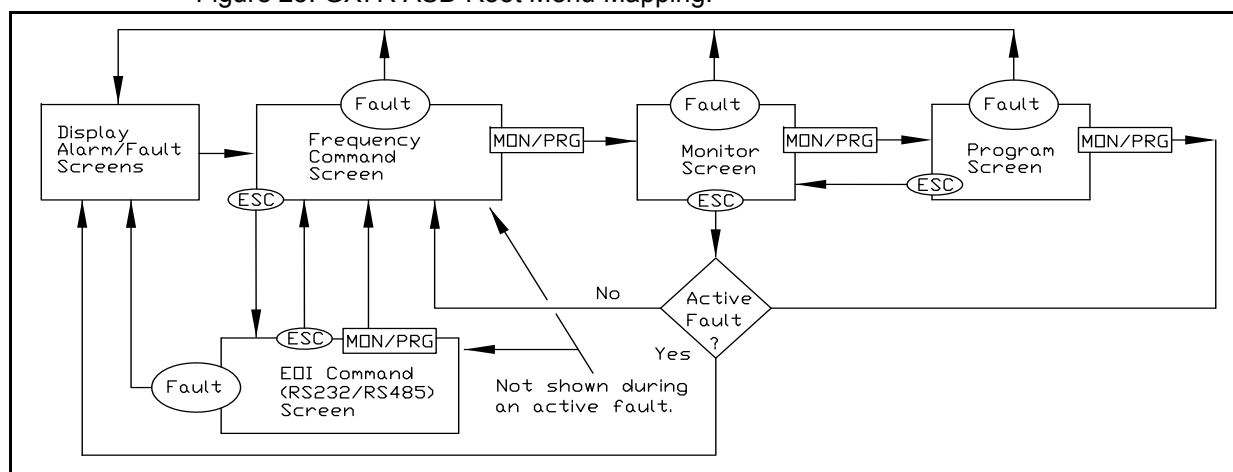
System Configuration and Menu Options

Root Menus

The **Mode** key accesses the three primary screens of the **GX7R ASD**: the **Frequency Command** screen, the **Monitor** screen, and the **Program** screen. From either screen, press the **Mode** key to loop through to the other two screens (see [Figure 25](#)). While on the **Frequency Command** screen, pressing the **ESC** key toggles the menu to and from the **Panel Menu** and the **Frequency Command** screen.

Note: Parameter changes made from the **Panel** menu are effective for **Local EOI control Only**.

Figure 25. GX7R ASD Root Menu Mapping.



Frequency Command Screen

Frequency Setting

While operating in the **Local** mode (Local|Remote LED is illuminated), the running frequency of the motor may be set from the **Frequency Command** screen. Using the **Rotary Encoder**, enter the **Frequency Command** value and then press the **Run** key. The motor will run at the **Frequency Command** speed and may be changed while running.

Scrolling Monitor

The Output Current and the ASD Load values are displayed below the **Frequency Command** parameter of the **Frequency Command** screen (default setting). Other user-selected parameters may be displayed on this screen for quick-access monitoring while running. These parameters may be accessed and enabled for display by placing a check in the box next to the item listed at Program ⇒ Monitor Setup ⇒ **Scrolling Monitor**. If no parameters are enabled for display, **No Items** is displayed.

When more than two items are selected for display the items are scrolled automatically. The display time for each selected item may be set from 1 to 60 seconds. The parameters that may be displayed on the **Scrolling Monitor** are listed in the section titled [Monitor Screen on pg. 49](#).

Panel Menu

The **Panel** menu is accessed by pressing **ESC** from the [Frequency Command](#) screen. The control settings of the **Panel** menu are effective for EOI control only.

The **Panel** menu provides quick access to the following menu parameters:

Direction — **Forward** or **Reverse**.

Stop Pattern — The **Decel Stop** or **Coast Stop** selection determines the method used to stop the motor when using the **Stop|Reset** key of the EOI. The **Decel Stop** setting enables the **Dynamic Braking** system setup at [F304](#) or the **DC Injection Braking** system setup at [F250](#), [F251](#), and [F252](#). The **Coast Stop** setting allows the motor to stop at the rate allowed by the inertia of the load.

Note: **Dynamic Braking** is not used with the *GX7R ASD*.

Note: The **Stop Pattern** setting has no effect on the **Emergency Off** settings of [F603](#).

V/f Group — One of four **V/f** profiles may be selected and run. Each **V/f** profile is comprised of four user settings: **Base Frequency**, **Base Frequency Voltage**, **Manual Torque Boost**, and **Electronic Thermal Protection**. Expanded descriptions of these parameters may be found in the section titled [Direct Access Parameter Information on pg. 78](#).

Accel/Decel Group — One of four **Accel/Decel** profiles may be selected and run. Each of the **Accel/Decel** profiles is comprised of three user settings: **Acceleration**, **Deceleration**, and **Pattern**. Expanded descriptions of these parameters may be found in the section titled [Direct Access Parameter Information on pg. 78](#).

Feedback in Panel Mode — This feature enables or disables the **PID** feedback function.

Torque Limit Group — This parameter is used to select one of four preset positive torque limits to apply to the active motor (of a multiple motor configuration). The settings of profiles 1 – 4 may be setup at [F441](#), [F444](#), [F446](#), and [F448](#), respectively.

Monitor Screen

The **Monitor** mode allows the user to monitor **GX7R ASD**/motor performance variables, ASD control settings, and configuration data during motor operation. The monitored parameters are listed and described below.

***Note:** The **Monitor** mode is a read-only mode. The settings **cannot** be changed from the **Monitor** mode. For information on how to change the values, see the section titled [Default Setting Changes on pg. 40](#).*

Running Frequency — Displays the **Output Frequency**.

Frequency Reference — Displays the **Frequency Setpoint**.

Output Current — Displays the **Output Current** of the ASD as a percentage of the rated capacity of the GX7R.

Bus Voltage — Displays the **Bus Voltage** as a percentage of the rated capacity of the GX7R.

Output Voltage — Displays the **Output Voltage** as a percentage of the rated capacity of the GX7R.

Discrete Input Terminal Status — Displays the status of the discrete input terminals of the **Control Terminal Strip**.

OUT1 OUT2 FL — Displays the status of the discrete output terminals of the **Control Terminal Strip**.

Timer — Displays the **Cumulative Run Time** in hours.

Postcomp Frequency — Displays the **Output Frequency** after the application of the slip compensation correction value.

Feedback (inst.) — Provides a status of the **Real Time Feedback** in Hz.

Feedback (1 second) — Provides a status of the **1-Second Averaging** feedback in Hz.

Torque — Displays the **Output Torque** as a percentage of the rated capacity of the GX7R.

Torque Reference — Displays the **Torque Reference** as a percentage.

Torque Current — Displays the current being used to produce torque.

Excitation Current — Displays the current required to produce the excitation field.

PID Value — Displays the **PID** feedback value in Hz (Proportional-Integral-Derivative).

Motor Overload — Displays the **Motor Overload** value as a percentage of the rated capacity of the motor.

ASD Overload — Displays the **ASD Overload** as a percentage of the rated capacity of the GX7R.

DBR Overload — Displays the **DBR Overload** value as a percentage of the **Dynamic Braking Resistor** capacity.

Motor Load — Displays the **Motor Load** in real time as a percentage of the rated capacity of the motor.

ASD Load — Displays the **ASD Load** as a percentage of the rated capacity of the GX7R.

DBR Load — Displays the **DBR Load** as a percentage of the **Dynamic Braking Resistor** capacity.

Input Power — Displays the **Input Power** in kilowatts (kW).

Output Power — Displays the **Output Power** in kilowatts (kW).

Peak Current — Displays the **Peak Current** since the last start was initiated. The current is displayed as a percentage of the rated capacity of the GX7R.

Peak Voltage — Displays the **Peak Voltage** since the last start was initiated. The voltage is displayed as a percentage of the rated capacity of the GX7R.

PG Speed — Displays the **PG Speed**.

Direction — Displays the **Direction** command (forward/reverse).

PG Position — Displays the **Pulse Generator Position**.

RR — Displays the **RR** input value as a percentage of the full range of the **RR** value (potentiometer input).

***VI/II** — Displays the **VI/II** input setting as a percentage of the full range of the **VI/II** value.

***Note:** * The **VI/II** input represents two analog inputs (and terminals). The **VI** input terminal is used for a 0 – 10 VDC analog signal and the **II** input terminal is used for current loop applications, such as with a 4-20 mA signal. Either may be used as a frequency or torque command source; however, the two cannot function simultaneously. Throughout this manual they will be listed as **VI/II**.*

RX — Displays the **RX** input setting as a percentage of the full range of the **RX** value (-10 to +10 VDC input).

RX2 — Displays the **RX2** input setting as a percentage of the full range of the **RX2** value.

***Note:** The **RX2** function is available on the **ASD-Multicom** option board only.*

FM — Displays the output frequency value as a percentage of the full range of the **FM** value.

AM — Displays the output current as a percentage of the full range of the **AM** value.

Option Type — Displays the type form number of the installed **ASD-Multicom** option board.

Option Term A — Not Used.

Option Term B — Not Used.

Option Term O — Not Used.

Option Term P — Not Used.

Max. Output — Not Used.

Pattern Select — Active Group Number and Speed Number separated by a period (e.g., 2.3).

Repeats Left — Number of remaining Speed cycles in the active Group.

Pattern — Active Speed Number of the Group.

Pattern Time Left — Time remaining in the active Speed.

Scrolling Monitor

All items of the [Monitor Screen](#) may be selected and displayed at the [Frequency Command](#) screen while running. The items are selected at Program \Rightarrow Monitor Setup \Rightarrow **Scrolling Monitor**. Place a check in the adjacent box of the monitored item of interest to display the item.

The display area at the **Frequency Command** screen is fixed and allows for two monitored items. If more than two items are selected for display, the items are scrolled at the one- to sixty-second rate set by the **Seconds Between Switch** user setting of the **Scrolling Monitor** screen.

If no items are selected, **No Items** is displayed at the **Frequency Command** screen.

The selected items, along with their real-time values, are displayed (and/or scrolled) on the **Frequency Command** screen while running.

Program Screen Menu Navigation

Table 9 lists the menu items of the **Program** mode and maps the flow of the menu selections. The **Parameter Numbers** for the listed functions are provided where applicable. The functions listed may be accessed (and changed) as mapped below or via the **Direct Access** method; Program ⇒ Direct Access ⇒ *applicable parameter number*.

Table 9. Program Mode Menu Items.

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
FUNDAMENTALS	Frequency Setting	Maximum Frequency	F011
		Upper Limit	F012
		Lower Limit	F013
		V/f Pattern	F015
	Standard Mode Selection	Command Mode	F003
		Frequency Mode #1	F004
		Frequency Mode #2	F207
		Reference Priority Selection	F200
		Mode #1/#2 Switching Frequency	F208
	Accel/Decel #1 Settings	Accel #1	F009
		Decel #1	F010
		Accel/Decel Pattern	F502
		Automatic Accel/Decel (check box)	F000
	Motor Set #1	#1 Base Frequency	F014
		#1 Max Output Voltage	F306
		#1 Torque Boost	F016
		#1 Electronic Thermal Protection Level	F600
STARTUP WIZARD	(See the section titled Startup Wizard Requirements on pg. 65.)		N/A
CHANGED FROM DEFAULT	(See the section titled Default Setting Changes on pg. 40.)		N/A
DIRECT ACCESS	(See the section titled Direct Access Parameter Information on pg. 78.)		N/A
EOI OPTION SETUPS	Contrast (adjustment)	Darker (highlight Darker and press Enter)	N/A
		Lighter (highlight Lighter and press Enter)	N/A
	Local Remote Key	Command (check box)	N/A
		Frequency (check box)	N/A
	Realtime Clock Setup	Date and time setting (requires RTC option)	N/A
	Preferences	Double Click Speed	N/A
		Arrow Speed	N/A
		Encoder Speed	N/A
		Encoder Action	N/A
	Alarm Popups (check box)	Over-Heat Alarm	N/A
		Undervoltage Alarm	N/A

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
EOI OPTION SETUPS	Alarm Popups (check box)	Over-Current Alarm	N/A
		ASD Overload Alarm	N/A
		Motor Overload Alarm	N/A
		Timer	N/A
		Over-Torque Alarm	N/A
		DBR Resistor Alarm	N/A
	Lockout (check box)	Lockout Reset	N/A
		Lockout Monitor	N/A
		Lockout Run/Stop	N/A
		Lockout Parameter Access	N/A
		Lockout Parameter Write	N/A
		Lockout Frequency Change	N/A
		Lockout Options	N/A
		Lockout Local Remote	N/A
		Password (Enable/Enter)	N/A
	Review Startup Screen	(displays the Startup screen)	N/A
UTILITY PARAMETERS	Versions (read only)	Typeform	N/A
		CPU Version	N/A
		CPU Revision	N/A
		EEPROM #1 Version	N/A
		EEPROM #2 Version	N/A
		EOI Version (keypad)	N/A
	Display Units	User-defined Units (check box)	N/A
		User-defined Units	N/A
		Hz Per User-defined Unit	F702
		Frequency Display Resolution	F703
		Units for Voltage and Current	F701
	Type Reset	None	F007
		Auto Setup for 50 Hz	
		Auto Setup for 60 Hz	
		Restore Factory Defaults	
		Clear Trip	
		Clear Run Timer	
		New Base Drive Board	
		Save User Parameters	
		Restore User Parameters	
		Reload EOI Flash (keypad)	
		Reset EOI Memory (keypad)	
		Comm. Stops During Reset	

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
TERMINAL SELECTION	Input Terminals	F	F111
		R	F112
		ST	F113
		RES	F114
		S1	F115
		S2	F116
		S3	F117
		S4	F117
		S5	F119
		S6	F120
		S7	F121
		12	F122
		13	F123
		14	F124
		15	F125
		16	F126
		ON	F110
	Output Terminals	Out 1	F130
		Out 2	F131
		FL	F132
		4	F133
		5	F134
		6	F135
		7	F136
	Analog Input Functions	Acc/Dec Base Frequency Adjustment	F650
		Upper-limit Frequency Adjustment	F651
		Acceleration Time Adjustment	F652
		Deceleration Time Adjustment	F653
		Torque Boost Adjustment	F654
	Reach Settings	Low Speed Signal Output Frequency	F100
		Speed Reach Setting Frequency	F100
	FP (Terminal Settings)	FP Terminal Meter Selection	F676
		FP Terminal Meter Adjustment	F677
	Input Special (Functions)	ST Signal Selection	F103
		F/R Priority Selection (w/both on)	F105
		Input Terminal Priority (check box)	F106
		Extended Terminal Function	F107
	Line Power Switching	(Commercial Power Switching) On Trip	F354

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
TERMINAL SELECTION	Line Power Switching	Switching-Frequency Setting and	F355
		ASD-Output Switching Wait-Time	F356
		Commercial Input-Power Wait-Time	F357
		Commercial-Power Switching-Frequency Hold-Time	F358
	Input Terminal Delays	F	F140
		R	F141
		ST	F142
		RES	F143
		S1-S4	F144
		S5-S16	F145
	Output Terminal Delays	OUT1 On Delay	F150
		OUT1 Off Delay	F160
		OUT2 On Delay	F151
		OUT2 Off Delay	F161
		FL On Delay	F152
		FL Off Delay	F162
		Out4 On Delay	F153
		Out4 Off Delay	F163
		Out5 On Delay	F154
		Out5 Off Delay	F164
		Out6 On Delay	F155
		Out6 Off Delay	F165
		Out7 On Delay	F156
		Out7 Off Delay	F166
FREQUENCY SETTING	Analog Filter	Analog Input Filter Selection	F209
	Speed Ref. Setpoints	VI/II	F201
		RR	F210
		RX	F216
		RX2	F222
		BIN	F228
		PG	F234
	Jog Settings	Jog Run Frequency	F260
		Jog Stop Control	F261
		Jog Window (check box)	
	Preset Speeds	#1 Frequency & Characteristics	F018
		#2 Frequency & Characteristics	F019
		#3 Frequency & Characteristics	F020
		#4 Frequency & Characteristics	F021

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
FREQUENCY SETTING	Preset Speeds	#5 Frequency & Characteristics	F022
		#6 Frequency & Characteristics	F023
		#7 Frequency & Characteristics	F024
		#8 Frequency & Characteristics	F287
		#9 Frequency & Characteristics	F288
		#10 Frequency & Characteristics	F289
		#11 Frequency & Characteristics	F290
		#12 Frequency & Characteristics	F291
		#13 Frequency & Characteristics	F292
		#14 Frequency & Characteristics	F293
		#15 Frequency & Characteristics	F294
	Preset Speed Mode	Use Preset Speed (check box)	F380
	Fwd/Rev Disable	Disable Forward Run/Disable Reverse Run (check box)	F311
	Motorized Pot Settings	Motorized Pot Setting Disposition at Power Down	F108
		Minimum Frequency	N/A
		Maximum Frequency	N/A
PROTECTION	Dynamic Braking	Dynamic Braking Configuration (Not Used)	F304
	Stall	Over-Current Stall Level	F601
		Over-Voltage Stall	F305
		Over-Voltage Stall Level Configuration	N/A
		Over-Voltage Stall Level (Fast)	F625
		Continuing Stall Period (During Positive Torque/Speed)	F452
		Stall Prevention During Regeneration	F453
	DC (Injection) Braking	DC Injection Start Frequency	F250
		DC Injection Braking Current	F251
		DC Injection Braking Time	F252
		Motor Shaft Fixing Control (check box)	F253
		Motor Shaft Stationary Control (check box)	F254
	Emergency Off Settings	Emergency Off Mode Configuration	F603
		DC Injection Braking Time	F604
		Emergency Off Activation of the FL Output (check box)	N/A
	Retry/Restart	Number of Retries	F303
		Restart Conditions (check box)	F301
		Scan Rate	F312
		Lock-on Rate	F313
		Search Method	F314
		Search Inertia	F315

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
PROTECTION	Undervoltage/ Ridethrough	Ridethrough Mode	F302
		Ridethrough Time	F310
		Undervoltage Stall Level	F629
		Undervoltage Trip (check box)	F627
		Undervoltage Detection Time	F628
	Overload	OL Reduction Starting Frequency	F606
		Motor 150% OL Time Limit	F607
		Soft Stall (check box)	F017
		Motor Overload Trip (check box)	N/A
		V/f Motor (check box)	N/A
	Trip Settings	Trip Save at Power Down (check box)	F602
	Cooling Fan Settings	Cooling Fan Control Mode	F620
	Cumulative Run Timer	Cumulative Run Timer Alarm Setting	F621
	Phase Loss	Output Phase Loss Detection (check box)	F605
	Low Current Settings	Low Current Trip/Alarm Configuration (check box)	F610
	Abnormal Speed Settings	Abnormal Speed Detection Filter Time	F622
		Over-Speed Detection Frequency Range	F623
		Speed Drop Detection Frequency Range	F624
	Arm Short (Circuit) Check	Short-Circuit-Pulse Run Command	F613
		Short-Circuit-Pulse Run Duration	F614
	Over Torque Settings	Over-Torque Trip (check box)	F615
		Over-Torque Trip/Alarm Level During Power Operation	F616
		Over-Torque Trip/Alarm Level During Regeneration	F617
		Over-Torque Detection Time	F618
	Brake Fault Timer	Braking Trouble Internal Timer	F630
		Release After Run Timer	F632
	Base Frequency Voltage	Supply Voltage Compensation (check box)	F307
		Output Voltage Limitation (check box)	
	Soft Start	Suppression of Inrush-Current Timing	F608
		Interlock with ST (check box)	F609
TORQUE SETTING	Setpoints	VI/II	F205
		RR	F214
		RX	F220
		RX2	F226
		BIN	F232

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
TORQUE SETTING	Torque Control	Torque Command Selection	F420
		Torque Command Filter	F421
		Synchronized Torque Bias Input Selection	F422
		Tension Torque Bias Input Selection	F423
		Load Sharing Gain Input Selection	F424
	Torque Limit Settings	Positive Torque Limit #1 Selection	F440
		Negative Torque Limit #1 Selection	F442
		Manual Settings	F441
		Torque Limit Mode	F450
		Torque Limit Mode (speed dependent)	F451
	Manual Torque Limit Settings	#1 Positive/Negative Torque Limit Settings	F441
		#2 Positive/Negative Torque Limit Settings	F444
		#3 Positive/Negative Torque Limit Settings	F446
		#4 Positive/Negative Torque Limit Settings	F448
	Torque Speed Limiting	Torque Command Mode Selection	F429
		Forward Speed Limit Selection	F425
		Forward Speed Limit Level	F426
		Reverse Speed Limit Selection	F427
		Reverse Speed Limit Level	F428
		Speed Limit Torque Reference Selection	F430
		Speed Limit Torque Level	F431
		Speed Limit Torque Band	F432
		Speed Limit Torque Recovery Time	F433
FEEDBACK PARAMETERS	Feedback Settings	Input Selection	F360
		Proportional (P) Gain	F362
		Integral (I) Gain	F363
		Differential (D) Gain	F366
		Delay Filter	F361
		Deviation Limits	F364
		Position Difference Limit	F631
	PG Settings	Number of PG Input Pulses	F367
		PG Input Phases	F368
		PG Disconnection Detection Selection	F369
		Electronic Gear Setting	F370
		Position Loop Gain	F371
		Positioning Completion Range	F372
		Frequency Limit at Position	F373
		Current Control Proportional Gain	F374
		Current Control Integral Gain	F375

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
FEEDBACK PARAMETERS	PG Settings	Speed Loop Proportional Gain	F376
		Speed Loop Integral Gain	F377
		Motor Counter Data Selection	F378
		Speed Loop Parameter Ratio	F379
	Drooping Control	Drooping Gain 100%	F320
		Speed at Drooping Gain 0%	F321
		Speed at Drooping Gain 100%	F322
		Drooping Insensitive Torque Band	F323
		Drooping Output Filter	F324
		Drooping Reference	F327
		Load Inertia (Acc/Dec Torque)	F325
		Load Torque Filter	F326
	Override Control	Adding Input Selection	F660
		Multiplying Input Selection	F661
		CN8 Option (Not Used) Override Multiplication Gain	F729
PATTERN RUN	Pattern Run	Pattern Run Mode and Restart Configuration	F520
	Speeds	Pattern #1 Speeds	F530
		Pattern #2 Speeds	F540
		Pattern #3 Speeds	F550
		Pattern #4 Speeds	F560
	Preset Speeds	#1 Frequency & Characteristics	F018
		#2 Frequency & Characteristics	F019
		#3 Frequency & Characteristics	F020
		#4 Frequency & Characteristics	F021
		#5 Frequency & Characteristics	F022
		#6 Frequency & Characteristics	F023
		#7 Frequency & Characteristics	F024
		#8 Frequency & Characteristics	F287
		#9 Frequency & Characteristics	F288
		#10 Frequency & Characteristics	F289
		#11 Frequency & Characteristics	F290
		#12 Frequency & Characteristics	F291
		#13 Frequency & Characteristics	F292
		#14 Frequency & Characteristics	F293
		#15 Frequency & Characteristics	F294
	Preset Speed Mode	Use Preset Speed	F380
COMMUNICATION	Communication Settings	ASD Number	F802
		Logic (TTL) Baud Rate	F800
		RS232/RS485 Baud Rate	F820

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
COMMUNICATION	Communication Settings	Parity	F801
		RS232/RS485 Communication Time Out Time	F803
		Logic (TTL) Communication Time Out Action	F804
		RS232/RS485 Communication Time Out Action	N/A
		Communication Interval (logic)	F805
		RS232/RS485 Wire Count	F821
		RS232/RS485 Response Time	F825
		TTL Master Output Selection	F806
		RS232/RS485 Master Output Selection	F826
		LCD Port Connection	N/A
	Communication Reference Adjust	Frequency Point Selection	F810
	S20 Settings (not used)	Receive Address	F860
		Transmit Address	F861
		Speed Reference Station	F862
		Speed Reference Address	F863
		Torque Reference Station	F865
		Torque Reference Address	F866
		Fault Detect Station Number	F868
		Station Mode	F869
		S20 Reset	F899
		Error Mode	F850
		Error Detect Time	F851
	Scan Receive Settings (not used)	#1 Scan Receive	F831
		#2 Scan Receive	F832
		#3 Scan Receive	F833
		#4 Scan Receive	F834
		#5 Scan Receive	F835
		#6 Scan Receive	F836
	Scan Transmit Settings (not used)	#1 Scan Transmit	F841
		#2 Scan Transmit	F842
		#3 Scan Transmit	F843
		#4 Scan Transmit	F844
		#5 Scan Transmit	F845
		#6 Scan Transmit	F846
	Communication Error (not used)	Command Request Disposition on Error	F830
	Optional Parameters (not used)	Optional Parameter #1	F890
		Optional Parameter #2	F891

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
COMMUNICATION	Optional Parameters (not used)	Optional Parameter #3	F892
		Optional Parameter #4	F893
		Optional Parameter #5	F894
METER TERMINAL ADJUSTMENT	FM	FM Terminal Assignment	F005
		FM Terminal Adjustment	F006
	AM	AM Terminal Assignment	F670
		AM Terminal Adjustment	F671
	Analog1	Analog 1 Terminal Assignment	F672
		Analog 1 Terminal Adjustment	F673
	Analog2	Analog 2 Terminal Assignment	F674
		Analog 2 Terminal Adjustment	F675
MOTOR PARAMETERS	Vector Motor Model	AutoTune and Reset Config.	F400
		AutoTune of Motor Constant 3	F414
		Slip Frequency Gain	F401
		Motor Constant 1 (primary resistance)	F402
		Motor Constant 2 (secondary resistance)	F403
		Motor Constant 3 (exciting inductance)	F404
		Motor Constant 4 (load inertia)	F405
		Motor Constant 5 (leakage inductance)	F410
	Motor Settings	Number of Motor Poles	F411
		Motor Capacity (kW)	F412
		Motor Type	F413
	Motor Set #1	#1 Base Frequency	F014
		#1 Max Output Voltage	F306
		#1 Torque Boost	F016
		#1 Electronic Thermal Protection Level	F600
	Motor Set #2	#2 Base Frequency	F170
		#2 Max Output Voltage	F171
		#2 Torque Boost	F172
		#2 Electronic Thermal Protection Level	F173
	Motor Set #3	#3 Base Frequency	F174
		#3 Max Output Voltage	F175
		#3 Torque Boost	F176
		#3 Electronic Thermal Protection Level	F177
	Motor Set #4	#4 Base Frequency	F178
		#4 Max Output Voltage	F179
		#4 Torque Boost	F180
		#4 Electronic Thermal Protection Level	F181

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
MONITOR SETUP	Trip History	Trip History Records	N/A
	Trip Monitor from ASD	Most Recent	N/A
		Second Most Recent	N/A
		Third Most Recent	N/A
		Fourth Most Recent	N/A
	Scrolling Monitor Select	Scrolling Monitor	N/A
SPECIAL CONTROL	Frequency Control	Start Frequency	F240
		End Frequency	F243
		Run Frequency	F241
		Run Frequency Hysteresis	F242
	Jump Frequencies	Jump Frequency Bandwidth Settings	F271
		Jump Frequency Processing Selection	F276
	Carrier Frequency	PWM Carrier Frequency Setting	F300
	Accel/Decel #1 – #4	Accel/Decel/Pattern #1 Configuration	F009
		Accel/Decel/Pattern #2 Configuration	F500
		Accel/Decel/Pattern #3 Configuration	F510
		Accel/Decel/Pattern #4 Configuration	F514
	Accel/Decel Special	S-Pattern Lower Limit Adjustment	F506
		S-Pattern Upper Limit Adjustment	F507
		Accel/Decel Time Lower Limit	F508
		Accel/Decel Switching Frequency #1	F505
		Accel/Decel Switching Frequency #2	F513
		Accel/Decel Switching Frequency #3	F517
		Accel/Decel Display Resolution	F704
	Crane/Hoist Load	Light-Load High-Speed Operation	F330
		Light-Load High-Speed Operation Switching Lower Limit Frequency	F331
		Light-Load High-Speed Operation Load Wait Time	F332
		Light-Load High-Speed Operation Load Detection Time	F333
		Light-Load High-Speed Operation Heavy-Load Detection Time	F334
		Switching Load Torque During Forward Run	F335
		Heavy-Load Torque During Forward Acceleration	F336
		Heavy-Load Torque During Fixed Speed Forward Run	F337
		Switching Load Torque During Reverse Run	F338
		Heavy-Load Torque During Reverse Acceleration	F339

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
SPECIAL CONTROL	Crane/Hoist Load	Heavy-Load Torque During Fixed Speed Reverse Run	F340
		Frequency for Automatic High-Speed Operation at Light Load	F341
	V/f Five Point Setting	#1 Frequency Setting	F190
		#1 Voltage Setting	F191
		#2 Frequency Setting	F192
		#2 Voltage Setting	F193
		#3 Frequency Setting	F194
		#3 Voltage Setting	F195
		#4 Frequency Setting	F196
		#4 Voltage Setting	F197
		#5 Frequency Setting	F198
		#5 Voltage Setting	F199
	Low Output Disable	LOD Control and Stopping Action	F731
		LOD Start Level (Hz)	F732
		LOD Start Time	F733
		LOD Setpoint Boost (Hz)	F734
		LOD Boost Time (Sec)	F735
		LOD Feedback Level (Hz)	F736
		LOD Restart Delay Time	F737
	Earth Fault	Earth Fault Alarm Level	F640
		Earth Fault Alarm Time	F641
		Earth Fault Trip Level	F642
		Earth Fault Trip Time	F643
	Special Parameters	V/f Adjustment Coefficient	F183
		0 Hz Dead Band Frequency Setting Signal	F244
		0 Hz Command Stop Function	F255
		Over-Exciting Cooperation	F481
		Stall Cooperation Gain at Field Weakening Zone	F485
		Exciting Starting Rate	N/A
		Compensation Coefficient for Iron Loss	F487
		Voltage Compensation Coefficient for Dead Time	N/A
		Dead Time Compensation	F489
		Dead Time Compensation Bias	F489
		Switching Frequency Between Current and Voltage	F491
		Optional Analog Terminal Mark	N/A
		Current Differential Gain	F454

Program Menu Navigation			
Primary Menu	Sub Menu	Parameter Name	Parameter Number
SPECIAL CONTROL	Special Parameters	Exciting Strengthening Coefficient	F480
		User Parameter Initialization During Typeform Initialization Enable/Disable	F709
		% Current Vector Control	F482
		% Voltage Vector Control	F483
		% Constant Vector Control	F484

Startup Wizard Requirements

The **Startup Wizard** assists the user with the initial configuration of the **GX7R ASD** by querying the user for information on the frequently used ASD control settings and system operational specifications. The GX7R ASD may also be setup by directly accessing each of the settings via the **Program** menu or the **Direct Access Number** for each item (see the section titled [Direct Access Parameter Information on pg. 78](#) for specifics on each parameter). Application-specific settings may still be required upon completion.

The **Startup Wizard** is launched from the **Program** menu.

Input the required information into the following screens to complete the **Startup Wizard**.

Select the input power specifications or click **Manually Configure- Finish** to exit.

Click **Next** or **Finish** after each subsequent window. **Next** opens the next **Startup Wizard** window. **Finish** returns the system to the [Frequency Command](#) screen.

1. Voltage and Frequency Rating of the Motor

Motors are designed and manufactured for operation within a specific voltage and frequency range. The voltage and frequency specifications for a given motor may be found on the nameplate of the motor.

Settings:

2 — 380 V, 50 Hz

3 — 460 V, 60 Hz

4 — 600 V – 690 V 50/60 Hz

Wizard: Motor Rating	
200V	50Hz
200/230V	60Hz

2. Upper Limit Frequency

This parameter sets the highest frequency that the GX7R ASD will accept as a frequency command or frequency setpoint. The GX7R ASD may output frequencies greater than the **Upper Limit Frequency** (but, less than the Maximum Frequency) when operating in the **PID Control** mode, **Torque Control** mode, or the **Vector Control** modes (sensorless or feedback).

Wizard: Max. Frq. (UL)	
What is your Upper Limit Frq?	
60.00	Hz
Next	

3. Lower Limit Frequency

This parameter sets the lowest frequency that the GX7R ASD will accept as a frequency command or frequency setpoint. The GX7R ASD will output frequencies lower than the **Lower Limit Frequency** when accelerating to the lower limit or decelerating to a stop. Frequencies below the **Lower Limit** may also be output when operating in the **PID Control** mode, **Torque Control** mode, or the **Vector Control** modes (sensorless or feedback).

Wizard: Min. Frq. (LL)	
What is your Lower Limit Frq?	
00.00	Hz
Next	

4. Adjust Accel/Decel Automatically?

When enabled, the GX7R ASD adjusts the acceleration and deceleration rates according to the applied load. The acceleration and deceleration times range from 12.5 to 800% of the programmed values [e.g., Acceleration Time 1 (F009) and Deceleration Time 1 (F010) adjusted for the actual Accel/Decel times used].

Settings:

0 — Disabled

1 — Enabled

The motor and the load must be connected prior to selecting **Automatic Accel/Decel**.

If **Automatic Accel/Decel** is not enabled, the **Acceleration** screen will appear followed by the **Deceleration** screen as shown below.

Acceleration Time	Deceleration Time
<div>Wizard: Acceleration</div> <div>What is your acceleration time?</div> <div><input type="text" value="10.0"/> sec</div> <div><input type="button" value="Next"/></div>	<div>Wizard: Deceleration</div> <div>What is your deceleration time?</div> <div><input type="text" value="10.0"/> sec</div> <div><input type="button" value="Next"/></div>

5. Volts Per Hertz Setting

This function establishes the relationship between the output voltage and the output frequency of the ASD.

Settings:

0 — Constant Torque

1 — Variable Torque

2 — Automatic Torque Boost

3 — Sensorless Vector Control (speed)

4 — Automatic Torque Boost with Automatic Energy Saving

5 — Sensorless Vector Control (speed) with Automatic Energy Saving

6 — V/f 5-Point Setting (opens 5-point setting screen)

7 — Sensorless Vector Control (speed/torque switching)

8 — PG Feedback Vector Control (speed/torque switching)

9 — PG Feedback Vector Control (speed/position switching)

Wizard: Volts/Hertz

Type of volts/hertz control?

6. Motor Current Rating

This parameter allows the user to input the full-load amperage (FLA) of the motor. This value is used by the GX7R ASD to determine the motor overload protection setting for the motor. The value is found on the nameplate of the motor.

Wizard: Motor Current

What is the rated current of your motor?

A

7. Command Source

This selection establishes the source of the **Run** commands (e.g., F, R, Stop, etc.).

Settings:

- 0 — Terminal Board
- 1 — CN8 Option (Not Used)
- 2 — TTL
- 3 — RS232/RS485
- 4 — Communication Card

Wizard: Command Source

Source of the Run/Stop and other commands?

Use RS232/485

Next

8. Frequency Command Source

This selection establishes the source of the **Frequency** (speed) command.

Settings:

- 1 — VI/II
- 2 — RR
- 3 — RX
- 4 — RX2 (option)
- 5 — CN8 Option (Not Used)
- 6 — Binary/BCD Input
- 7 — TTL
- 8 — RS232/RS485
- 9 — Communication Card
- 10 — UP/DOWN Frequency
- 11 — Pulse Input (option)

Wizard: Frequency Source

Frequency reference source?

Use Common (TTL)

Next

9. Wizard Finished!

This screen is the final screen of the **Startup Wizard**. The basic parameters of the **GX7R ASD** have been set. Click **Exit** to load the **Startup Wizard** input and to return to the **Frequency Command** screen. Additional application-specific programming may be required.

Wizard: Finished!

Other parameters may need adjustment. Read the manual to ensure proper setup.

Finish

Alarms, Trips, and Troubleshooting

Alarms and Trips

This section lists the available **User Notification** codes of the EOI display and provides information that assists the user in the event that a **Fault** is incurred. The **User Notification** codes are displayed as an indication that a system function or system condition is active (i.e., ATN or DBON). The code is displayed on the EOI for the duration of the activation.

If a user setting or an ASD parameter has been exceeded, or if a data transfer function produces an unexpected result, a condition that is referred to as a **Fault** is incurred.

An **Alarm** is an indication that a **Fault** is imminent if existing operating conditions continue unchanged. An **Alarm** may be associated with an output terminal to notify the operator of the condition remotely, close a contact, or engage a brake. At the least, an **Alarm** will cause an alarm code to appear on the EOI display. [Table 11 on pg. 70](#) lists the **Alarm** codes that may be displayed during operation of the **GX7R ASD**.

In the event that the condition that caused the **Alarm** does not return to its normal operating level within a specified time, the ASD **Faults** and a **Trip** is incurred (Fault and Trip are sometimes used interchangeably). A **Trip** is a safety feature, and is the result of a **Fault**, that disables the ASD system in the event that a subsystem of the ASD is malfunctioning, or one or more of the variables listed below exceeds its normal range (time and/or magnitude).

- Current,
- Voltage,
- Speed,
- Temperature,
- Torque, or
- Load.

See [Table 12 on pg. 72](#) for a listing of the potential **Trips** and the associated probable causes.

The operating conditions at the time of the trip may be used to help determine the cause of the trip. Listed below are operating conditions that may be used to assist the operator in correcting the problem or that the ASD operator should be prepared to discuss when contacting the [Toshiba Customer Support Center](#) for assistance.

- What is the ASD/Motor size?
- What trip information is displayed?
- Is this a new installation?
- Has the system ever worked properly and what are the recent modifications (if any)?
- Does the ASD trip when accelerating, running, decelerating, or when not running?
- Does the ASD reach the commanded frequency?
- Does the ASD trip without the motor attached?
- Does ASD trip with an unloaded motor?
- What is the CPU version and revision level?
- What is the EOI version?

User Notification Codes

The **User Notification** codes appear in the top right corner of the [Frequency Command](#) screen while the associated function is active.

User Notification codes notify the user of active functions that are typically only momentary under normal conditions and are active for the duration of activation only. User notification events are not error conditions and only convey active system functions to the user.

Table 10. GX7R ASD User Notification Codes.

EOI Display	Function	Description
Atn	Autotune active	Atn indicates that the Autotune function is active. If the initial Autotune fails for any reason, an automatic retry is initiated if Other is selected at F413 . Atn2 indicates that an Autotune retry is active for the duration of the automatic retry.
dbOn	DC Braking	This code conveys the DC Injection function being carried out. The display shows db when braking and shows dbOn when the motor shaft stationary function is being carried out.

Alarms

Table 11 lists the alarm codes that may be displayed during operation of the **GX7R ASD**. Each alarm code listed is accompanied by a description and a possible cause. In the event that the source of the malfunction cannot be determined, contact your the **Toshiba Customer Support Center** for further information on the condition and for an appropriate course of action.

The **Alarms** are listed in the top-down order that they are checked for activation. Only the first to be detected will be displayed on the **Frequency Command** screen.

Table 11. GX7R ASD Alarms.

EOI Display	Function	Description	Possible Causes
* Reset ignored if active.			
CM1	Comm1 Error	Internal communications error.	<ul style="list-style-type: none"> Improperly programmed ASD. Improper communications settings. Improperly connected cables.
CM2	Comm2 Error	External communications error.	
EMG	Emergency Off	Output signal from the ASD is terminated and a brake may be applied if so configured.	<ul style="list-style-type: none"> Stop/Reset pressed twice at the EOI. EOFF command received remotely. ASD reset required.
MOFF	Main Undervoltage	Undervoltage condition at the 3-phase AC input to the ASD.	<ul style="list-style-type: none"> Low 3-phase commercial power voltage too low.
OC	Over Current	ASD output current greater than F601 setting.	<ul style="list-style-type: none"> Defective IGBT (U, V, or W). ASD output to the motor is connected incorrectly. Disconnect the motor and retry. ASD output phase-to-phase short. The ASD is starting into a spinning motor. Motor/machine jammed. Mechanical brake engaged while the ASD is starting or while running. Accel/Decel time is too short. Voltage Boost setting is too high. Load fluctuations. ASD operating at an elevated temperature.
*OH	Overheat	ASD ambient temperature excessive.	<ul style="list-style-type: none"> ASD is operating at an elevated temperature. ASD is too close to heat-generating equipment. Cooling fan vent is obstructed (see Installing the ASD on pg. 15). Cooling fan is inoperative. Internal thermistor is disconnected.
OJ	Timer	Run-time counter exceeded.	<ul style="list-style-type: none"> Type Reset required; select Clear run timer.

EOI Display	Function	Description	Possible Causes
* Reset ignored if active.			
*OLI	ASD Overload	Load requirement in excess of the capability of the ASD.	<ul style="list-style-type: none"> The carrier frequency is too high. An excessive load. Acceleration time is too short. DC damping rate is set too high. The motor is starting into a spinning load after a momentary power failure. The ASD is improperly matched to the application.
OLM	Motor Overload	Load requirement in excess of the capability of the motor.	<ul style="list-style-type: none"> V/f parameter improperly set. Motor is locked. Continuous operation at low speed. The load is in excess of what the motor can deliver.
*OLR	Resistor Overload	Excessive current at the Dynamic Braking Resistor .	<ul style="list-style-type: none"> Deceleration time is too short. Unsupported DBR configuration attempt.
*OP	Overvoltage	DC bus voltage exceeds specifications.	<ul style="list-style-type: none"> ASD attempting to start into a spinning motor after a momentary power loss. Incoming commercial power is above the specified range. Decel time is too short. Voltage spikes at the 3-phase input; install inductive filter. DBR required. DBR resistance value is too high. DBR function is turned off. Overvoltage Stall feature is turned off. System is regenerating. Load instability. Disable the Ridethrough function (F302).
OT	Overtorque	Torque requirement in excess of the setting of F616 or F617 for a time longer than the setting of F618.	<ul style="list-style-type: none"> ASD is not correctly matched to the application. F616 or F617 setting is too low. Obstructed load.
*POFF	Control Undervoltage	Undervoltage condition at the 5, 15, or the 24 VDC supply.	<ul style="list-style-type: none"> Defective Control board. Excessive load on power supply. Low input voltage.
PtSt	Reference Point	Two speed-reference frequency setpoint values are too close to each other.	<ul style="list-style-type: none"> Two speed reference frequency setpoints are too close to each other (increase the difference).
UC	Undercurrent	Output current of the ASD is below the level defined at F611 and remains there for the time set at F612.	<ul style="list-style-type: none"> Adjust F611 and F612 to match the application.

Trips/Faults

A **Trip** is an ASD response to a **Fault** (though, Fault and Trip are sometimes used interchangeably). A **Trip** is a safety feature that disables the ASD system in the event that a subsystem of the ASD is experiencing an overload condition or a malfunction.

Listed in [Table 12](#) are the possible **Faults** that may cause a **Trip** and the possible causes. When a **Trip** is incurred the system displays the **Fault** screen. The **Fault** screen identifies the active **Fault**.

Table 12. GX7R ASD Faults.

Fault Screen Display	Possible Causes
ASD Overload	<ul style="list-style-type: none"> Acceleration time is too short. DC Injection current is too high. V/f setting needs to be adjusted. Motor running during restart. ASD or the motor is improperly matched to the application.
Autotune Error	<ul style="list-style-type: none"> Autotune readings that are significantly inconsistent with the configuration information. A non-3-phase motor is being used. Incorrect settings at F400, F413, or F414. Using a motor that has a significantly smaller rating than the ASD. ASD output cabling is too small, too long, or is being housed in a cable tray with other cables that are producing an interfering EMF. Motor is running during the Autotune function.
Communication Error	<ul style="list-style-type: none"> Communication malfunction. Improper or loose connection. Improper system settings.
Control Power Undervoltage	<ul style="list-style-type: none"> This fault is caused by an undervoltage condition at the 5, 15, or the 24 VDC supply. 3-phase input voltage low.
CPU Fault	<ul style="list-style-type: none"> CPU malfunction.
MOFF	<ul style="list-style-type: none"> 3-phase input voltage low. Defective control board. Excessive load on the power supply. Undervoltage/Ridethrough settings require adjustment.
DC Fuse Open	<ul style="list-style-type: none"> Internal DC bus fuse is open. Confirm at Fuse Open LED at the Gate Driver Board.
<p>Note: The event that caused the Trip(s) must be corrected or must decrease to less than the threshold value required to cause the trip to allow for a Reset to be recognized. In the event of multiple active trips, the trip displayed will remain until all faults are corrected and all trips are cleared.</p>	

Fault Screen Display	Possible Causes
Dynamic Braking Resistor Overcurrent	<ul style="list-style-type: none"> • Unsupported DBR configuration attempt. • ASD inability to discharge the bus voltage during regeneration. • No dynamic braking resistor (DBR) installed. • Deceleration time is too short. • Improper DBR setup information. • Defective IGBT7 (or IGBT7 circuit). • 3-phase input voltage is above specification.
Dynamic Braking Resistor Overload	<ul style="list-style-type: none"> • Unsupported DBR configuration attempt. • Deceleration time is too short. • DBR setting adjustment required. • Overvoltage Stall setting adjustment required.
Earth Fault	<ul style="list-style-type: none"> • Ground fault at the motor. • Ground fault at the output of the ASD. • Current leakage to Earth Ground.
EEPROM Data Fault	<ul style="list-style-type: none"> • EEPROM read malfunction.
EEPROM Fault	<ul style="list-style-type: none"> • EEPROM write malfunction.
Emergency Off	<ul style="list-style-type: none"> • Emergency Off command received via EOI or remotely.
Encoder Loss	<ul style="list-style-type: none"> • Encoder signal missing while running during closed-loop operation.
Flash Memory Fault	<ul style="list-style-type: none"> • Flash memory malfunction.
Gate Array Fault	<ul style="list-style-type: none"> • Defective Gate Array or Gate Array malfunction.
Input Phase Loss	<ul style="list-style-type: none"> • 3-phase input to the ASD is low or missing.
Load Drooping	<ul style="list-style-type: none"> • Load requirement is in excess of the capabilities of the motor.
Load End Short Circuit	<ul style="list-style-type: none"> • Improper wiring at the ASD output to the motor.
Low Current	<ul style="list-style-type: none"> • Improper Low Current detection level setting.
Main Board EEPROM Fault	<ul style="list-style-type: none"> • Internal EEPROM malfunction.
Motor Overload	<ul style="list-style-type: none"> • V/f setting needs to be adjusted. • Motor is locked. • Continuous operation at low speed. • Load requirement exceeds ability of the motor. • Startup frequency setting adjustment required.
No Fault	<ul style="list-style-type: none"> • No active faults.
Option Fault	<ul style="list-style-type: none"> • Optional device malfunction. • Improper system settings (at ASD or optional device). • Loose or improper connection.
<p>Note: The event that caused the Trip(s) must be corrected or must decrease to less than the threshold value required to cause the trip to allow for a Reset to be recognized. In the event of multiple active trips, the trip displayed will remain until all faults are corrected and all trips are cleared.</p>	

Fault Screen Display	Possible Causes
Output Current Protection Fault	<ul style="list-style-type: none"> Output current is not within specified limits. Loose or improper ASD-to-motor connection.
Output Phase Loss	<ul style="list-style-type: none"> 3-phase output from the ASD is low or missing.
Overcurrent During Acceleration	<ul style="list-style-type: none"> V/f setting needs to be adjusted. Restart from a momentary power outage. The ASD is starting into a rotating motor. ASD/Motor not properly matched. Phase-to-phase short (U, V, or W). Accel time too short. Voltage Boost setting is too high. Motor/machine jammed. Mechanical brake engaged while the ASD is running. ASD current exceeds 340% of the rated FLA on ASDs that are 100 HP or less during acceleration. On ASDs that are greater than 100 HP, this fault occurs when the ASD current exceeds 320% of the rated FLA during acceleration.
Overcurrent During Deceleration	<ul style="list-style-type: none"> Phase-to-phase short (U, V, or W). Deceleration time is too short. Motor/machine jammed. Mechanical brake engaged while the ASD is running. ASD current exceeds 340% of the rated FLA on ASDs that are 100 HP or less during deceleration. On ASDs that are greater than 100 HP, it occurs when the ASD current exceeds 320% of the rated FLA during deceleration.
Overcurrent During Run	<ul style="list-style-type: none"> Load fluctuations. ASD is operating at an elevated temperature. ASD current exceeds 340% of the rated FLA on ASDs that are 100 HP or less during a fixed-speed run or if during a fixed-speed run the ASD overheats. On ASDs that are greater than 100 HP, it occurs when the ASD current exceeds 320% of the rated FLA on a fixed-speed run.
Overheat	<ul style="list-style-type: none"> Cooling fan inoperative. Ventilation openings are obstructed. Internal thermistor is disconnected.
Over Speed	<ul style="list-style-type: none"> Result of a motor speed that is greater than the commanded speed when using an encoder for speed control. Improper encoder connection or setup information. Defective encoder.
<p>Note: The event that caused the Trip(s) must be corrected or must decrease to less than the threshold value required to cause the trip to allow for a Reset to be recognized. In the event of multiple active trips, the trip displayed will remain until all faults are corrected and all trips are cleared.</p>	

Fault Screen Display	Possible Causes
Overtorque	<ul style="list-style-type: none"> A torque requirement by the load in excess of the setting of F616 or F617 for a time longer than the setting of F618. The ASD is improperly matched to the application. The load is obstructed.
Overvoltage During Acceleration	<ul style="list-style-type: none"> Motor running during restart.
Overvoltage During Deceleration	<ul style="list-style-type: none"> Deceleration time is too short. DBR value is too high. DBR required (DBR setup required). Stall protection is disabled. 3-phase input voltage is out of specification. Input reactance required.
Overvoltage During Run	<ul style="list-style-type: none"> Load fluctuations. 3-Phase input voltage out of specification.
PG Type/Connection Error	<ul style="list-style-type: none"> ASD is configured to receive a signal from a shaft-mounted encoder and no signal is being received while running. Disconnection at the Encoder circuit. Motor is stopped and is generating torque via torque limit control. ASD is not configured properly.
Phantom Fault	<ul style="list-style-type: none"> In a multiple ASD configuration a faulted ASD signals the remaining ASDs that a fault has occurred and shuts down the non-faulted ASDs.
Position Deviation Error	<ul style="list-style-type: none"> Operating in the Position Control mode and the resulting position exceeds the limits of the F631 setting.
RAM Fault	<ul style="list-style-type: none"> Internal RAM malfunction.
ROM Fault	<ul style="list-style-type: none"> Internal ROM malfunction.
Sink/Source Setting Error	<ul style="list-style-type: none"> Improperly positioned Sink/Source jumper on the control board or on an option device. Sink/Source configuration of an option device is incorrect.
Torque Proving Fault	<ul style="list-style-type: none"> Lift-First Pulse Count (F743) adjustment required.
Typeform Error	<ul style="list-style-type: none"> Firmware information (typeform) loaded into the Gate Driver board is inconsistent with the device in which the firmware is being used. The Gate Driver board has been replaced. The Gate Driver board is defective.
U Phase Short Circuit	<ul style="list-style-type: none"> Low impedance at the U lead of the ASD output.
V Phase Short Circuit	<ul style="list-style-type: none"> Low impedance at the V lead of the ASD output.
W Phase Short Circuit	<ul style="list-style-type: none"> Low impedance at the W lead of the ASD output.
<p>Note: The event that caused the Trip(s) must be corrected or must decrease to less than the threshold value required to cause the trip to allow for a Reset to be recognized. In the event of multiple active trips, the trip displayed will remain until all faults are corrected and all trips are cleared.</p>	

Viewing Trip Information

In the event that the condition that caused the **Alarm** does not return to the normal operating range within a specified time, the ASD **Faults** and a **Trip** is incurred.

When a trip occurs, the resultant error information may be viewed either from the [Trip History](#) screen (Program ⇒ Monitor Setup ⇒ Trip History), the [Trip Monitor from ASD](#) screen (Program ⇒ Monitor Setup ⇒ Trip Monitor From ASD), or from the [Monitor Screen](#).

Trip History

The **Trip History** screen records the system parameters for up to 101 trips (RTC option required). The recorded trips are numbered from zero to 100. Once the **Trip History** record reaches trip number 100, the oldest recorded trip will be deleted with each new record stored (first-in first-out). The **Trip #** field may be selected and scrolled through to view the recorded trip information for a given trip number. The monitored parameters are listed in [Table 13](#) as **At-trip Recorded Parameters** (parameter readings at the time that the trip occurred).

Table 13. GX7R ASD Trip History Record Parameters (RTC option required).

At-trip Recorded Parameters			
Trip records that are assigned zero and one are comprised of the full list of monitored parameters (32). Trip records 2 – 18 are comprised of parameters 1 – 16. Trip records 19 – 100 are comprised of parameters 1 – 7.			
1) Trip Number	9) Bus Voltage	17) Torque Reference	25) ASD Load
2) Trip Type	10) Discrete Input Status	18) Torque Current	26) DBR Load
3) Time and Date	11) OUT1/OUT2/FL Status	19) Excitation Current	27) Input Power
4) Frequency at Trip	12) Timer	20) PID Value	28) Output Power
5) Output Current	13) Post Compensation Frequency	21) Motor Overload	29) Peak Current
6) Output Voltage	14) Feedback (inst.)	22) ASD Overload	30) Peak Voltage
7) Direction	15) Feedback (1 sec.)	23) DBR Overload	31) PG Speed
8) Frequency Reference	16) Torque	24) Motor Load	32) PG Position

Trip Monitor from ASD

The **Trip Monitor From ASD** function records the trip name of up to four trips and catalogs each trip as **Most Recent**, **Second Most Recent**, **Third Most Recent**, and **Fourth Most Recent**. Once reset (Clear Trip), the trip records are erased. If no trips have occurred since the last reset, **No Fault** is displayed for each trip record.

***Note:** An improper ASD setup may cause some trips — reset the ASD to the **Factory Default** settings before pursuing a systemic malfunction (Program ⇒ Utility Parameters ⇒ Type Reset ⇒ Restore Factory Defaults).*

Trip Record at Monitor Screen

The at-trip condition of the last incurred trip may be viewed at the **Monitor** screen (see [pg. 49](#)). The **Monitor** screen at-trip record is erased when the ASD is reset and may be viewed without the use of the RTC option.

Clearing a Trip

Once the cause of the trip has been corrected, performing a [Reset](#) re-enables the ASD for normal operation.

The record of a trip may also be cleared using either of the following methods:

- Cycling power (trip info may be saved via [F602](#) if desired),
- Pressing the **Stop|Reset** key twice,
- Remotely via the communications channel,
- Momentarily connecting terminal **RES** to **CC** of the **Control Terminal Strip**, or
- Via Program ⇒ Utility Parameters ⇒ Type Reset ⇒ **Clear Trip** (clears Trip Monitor From ASD).

Direct Access Parameter Information

The **GX7R ASD** allows the user direct access to the motor control functions. The functions listed below have an associated **Parameter Number** which accesses its setting. There are two ways in which the menu may be used to allow access to the motor-control parameters for modification: Program ⇒ *applicable menu path* or Program ⇒ Direct Access ⇒ *applicable parameter number*. Both methods access the parameter via the **Program** mode. Once accessed, the parameter may be viewed or changed.

The **Program** mode allows the user to develop an application-specific motor control profile. Motor control functions may be set to accommodate specific power and timing requirements for a given application. The configurable parameters of the **Program** mode are listed and described below.

***Note:** The setup procedures included within this section may require a **Reset** before performing the procedure. Application-specific settings may then be performed. The pre-Reset conditions may be saved (see [F007](#)).*

Direct Access Parameters/Numbers

Automatic Accel/Decel #1

Program ⇒ Fundamentals

This parameter **Enables/Disables** the ability of the ASD to adjust the acceleration and deceleration rates in accordance with the applied load automatically.

The adjusted acceleration and deceleration times range from 12.5% to 800% of the programmed values for **Acceleration Time #1** ([F009](#)) and **Deceleration Time #1** ([F010](#)).

Settings:

- 0 — Disabled
- 1 — Enabled (box checked)

***Note:** The motor and the load must be connected prior to selecting **Automatic Accel/Decel**.*

Direct Access Number — F000

Parameter Type — **Check Box**

Factory Default — **Disabled**

Changeable During Run — **No**

Command Mode Selection

Program ⇒ Fundamentals ⇒ Standard Mode Selection

The **Command Mode Selection** establishes the source of the command input for the ASD. **Command** inputs include **Run**, **Stop**, **Forward**, etc. The **Override** feature may supersede the **Command Mode Selection** setting (see [Command Mode and Frequency Mode Control on pg. 42](#)).

Settings:

- 0 — Use Terminal Board
- 1 — Use CN8 Option (Not Used)
- 2 — Use Common Serial (TTL)
- 3 — Use RS232/RS485
- 4 — Use Communication Card

Direct Access Number — F003

Parameter Type — **Selection List**

Factory Default — **Use Terminal Board**

Changeable During Run — **No**

Frequency Mode #1

Program ⇒ Fundamentals ⇒ Standard Mode Selection

The **Frequency Mode #1** setting establishes the source of the frequency-control input for the ASD. The **Override** feature may supersede the **Frequency Mode #1** setting (see [Command Mode and Frequency Mode Control on pg. 42](#)).

Note: Only **Bolded** items from the **Settings** list below may be placed in the **Override** mode. See the section titled [Command Mode and Frequency Mode Control on pg. 42](#) for further information on the **Override** feature.

Settings:

- 1 — **Use VI/II**
- 2 — Use RR
- 3 — Use RX
- 4 — Use Option Card RX2
- 5 — **Use CN8 Option** (Not Used)
- 6 — Use Binary/BCD Input
- 7 — **Use Common Serial (TTL)**
- 8 — **Use RS232/RS485**
- 9 — **Use Communication Card**
- 10 — Use Motorized Pot. Simulation
- 11 — Use Pulse Input Option

FM Terminal Assignment

Program ⇒ Meter Terminal Adjustment

This setting determines the output function of the **FM** analog output terminal. The **FM** output terminal produces an output current that is proportional to the magnitude of the function assigned to this terminal. The available assignments for this output terminal are listed in [Table 15 on pg. 198](#).

Note: To read **voltage** at this terminal a 100 – 500Ω resistor is required and it must be connected from FM (+) to FM (-). The voltage is read across the 100 – 500Ω resistor.

Current may be read by connecting an ammeter from FM (+) to FM (-).

The **FM** analog output has a maximum resolution of 1/1024. The **FM Terminal Adjustment** (F006) must be used to calibrate the output signal for a proper response. **SW-2** may be switched to allow for the full-range output to be either 0 – 1 mA or 4 – 20 mA when providing an output current, or either 0 – 1 or 1 – 7.5 volts when providing an output voltage at this terminal.

FM Terminal Adjustment

Program ⇒ Meter Terminal Adjustment

This function is used to calibrate the **FM** analog output terminal.

To calibrate the **FM** analog output, connect a meter (current or voltage) as described at [F005](#). With the drive running at a known frequency, adjust this parameter ([F006](#)) until the running frequency produces the desired DC level output at the **FM** terminal.

Direct Access Number — F004Parameter Type — **Selection List**Factory Default — **Use RR**Changeable During Run — **No**

Direct Access Number — F005Parameter Type — **Selection List**Factory Default — **Output Frequency**Changeable During Run — **Yes**

Direct Access Number — F006Parameter Type — **Numerical**Factory Default — **512**Changeable During Run — **Yes**

Minimum — 0

Maximum — 1280

Type Reset

Program ⇒ Utility Parameters

This feature assists the user when performing fault analysis or by allowing a quick system setup change when required. Performing a **Type Reset** results in one of the following user-selected post-reset configurations.

Settings:

- 0 — None
- 1 — Auto Setup for 50 Hz
- 2 — Auto Setup for 60 Hz
- 3 — Restore Factory Defaults
- 4 — Clear Trip
- 5 — Clear Run Timer
- 6 — New Base Drive Board
- 7 — *Save User Parameters
- 8 — Restore User Parameters
- 9 — Reload EOI Flash
- 10 — Reset EOI Memory

Note: *User settings that are stored in the memory of the EOI are not saved via the **Save User Parameters** selection. The unsaved functions include the **EOI Option Setups**, (Utility Parameters ⇒) **Display Units**, and (Monitor Setup ⇒) **Scrolling Monitor**.

Direct Access Number — F007Parameter Type — **Selection List**Factory Default — **None**Changeable During Run — **No****Direction (of motor rotation)**

No path available (Direct Access Only)

While operating using the **CN8 Option** (Not Used) this parameter sets the direction of motor rotation. This setting may be changed during operation. This setting will not override parameter **F311** (**Forward/Reverse Disable**).

If either direction is disabled via parameter **F311**, the disabled direction will not be recognized if commanded by the **CN8 Option**. If both directions are disabled via parameter **F311**, the direction command from the **CN8 Option** will determine the direction of the motor rotation.

Settings:

- 0 — Forward
- 1 — Reverse

Note: Press **ESC** from the **Frequency Command** screen to access the **Motor Direction** parameter.

Direct Access Number — F008Parameter Type — **Selection List**Factory Default — **Forward**Changeable During Run — **Yes**

Accel #1 Time

Program ⇒ Fundamentals ⇒ Accel/Decel #1 Settings

This parameter specifies the time in seconds for the drive to go from 0.0 Hz to the **Maximum Frequency** for the **#1 Acceleration** profile. The accel/decel pattern may be set using F502. The minimum accel/decel time may be set using F508.

Note: *An acceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads.
Automatic Accel/Decel and Stall settings may lengthen the acceleration time.*

Acceleration

The acceleration rate of a motor is determined by several factors: applied power, applied load, and the physical properties of the motor (winding parameters, motor size, etc.). The ASD will control the first of these factors: input power. The settings of the ASD control the frequency and amplitude of the applied voltage to the motor.

Under most operating conditions, as the output frequency of the drive goes up so does the output voltage (linear acceleration). The ASD has the ability to modify the relationship between frequency and voltage automatically to produce smoother operation or increased (starting) torque.

Decel #1 Time

Program ⇒ Fundamentals ⇒ Accel/Decel #1 Settings

This parameter specifies the time in seconds for the drive to go from the **Maximum Frequency** to 0.0 Hz for the **#1 Deceleration** profile. The accel/decel pattern may be set using F502.

When operating with the **Automatic Accel/Decel** enabled (F000) the minimum accel/decel time may be set using F508.

Note: *A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads.
Automatic Accel/Decel and Stall settings may lengthen the acceleration time.*

Maximum Frequency

Program ⇒ Fundamentals ⇒ Frequency Settings

This setting determines the absolute maximum frequency that the ASD can output. This setting is also referred to as **FH**.

Accel/decel times are calculated based on the **Maximum Frequency** setting.

Note: *This setting may not be lower than the **Upper Limit** setting (F012).*

Direct Access Number — F009

Parameter Type — **Numerical**

Factory Default — (ASD dependent)

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000

Units — Seconds

Direct Access Number — F010

Parameter Type — **Numerical**

Factory Default — (ASD dependent)

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — 6000

Units — Seconds

Direct Access Number — F011

Parameter Type — **Numerical**

Factory Default — **80.0**

Changeable During Run — **No**

Minimum — 30.0

Maximum — 299.0

Units — Hz

<p>Upper Limit Frequency</p> <p>Program ⇒ Fundamentals ⇒ Frequency Settings</p> <p>This parameter sets the highest frequency that the ASD will accept as a frequency command or frequency setpoint. The ASD may output frequencies higher than the Upper Limit Frequency (but, lower than the Maximum Frequency) when operating in the PID Control mode, Torque Control mode, or the Vector Control modes (sensorless or feedback).</p> <p><i>Note: This setting may not be higher than the Maximum Frequency (F011) setting.</i></p>	<p>Direct Access Number — F012</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 80.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>Lower Limit Frequency</p> <p>Program ⇒ Fundamentals ⇒ Frequency Settings</p> <p>This parameter sets the lowest frequency that the ASD will accept as a frequency command or frequency setpoint. The ASD will output frequencies lower than the Lower Limit Frequency when accelerating to the lower limit or decelerating to a stop. Frequencies below the Lower Limit may also be output when operating in the PID Control mode, Torque Control mode, or the Vector Control modes (sensorless or feedback).</p>	<p>Direct Access Number — F013</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — Upper Limit (F012)</p> <p>Units — Hz</p>
<p>Motor #1 Base Frequency</p> <p>Program ⇒ Fundamentals ⇒ Motor Set #1</p> <p>The Base Frequency setting determines the <u>frequency</u> at which the output <u>voltage</u> of the ASD reaches its maximum setting. The maximum voltage setting cannot be more than the input voltage (see Maximum Output Voltage at F306). There are four Base Frequency profile settings: #1 – #4.</p> <p><i>Note: For proper motor operation, the Base Frequency is normally set for the name-plated frequency of the motor.</i></p>	<p>Direct Access Number — F014</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 60.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 25.0</p> <p>Maximum — 299.0</p> <p>Units — Hz</p>

V/f Pattern

Program ⇒ Fundamentals ⇒ Frequency Settings

This function establishes the relationship between the output frequency and the output voltage.

Settings:

- 0 — Constant Torque
- 1 — Variable Torque
- 2 — Automatic Torque Boost
- 3 — Sensorless Vector Control (speed)
- 4 — Auto Torque Boost with Automatic Energy Savings
- 5 — Sensorless Vector Control (speed) with Automatic Energy Savings
- 6 — V/f 5-Point Setting (opens 5-point setting screen)
- 7 — Sensorless Vector Control (speed/torque switching)
- 8 — PG Feedback Vector Control (speed/torque switching)
- 9 — PG Feedback Vector Control (speed/position switching)

Note: For proper operation, the carrier frequency must be 2.2 kHz or above except while operating in the **Constant Torque**, **Variable Torque**, or the **5-Point Setting** modes.

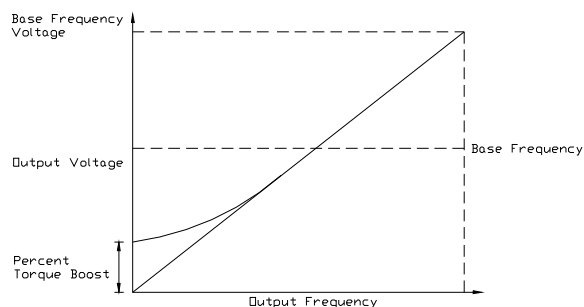
The **Automatic Torque Boost** and the **Sensorless Vector Control** selections use the motor tuning parameters of the drive to properly configure the ASD for the motor being used. If **Load Reactors** or **Long Lead Filters** are used, or if the capacity of the ASD is greater than the motor, manual tuning of the motor parameters may be required for optimum performance.

Motor #1 Torque Boost

Program ⇒ Fundamentals ⇒ Motor Set #1

The **Motor #1 Torque Boost** function is used to increase the low frequency torque for high-inertia loads by increasing the output voltage at frequencies below ½ of the **#1 Base Frequency (F014)** setting.

The value programmed as a boost percentage establishes an output voltage vs. output frequency relationship to be used to start the motor or to provide smoother operation.



Note: Setting an excessive **Torque Boost** level may cause nuisance tripping and mechanical stress to loads.

Direct Access Number — F015Parameter Type — **Selection List**Factory Default — **Constant Torque**Changeable During Run — **No****Direct Access Number — F016**Parameter Type — **Numerical**

Factory Default — (ASD dependent)

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 30.0

Units — %

Soft Stall

Program ⇒ Protection ⇒ Overload

This parameter **Enables/Disables** the **Soft Stall** function. When enabled, the **Soft Stall** function reduces the output frequency of the ASD when the current requirements of the motor exceed the **Electronic Thermal Protection #1** setting (**F600**); thus, reducing the output current.

If the current drops below the level setting within a specified time, the output of the ASD will accelerate to the programmed frequency setpoint. If not, a trip will be incurred.

The **Soft Stall** feature is available when the (Program ⇒ Protection ⇒ Overload ⇒) Motor Overload Trip (check box) parameter is enabled only.

Soft Stall is highly effective in preventing motor overload trips when used on fans, blowers, pumps, and other centrifugal loads which require less torque at lower frequencies.

Note: *The **Soft Stall** setting may affect acceleration times and patterns.*

Settings:

- 0 — Disabled
- 1 — Enabled (check box to enable)

Direct Access Number — F017

Parameter Type — **Check Box**

Factory Default — **Disabled**

Changeable During Run — **No**

Preset Speed #1

Program ⇒ Pattern Run ⇒ Preset Speeds

Up to 15 output frequency values that fall within the **Lower Limit** and the **Upper Limit** range may be programmed into the drive and output as a **Preset Speed**. This parameter assigns an output frequency to binary number 0001 and is identified as **Preset Speed #1**. The binary number is applied to **S1 – S4** of the **Terminal Board** to output the **Preset Speed**.

Perform the following setup to allow the system to receive **Preset Speed** control input at the **S1 – S4** terminals:

1. Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ **Use Terminal Board**.
2. Program ⇒ Terminal Selection ⇒ Input Terminals ⇒ **S1** (set to **Preset Speed Command 1**; LSB of 4-bit count). Repeat for **S2 – S4** (MSB of 4-bit count) as **Preset Speed Command 2 – 4**, respectively (all **Normally Open**).

Note: The default setting of **S4** is **EOff**, but this terminal may be re-assigned as the **MSB**.

3. Program ⇒ Frequency Setting ⇒ Preset Speeds ⇒ **1** (press **Enter** twice and set an output frequency as **Preset Speed #1**; repeat for **Preset Speeds 2 – 15** as required).
4. Program ⇒ Frequency Setting ⇒ Preset Speed Mode ⇒ **Use Speed Modes (Enable/Disable)**.
5. When **Enabled**, the direction, accel/decel, and torque settings of the **Preset Speed** being run are used.
6. When **Disabled**, only the speed setting of the **Preset Speed** being run is used.
7. Place the system in the **Remote** mode (**Local/Remote** LED Off).
8. Provide a **Run** command (connect **F** and/or **R** to **CC**).

Connect **S1** to **CC** to run **Preset Speed #1** (**S1** to **CC** = 0001 binary).

With **S1 – S4** configured to output **Preset Speeds (F115 – F118)**, 0001 – 1111 may be applied to **S1 – S4** of the **Terminal Board** to run the associated **Preset Speed**. If bidirectional operation is required, **F** and **R** must be connected to **CC**, and **Use Speed Modes** must be enabled at **F380**.

With **S1** being the least significant bit of a binary count, the **S1 – S4** settings will produce the programmed speed settings as indicated in the Preset Speed Truth Table to the right.

Preset Speeds are also used in the **Pattern Run** mode.

Preset Speed #2

Program ⇒ Pattern Run ⇒ Preset Speeds

This parameter assigns an output frequency to binary number 0010 and is identified as **Preset Speed #2**. The binary number is applied to **S1 – S4** of the **Terminal Board** to output the **Preset Speed** (see **F018** for further information on this parameter).

Direct Access Number — F018

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **Yes**

Minimum — **Lower Limit (F013)**

Maximum — **Upper Limit (F012)**

Units — Hz

Preset Speed Truth Table.

Preset	S4 MSB	S3	S2	S1 LSB	Output
1	0	0	0	1	F018
2	0	0	1	0	F019
3	0	0	1	1	F020
4	0	1	0	0	F021
5	0	1	0	1	F022
6	0	1	1	0	F023
7	0	1	1	1	F024
8	1	0	0	0	F287
9	1	0	0	1	F288
10	1	0	1	0	F289
11	1	0	1	1	F290
12	1	1	0	0	F291
13	1	1	0	1	F292
14	1	1	1	0	F293
15	1	1	1	1	F294
Note: 1 = Terminal connected to CC.					

Direct Access Number — F019

Parameter Type — **Numerical**

Factory Default — **0.0**

Changeable During Run — **Yes**

Minimum — **Lower Limit (F013)**

Maximum — **Upper Limit (F012)**

Units — Hz

Preset Speed #3 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 0011 and is identified as Preset Speed #3 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F020 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #4 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 0100 and is identified as Preset Speed #4 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F021 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #5 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 0101 and is identified as Preset Speed #5 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F022 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #6 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 0110 and is identified as Preset Speed #6 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F023 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #7 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 0111 and is identified as Preset Speed #7 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F024 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Low Speed Signal Output Frequency Program ⇒ Terminal Selection ⇒ Reach Settings The Low Speed Signal Output Frequency parameter sets a frequency threshold that activates the assigned output terminal so long as the ASD output is at or above this setting (see Table 16 on pg. 199 for the available output assignments).	Direct Access Number — F100 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — Max. Freq. (F011) Units — Hz

Speed Reach Frequency

Program ⇒ Terminal Selection ⇒ Reach Settings

The **Speed Reach Frequency** sets a frequency threshold that, when reached or is within the bandwidth specified by parameter [F102](#), will provide a signal at an output terminal that can close an appropriately configured output contact (see [Table 16 on pg. 199](#) for the available output assignments).

Direct Access Number — F101Parameter Type — **Numerical**Factory Default — **0.0**Changeable During Run — **Yes**

Minimum — 0.0

Maximum — **Max. Freq. (F011)**Units — Hz

Speed Reach Frequency Range

Program ⇒ Terminal Selection ⇒ Reach Settings

This parameter sets the bandwidth of the **Speed Reach Frequency** ([F101](#)) setting.

Direct Access Number — F102Parameter Type — **Numerical**Factory Default — **2.5**Changeable During Run — **Yes**

Minimum — 0.0

Maximum — **Max. Freq. (F011)**Units — Hz

ST Signal Selection

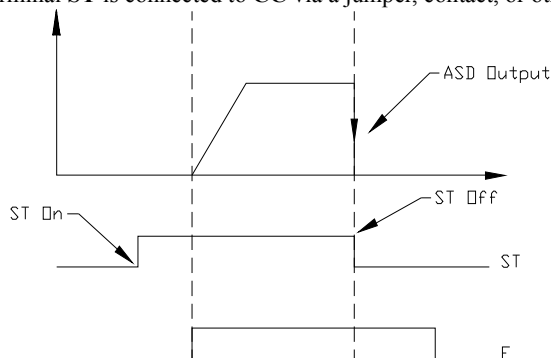
Program ⇒ Terminal Selection ⇒ Input Special

This parameter is used to set the operation of the **Standby (ST)** control terminal or any terminal configured as the **ST** terminal.

Settings:

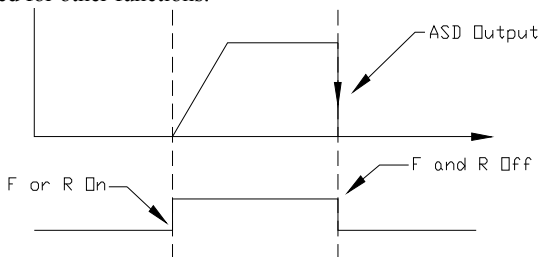
- 0 — ST-to-CC Required
- 1 — ST-to-CC Not Required
- 2 — Interlock with F/R Terminal

The setting **ST-to-CC Required** enables the ASD for operation so long as the control terminal **ST** is connected to **CC** via a jumper, contact, or other means.



The **ST-to-CC Not Required** setting allows the ASD to operate without the **ST-to-CC** connection. The control terminal **ST** may be configured for other functions.

The **Interlock with F/R Terminal** setting configures the **F (Forward)** and **R (Reverse)** control terminals for the secondary function of **Standby**. Closing a set of contacts to either **F** or **R** will cause the ASD to accelerate the motor to the programmed setpoint of **F** or **R**. Opening the **F** and **R** contact will disable the ASD and the motor will coast to a stop. The control terminal **ST** may be configured for other functions.



R/F Priority Selection

Program ⇒ Terminal Selection ⇒ Input Special

The **R/F Priority Selection** determines the operation of the ASD if both the **R** and **F** control terminals are activated.

Settings:

- 0 — Reverse
- 1 — Suspend

The waveforms below depict the motor response for all combinations of the **F** and **R** terminal settings if the **Reverse** option is chosen.

The **Suspend** setting will decelerate the motor to a stop regardless of the rotation direction when both the **F** and **R** control terminals are activated.

Direct Access Number — F103

Parameter Type — Selection List

Factory Default — ST – CC Required

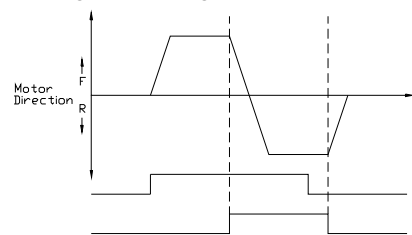
Changeable During Run — No

Direct Access Number — F105

Parameter Type — Selection List

Factory Default — Reverse

Changeable During Run — No



Input Terminal Priority

Program ⇒ Terminal Selection ⇒ Input Special

This parameter is used to allow the **Jog** and **DC Injection Braking** input signals to control the ASD when received via the **Terminal Board** even though the system is in the **Local** mode.

With this parameter enabled, a **Jog** command or a **DC Injection Braking** command received from the **Terminal Board** will receive priority over commands from the EOI.

See [F260](#) for further information on using the **Jog** function.

See [F250 – F252](#) for further information on **DC Injection Braking**.

Settings:

- 0 — Enabled (box checked)
- 1 — Disabled

Direct Access Number — F106

Parameter Type — **Check Box**

Factory Default — **Disabled**

Changeable During Run — **No**

Extended Terminal Function

Program ⇒ Terminal Selection ⇒ Input Special

The **Extended Terminal Function** is used with the optional **ASD-Multicom** card only. This parameter defines the format of the binary or BCD data when using the option card.

Settings:

- 0 — None
- 1 — 12-Bit Binary
- 2 — 16-Bit Binary
- 3 — 3-Digit BCD
- 4 — 4-Digit BCD
- 5 — Reverse 12-Bit Binary
- 6 — Reverse 16-Bit Binary
- 7 — Reverse 3-Digit BCD
- 8 — Reverse 4-Digit BCD

Selections using 16-bit binary or 4-digit BCD will require the configuration of terminals S1-S4 on the **Terminal Board** as binary bits 0 – 3 ([F115 – F118](#)). The **Frequency Mode #1 Selection (F004)** must be set to **Use Binary/BCD Input**.

For proper scaling of the binary or BCD input, parameters [F228 – F231](#) must be configured [**BIN Reference Point #1**, **BIN Reference #1 (frequency)**, **Bin Reference Point #2**, and **BIN Reference #2 (frequency)**].

Direct Access Number — F107

Parameter Type — **Selection List**

Factory Default — **None**

Changeable During Run — **No**

<p>Motorized Pot Frequency at Power Down</p> <p>Program ⇒ Frequency Setting ⇒ Motorized Pot</p> <p>When the Frequency Mode #1 Selection (F004) setting is set to Use MOP Function Simulation, this parameter determines the outcome of the Frequency Mode #1 setting at powerdown or stop.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Erase 1 — Store <p>If Erase is selected, the ASD will not store the frequency setpoint and establishes a setpoint of 0.0 Hz when restarted.</p> <p>If Store is selected, the ASD will maintain the current frequency setpoint in memory while stopped, during fault conditions, or when power is removed. This setpoint will be used as the initial frequency setpoint when the ASD is restarted.</p> <p>A control terminal configured as MOP Frequency Clear will establish a frequency setpoint of 0.0 Hz regardless of the Motorized Pot Frequency at Power Down setting.</p>	<p>Direct Access Number — F108</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Erase</p> <p>Changeable During Run — No</p>
<p>ON Input Terminal Assignment</p> <p>Program ⇒ Terminal Selection ⇒ Input Terminals</p> <p>This parameter selects the functionality of the virtual input terminal ON. As a virtual terminal, the ON control terminal exists only in memory and is considered to always be in its True (or connected to CC) state.</p> <p>It is often practical to assign this terminal to a function that the user desires to be maintained regardless of external conditions or operations.</p> <p>This parameter sets the programmable ON terminal to the user-selected item of Table 14 on pg. 194.</p>	<p>Direct Access Number — F110</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Unassigned</p> <p>Changeable During Run — No</p>
<p>F Input Terminal Assignment</p> <p>Program ⇒ Terminal Selection ⇒ Input Terminals</p> <p>This parameter selects the functionality of the F input terminal.</p> <p>In addition, the input terminal must be specified as Normally Open or Normally Closed.</p> <p>This parameter sets the programmable F terminal to the user-selected item of Table 14 on pg. 194.</p>	<p>Direct Access Number — F111</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Forward</p> <p>Changeable During Run — No</p>
<p>R Input Terminal Assignment</p> <p>Program ⇒ Terminal Selection ⇒ Input Terminals</p> <p>This parameter selects the functionality of the R input terminal.</p> <p>In addition, the input terminal must be specified as Normally Open or Normally Closed.</p> <p>This parameter sets the programmable R terminal to the user-selected item of Table 14 on pg. 194.</p>	<p>Direct Access Number — F112</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Reverse</p> <p>Changeable During Run — No</p>

ST Input Terminal Assignment Program ⇒ Terminal Selection ⇒ Input Terminals This parameter selects the functionality of the ST input terminal. In addition, the input terminal must be specified as Normally Open or Normally Closed . This parameter sets the programmable ST terminal to the user-selected item of Table 14 on pg. 194 .	Direct Access Number — F113 Parameter Type — Selection List Factory Default — Standby Changeable During Run — No
RES Input Terminal Assignment Program ⇒ Terminal Selection ⇒ Input Terminals This parameter selects the functionality of the RES input terminal. In addition, the input terminal must be specified as Normally Open or Normally Closed . This parameter sets the programmable RES terminal to the user-selected item of Table 14 on pg. 194 .	Direct Access Number — F114 Parameter Type — Selection List Factory Default — Reset Changeable During Run — No
S1 Input Terminal Assignment Program ⇒ Terminal Selection ⇒ Input Terminals This parameter selects the functionality of the S1 input terminal. In addition, the input terminal must be specified as Normally Open or Normally Closed . This parameter sets the programmable S1 terminal to the user-selected item of Table 14 on pg. 194 .	Direct Access Number — F115 Parameter Type — Selection List Factory Default — Preset Speed Cmd #1 Changeable During Run — No
S2 Input Terminal Assignment Program ⇒ Terminal Selection ⇒ Input Terminals This parameter selects the functionality of the S2 input terminal. In addition, the input terminal must be specified as Normally Open or Normally Closed . This parameter sets the programmable S2 terminal to the user-selected item of Table 14 on pg. 194 .	Direct Access Number — F116 Parameter Type — Selection List Factory Default — Preset Speed Cmd #2 Changeable During Run — No
S3 Input Terminal Assignment Program ⇒ Terminal Selection ⇒ Input Terminals This parameter selects the functionality of the S3 input terminal. In addition, the input terminal must be specified as Normally Open or Normally Closed . This parameter sets the programmable S3 terminal to the user-selected item of Table 14 on pg. 194 .	Direct Access Number — F117 Parameter Type — Selection List Factory Default — Preset Speed Cmd #3 Changeable During Run — No
S4 Input Terminal Assignment Program ⇒ Terminal Selection ⇒ Input Terminals This parameter selects the functionality of the S4 input terminal. In addition, the input terminal must be specified as Normally Open or Normally Closed . This parameter sets the programmable S4 terminal to the user-selected item of Table 14 on pg. 194 .	Direct Access Number — F118 Parameter Type — Selection List Factory Default — Emergency Off Changeable During Run — No

S5 Input Terminal Assignment

Program ⇒ Terminal Selection ⇒ Input Terminals

This parameter selects the functionality of the **S5** input terminal.

Note: *The **S5** input terminal may be used without the **ASD-Multicom** option board.*

*Without the **ASD-Multicom** option board the **S5** terminal assignment information will be stored in volatile memory. The terminal assignment information will be lost if the system is powered down or reset.*

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

This parameter sets the programmable **S5** terminal to the user-selected item of [Table 14 on pg. 194](#).

Direct Access Number — F119

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

S6 Input Terminal Assignment

Program ⇒ Terminal Selection ⇒ Input Terminals

This parameter selects the functionality of the **S6** input terminal.

Note: *The **S6** input terminal may be used without the **ASD-Multicom** option board.*

*Without the **ASD-Multicom** option board the **S6** terminal assignment information will be stored in volatile memory. The terminal assignment information will be lost if the system is powered down or reset.*

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

This parameter sets the programmable **S6** terminal to the user-selected item of [Table 14 on pg. 194](#).

Direct Access Number — F120

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

S7 Input Terminal Assignment

Program ⇒ Terminal Selection ⇒ Input Terminals

This parameter selects the functionality of the **S7** input terminal.

Note: *The **S7** input terminal may be used without the **ASD-Multicom** option board.*

*Without the **ASD-Multicom** option board the **S7** terminal assignment information will be stored in volatile memory. The terminal assignment information will be lost if the system is powered down or reset.*

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

This parameter sets the programmable **S7** terminal to the user-selected item of [Table 14 on pg. 194](#).

Direct Access Number — F121

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

Input Terminal 12 Assignment

Program ⇒ Terminal Selection ⇒ Input Terminals

This parameter selects the functionality of the #12 input terminal.

Note: *The #12 input terminal may be used without the ASD-Multicom option board.*

Without the ASD-Multicom option board the #12 terminal assignment information will be stored in volatile memory. The terminal assignment information will be lost if the system is powered down or reset.

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

This parameter sets the programmable #12 terminal to the user-selected item of [Table 14 on pg. 194](#).

Direct Access Number — F122

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

Input Terminal 13 Assignment

Program ⇒ Terminal Selection ⇒ Input Terminals

This parameter selects the functionality of the #13 input terminal.

Note: *The #13 input terminal may be used without the ASD-Multicom option board.*

Without the ASD-Multicom option board the #13 terminal assignment information will be stored in volatile memory. The terminal assignment information will be lost if the system is powered down or reset.

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

This parameter sets the programmable #13 terminal to the user-selected item of [Table 14 on pg. 194](#).

Direct Access Number — F123

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

Input Terminal 14 Assignment

Program ⇒ Terminal Selection ⇒ Input Terminals

This parameter selects the functionality of the #14 input terminal.

Note: *The #14 input terminal may be used without the ASD-Multicom option board.*

Without the ASD-Multicom option board the #14 terminal assignment information will be stored in volatile memory. The terminal assignment information will be lost if the system is powered down or reset.

In addition, the input terminal must be specified as **Normally Open** or **Normally Closed**.

This parameter sets the programmable #14 terminal to the user-selected item of [Table 14 on pg. 194](#).

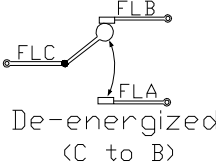
Direct Access Number — F124

Parameter Type — **Selection List**

Factory Default — **Unassigned**

Changeable During Run — **No**

Input Terminal 15 Assignment Program ⇒ Terminal Selection ⇒ Input Terminals This parameter selects the functionality of the #15 input terminal. Note: <i>The #15 input terminal may be used without the ASD-Multicom option board.</i> <i>Without the ASD-Multicom option board the #15 terminal assignment information will be stored in volatile memory. The terminal assignment information will be lost if the system is powered down or reset.</i> In addition, the input terminal must be specified as Normally Open or Normally Closed . This parameter sets the programmable #15 terminal to the user-selected item of Table 14 on pg. 194 .	Direct Access Number — F125 Parameter Type — Selection List Factory Default — Unassigned Changeable During Run — No
Input Terminal 16 Assignment Program ⇒ Terminal Selection ⇒ Input Terminals This parameter selects the functionality of the #16 input terminal. Note: <i>The #16 input terminal may be used without the ASD-Multicom option board.</i> <i>Without the ASD-Multicom option board the #16 terminal assignment information will be stored in volatile memory. The terminal assignment information will be lost if the system is powered down or reset.</i> In addition, the input terminal must be specified as Normally Open or Normally Closed . This parameter sets the programmable #16 terminal to the user-selected item of Table 14 on pg. 194 .	Direct Access Number — F126 Parameter Type — Selection List Factory Default — Unassigned Changeable During Run — No
OUT1 Output Terminal Assignment Program ⇒ Terminal Selection ⇒ Output Terminal This parameter sets the functionality of the OUT1 (A & C) output terminals to the user-selected item of Table 16 on pg. 199 . The on and off delay times of the OUT1 terminals may be adjusted to provide more response time to the device that is connected to the output terminals. In addition, the output terminals must be specified as Normally Open or Normally Closed .	Direct Access Number — F130 Parameter Type — Selection List Factory Default — Low Changeable During Run — No
OUT2 Output Terminal Assignment Program ⇒ Terminal Selection ⇒ Output Terminal This parameter sets the functionality of the OUT2 (A & C) output terminals to one of the user-selected functions of Table 16 on pg. 199 . The on and off delay times of the OUT2 terminals may be adjusted to provide more response time to the device that is connected to the output terminals. In addition, the output terminals must be specified as Normally Open or Normally Closed .	Direct Access Number — F131 Parameter Type — Selection List Factory Default — RCH (Acc/Dec Complete) Changeable During Run — No

<div>FL Output Terminal Assignment Program ⇒ Terminal Selection ⇒ Output Terminal This parameter sets the functionality of the FL output terminals to one of the user-selected functions of Table 16 on pg. 199. The on and off delay times of the FL terminals may be adjusted to provide more response time to the device that is connected to the output terminals. In addition, the output terminals must be specified as Normally Open or Normally Closed.</div> <div></div>	<div>Direct Access Number — F132 Parameter Type — Selection List Factory Default — Fault (All) Changeable During Run — No</div>
<div>Output #4 Terminal Assignment Program ⇒ Terminal Selection ⇒ Output Terminal This parameter sets the functionality of the OUT4 terminals to one of the user-selected functions of Table 16 on pg. 199. The on and off delay times of the OUT4 terminals may be adjusted to provide more response time to the device that is connected to the output terminals. In addition, the output terminals must be specified as Normally Open or Normally Closed.</div>	<div>Direct Access Number — F133 Parameter Type — Selection List Factory Default — LL Changeable During Run — No</div>
<div>OUT5 Terminal Assignment Program ⇒ Terminal Selection ⇒ Output Terminal This parameter sets the functionality of the OUT5 terminals to one of the user-selected functions of Table 16 on pg. 199. The on and off delay times of the OUT5 terminals may be adjusted to provide more response time to the device that is connected to the output terminals. In addition, the output terminals must be specified as Normally Open or Normally Closed.</div>	<div>Direct Access Number — F134 Parameter Type — Selection List Factory Default — UL Changeable During Run — No</div>
<div>OUT6 Terminal Assignment Program ⇒ Terminal Selection ⇒ Output Terminal This parameter sets the functionality of the OUT6 terminals to one of the user-selected functions of Table 16 on pg. 199. The on and off delay times of the OUT6 terminals may be adjusted to provide more response time to the device that is connected to the output terminals. In addition, the output terminals must be specified as Normally Open or Normally Closed.</div>	<div>Direct Access Number — F135 Parameter Type — Selection List Factory Default — RCH (Specified Speed) Changeable During Run — No</div>

OUT7 Terminal Assignment

Program ⇒ Terminal Selection ⇒ Output Terminal

This parameter sets the functionality of the **OUT7** terminals to one of the user-selected functions of [Table 16 on pg. 199](#).

The on and off delay times of the **OUT7** terminals may be adjusted to provide more response time to the device that is connected to the output terminals.

In addition, the output terminals must be specified as **Normally Open** or **Normally Closed**.

Direct Access Number — F136

Parameter Type — Selection List

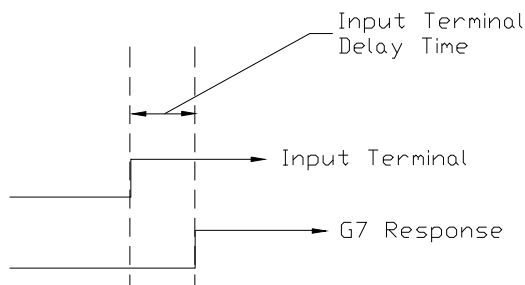
Factory Default — Over-Current
Prealarm

Changeable During Run — No

F Input Terminal Delay

Program ⇒ Terminal Selection ⇒ In Terminal Delays

This parameter delays the response of the ASD to any change in the **F** terminal input by the programmed value.



The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F140

Parameter Type — Numerical

Factory Default — 8.0

Changeable During Run — No

Minimum — 2.0

Maximum — 200.0

Units — mS

R Input Terminal Delay

Program ⇒ Terminal Selection ⇒ In Terminal Delays

This parameter delays the response of the drive to any change in the **R** terminal input by the programmed value (see waveforms at [F140](#)).

The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F141

Parameter Type — Numerical

Factory Default — 8.0

Changeable During Run — No

Minimum — 2.0

Maximum — 200.0

Units — mS

ST Input Terminal Delay

Program ⇒ Terminal Selection ⇒ In Terminal Delays

This parameter delays the response of the drive to any change in the **ST** terminal input by the programmed value (see waveforms at [F140](#)).

The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F142

Parameter Type — Numerical

Factory Default — 8.0

Changeable During Run — No

Minimum — 2.0

Maximum — 200.0

Units — mS

RES Input Terminal Delay

Program ⇒ Terminal Selection ⇒ In Terminal Delays

This parameter delays the response of the drive to any change in the **RES** terminal input by the programmed value (see waveforms at [F140](#)).

The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.

Direct Access Number — F143

Parameter Type — Numerical

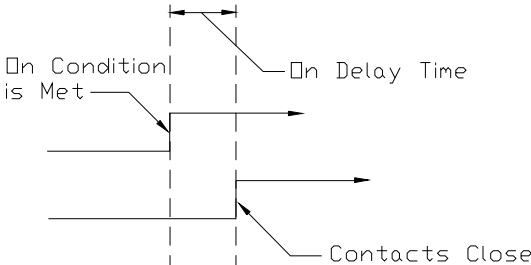
Factory Default — 8.0

Changeable During Run — No

Minimum — 2.0

Maximum — 200.0

Units — mS

<div>S1 – S4 Input Terminal Delay</div> <div>Program ⇒ Terminal Selection ⇒ In Terminal Delays</div> <div><p>This parameter delays the response of the drive to any change in the S1 – S4 terminal input by the programmed value (see waveforms at F140).</p><p>The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.</p></div>	<div>Direct Access Number — F144</div> <div>Parameter Type — Numerical</div> <div>Factory Default — 8.0</div> <div>Changeable During Run — No</div> <div>Minimum — 2.0</div> <div>Maximum — 200.0</div> <div>Units — mS</div>
<div>S5 – S16 Input Terminal Delay</div> <div>Program ⇒ Terminal Selection ⇒ In Terminal Delays</div> <div><p>This parameter delays the response of the drive to any change in the S5 – S16 terminal input by the programmed value (see waveforms at F140).</p><p>The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact bounce or chatter.</p></div>	<div>Direct Access Number — F145</div> <div>Parameter Type — Numerical</div> <div>Factory Default — 8.0</div> <div>Changeable During Run — No</div> <div>Minimum — 2.0</div> <div>Maximum — 200.0</div> <div>Units — mS</div>
<div>OUT1 On Delay</div> <div>Program ⇒ Terminal Selection ⇒ Out Terminal Delays</div> <div><p>Once the condition is met to close the OUT1 (A & C) output terminals, this parameter delays the closing of the terminals by the programmed value.</p><p>For example, if the OUT1 function is programmed as Over-Torque Alarm, OUT1 will close 2.0 mS (the default value for OUT1 On Delay) after the over-torque condition occurs.</p><p>The delay may be increased to prevent relay chatter.</p></div>	<div>Direct Access Number — F150</div> <div>Parameter Type — Numerical</div> <div>Factory Default — 2.0</div> <div>Changeable During Run — No</div> <div>Minimum — 2.0</div> <div>Maximum — 200.0</div> <div>Units — mS</div>
<div></div>	
<div>OUT2 On Delay</div> <div>Program ⇒ Terminal Selection ⇒ Out Terminal Delays</div> <div><p>This parameter delays the closing of the OUT2 (A & C) output terminals by the programmed value (see waveforms at F150).</p><p>The delay may be increased to prevent relay chatter.</p></div>	<div>Direct Access Number — F151</div> <div>Parameter Type — Numerical</div> <div>Factory Default — 2.0</div> <div>Changeable During Run — No</div> <div>Minimum — 2.0</div> <div>Maximum — 200.0</div> <div>Units — mS</div>

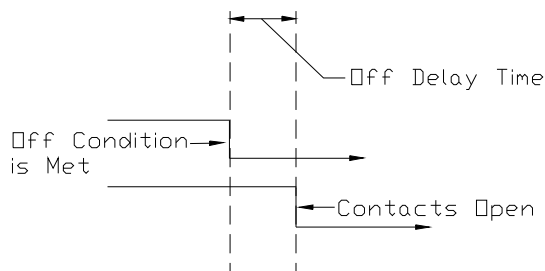
FL On Delay Program ⇒ Terminal Selection ⇒ Out Terminal Delays This parameter delays the closing of the FL output terminals by the programmed value (see waveforms at F150). The delay may be increased to prevent relay chatter.	Direct Access Number — F152 Parameter Type — Numerical Factory Default — 2.0 Changeable During Run — No Minimum — 2.0 Maximum — 200.0 Units — mS
OUT4 On Delay Program ⇒ Terminal Selection ⇒ Out Terminal Delays This parameter delays the closing of the OUT4 output terminals by the programmed value (see waveforms at F150). The delay may be increased to prevent relay chatter.	Direct Access Number — F153 Parameter Type — Numerical Factory Default — 2.0 Changeable During Run — No Minimum — 2.0 Maximum — 200.0 Units — mS
OUT5 On Delay Program ⇒ Terminal Selection ⇒ Out Terminal Delays This parameter delays the closing of the OUT5 output terminals by the programmed value (see waveforms at F150). The delay may be increased to prevent relay chatter.	Direct Access Number — F154 Parameter Type — Numerical Factory Default — 2.0 Changeable During Run — No Minimum — 2.0 Maximum — 200.0 Units — mS
OUT6 On Delay Program ⇒ Terminal Selection ⇒ Out Terminal Delays This parameter delays the closing of the OUT6 output terminals by the programmed value (see waveforms at F150). The delay may be increased to prevent relay chatter.	Direct Access Number — F155 Parameter Type — Numerical Factory Default — 2.0 Changeable During Run — No Minimum — 2.0 Maximum — 200.0 Units — mS
OUT7 On Delay Program ⇒ Terminal Selection ⇒ Out Terminal Delays This parameter delays the closing of the OUT7 output terminals by the programmed value (see waveforms at F150). The delay may be increased to prevent relay chatter.	Direct Access Number — F156 Parameter Type — Numerical Factory Default — 2.0 Changeable During Run — No Minimum — 2.0 Maximum — 200.0 Units — mS

OUT1 Off Delay

Program ⇒ Terminal Selection ⇒ Out Terminal Delays

This parameter delays the opening of the **OUT1 (A & C)** output terminals by the programmed value.

The delay may be increased to allow the devices that are connected to **OUT1** to respond.



Direct Access Number — F160

Parameter Type — **Numerical**

Factory Default — **2.0**

Changeable During Run — **No**

Minimum — 2.0

Maximum — 200.0

Units — mS

OUT2 Off Delay

Program ⇒ Terminal Selection ⇒ Out Terminal Delays

This parameter delays the opening of the **OUT2 (A & C)** output terminals by the programmed value (see waveforms at [F160](#)).

The delay may be increased to allow the devices that are connected to **OUT2** to respond.

Direct Access Number — F161

Parameter Type — **Numerical**

Factory Default — **2.0**

Changeable During Run — **No**

Minimum — 2.0

Maximum — 200.0

Units — mS

FL Off Delay

Program ⇒ Terminal Selection ⇒ Out Terminal Delays

This parameter delays the opening of the **FL** output terminals by the programmed value (see waveforms at [F160](#)).

The delay may be increased to allow the devices that are connected to **FL** to respond.

Direct Access Number — F162

Parameter Type — **Numerical**

Factory Default — **2.0**

Changeable During Run — **No**

Minimum — 2.0

Maximum — 200.0

Units — mS

OUT4 Off Delay

Program ⇒ Terminal Selection ⇒ Out Terminal Delays

This parameter delays the opening of the **OUT4** output terminals by the programmed value (see waveforms at [F160](#)).

The delay may be increased to allow the devices that are connected to **OUT4** to respond.

Direct Access Number — F163

Parameter Type — **Numerical**

Factory Default — **2.0**

Changeable During Run — **No**

Minimum — 2.0

Maximum — 200.0

Units — mS

OUT5 Off Delay

Program ⇒ Terminal Selection ⇒ Out Terminal Delays

This parameter delays the opening of the **OUT5** output terminals by the programmed value (see waveforms at [F160](#)).

The delay may be increased to allow the devices that are connected to **OUT5** to respond.

Direct Access Number — F164

Parameter Type — **Numerical**

Factory Default — **2.0**

Changeable During Run — **No**

Minimum — 2.0

Maximum — 200.0

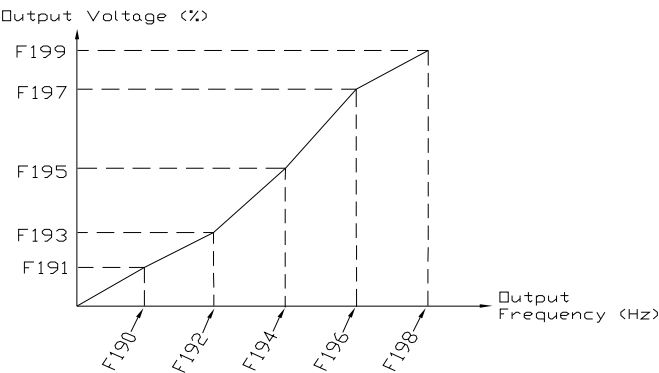
Units — mS

OUT6 Off Delay Program ⇒ Terminal Selection ⇒ Out Terminal Delays This parameter delays the opening of the OUT6 output terminals by the programmed value (see waveforms at F160). The delay may be increased to allow the devices that are connected to OUT6 to respond.	Direct Access Number — F165 Parameter Type — Numerical Factory Default — 2.0 Changeable During Run — No Minimum — 2.0 Maximum — 200.0 Units — mS
OUT7 Off Delay Program ⇒ Terminal Selection ⇒ Out Terminal Delays This parameter delays the opening of the OUT7 output terminals by the programmed value (see waveforms at F160). The delay may be increased to allow the devices that are connected to OUT7 to respond.	Direct Access Number — F166 Parameter Type — Numerical Factory Default — 2.0 Changeable During Run — No Minimum — 2.0 Maximum — 200.0 Units — mS
Motor #2 Base Frequency Program ⇒ Motor Parameters ⇒ Motor Set #2 The Motor #2 Base Frequency setting is the frequency at which the output voltage of the ASD reaches its maximum setting. The #2 Maximum Output Voltage is set at F171 . This parameter is used only when the parameters for motor set #2 are configured and selected. Motor set #2 may be selected by a properly configured input terminal. For proper motor operation, the Base Frequency should be set for the name-plated frequency of the motor.	Direct Access Number — F170 Parameter Type — Numerical Factory Default — 60.0 Changeable During Run — Yes Minimum — 25.0 Maximum — 299.0 Units — Hz
Motor #2 Max Output Voltage Program ⇒ Motor Parameters ⇒ Motor Set #2 The Motor #2 Maximum Output Voltage is the Motor #2 output voltage at the Base Frequency (F170). Regardless of the programmed value, the output voltage cannot be higher than the input voltage. The actual output voltage will be influenced by the input voltage of the ASD and the Supply Voltage Compensation setting (F307). This parameter is used only when the parameters for motor set #2 are configured and selected. Motor set #2 may be selected by a properly configured input terminal.	Direct Access Number — F171 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 0.0 Maximum — 600.0 Units — Volts
Motor #2 Torque Boost Program ⇒ Motor Parameters ⇒ Motor Set #2 The Motor #2 Torque Boost function is used to increase the low frequency torque for high inertia loads by increasing the output voltage at frequencies below ½ of the #2 Base Frequency setting (F170). See parameter F016 (Motor #1 Torque Boost) for an explanation of torque boost. This parameter is used only when the parameters for motor set #2 are configured and selected. Motor set #2 may be selected by a properly configured input terminal.	Direct Access Number — F172 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 0.0 Maximum — 30.0 Units — %

<p>Electronic Thermal Protection #2</p> <p>Program ⇒ Motor Parameters ⇒ Motor Set #2</p> <p>The Motor #2 Electronic Thermal Protection parameter specifies the motor overload current level for motor set #2. This value is entered as either a percentage of the full load rating of the ASD or as the FLA of the motor.</p> <p>The unit of measurement for this parameter may be set to Amps (V/A) or it may be set as a percentage of the ASD rating. The name-plated FLA of the motor may be entered directly when Amps is selected as the unit of measurement (see F701 to change the display unit).</p> <p>Electronic Thermal Protection settings (#1 – #4) will be displayed in Amps if the EOI display units are set to V/A rather than %.</p>	<p>Direct Access Number — F173</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 100.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 10.0</p> <p>Maximum — 100.0</p> <p>Units — %</p>
<p>Motor #3 Base Frequency</p> <p>Program ⇒ Motor Parameters ⇒ Motor Set #3</p> <p>The Motor #3 Base Frequency setting is the frequency at which the output voltage of the ASD reaches its maximum setting. The Maximum Output Voltage is set at F175.</p> <p>This parameter is used only when the parameters for motor set #3 are configured and selected. Motor set #3 may be selected by a properly configured input terminal.</p> <p>For proper motor operation, the Base Frequency should be set for the name-plated frequency of the motor.</p>	<p>Direct Access Number — F174</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 60.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 25.0</p> <p>Maximum — 299.0</p> <p>Units — Hz</p>
<p>Motor #3 Max Output Voltage</p> <p>Program ⇒ Motor Parameters ⇒ Motor Set #3</p> <p>The Motor #3 Maximum Output Voltage is the Motor #3 output voltage at the Base Frequency (F174). Regardless of the programmed value, the output voltage cannot be higher than the input voltage.</p> <p>The actual output voltage will be influenced by the input voltage of the ASD and the Supply Voltage Compensation setting (F307).</p> <p>This parameter is used only when the parameters for motor set #3 are configured and selected. Motor set #3 may be selected by a properly configured input terminal.</p>	<p>Direct Access Number — F175</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 600.0</p> <p>Units — Volts</p>
<p>Motor #3 Torque Boost</p> <p>Program ⇒ Motor Parameters ⇒ Motor Set #3</p> <p>The Motor #3 Torque Boost function is used to increase the low frequency torque for high inertia loads by increasing the output voltage at frequencies below ½ of the #3 Base Frequency setting (F174).</p> <p>See parameter F016 (Motor #1 Torque Boost) for an explanation of torque boost.</p> <p>This parameter is used only when the parameters for motor set #3 are configured and selected. Motor set #3 may be selected by a properly configured input terminal.</p>	<p>Direct Access Number — F176</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 30.0</p> <p>Units — %</p>

<p>Electronic Thermal Protection #3</p> <p>Program ⇒ Motor Parameters ⇒ Motor Set #3</p> <p>The Motor #3 Electronic Thermal Protection parameter specifies the motor overload current level for motor set #3. This value is entered as either a percentage of the full load rating of the ASD or as the FLA of the motor.</p> <p>The unit of measurement for this parameter may be set to Amps (V/A) or it may be set as a percentage of the ASD rating. The name-plated FLA of the motor may be entered directly when Amps is selected as the unit of measurement (see F701 to change the display unit).</p> <p>Electronic Thermal Protection settings (#1 – #4) will be displayed in Amps if the EOI display units are set to V/A rather than %.</p>	<p>Direct Access Number — F177</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 100.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 10.0</p> <p>Maximum — 100.0</p> <p>Units — %</p>
<p>Motor #4 Base Frequency</p> <p>Program ⇒ Motor Parameters ⇒ Motor Set #4</p> <p>The Motor #4 Base Frequency setting is the frequency at which the output voltage of the ASD reaches its maximum setting. The Maximum Output Voltage is set at F179.</p> <p>This parameter is used only when the parameters for motor set #4 are configured and selected. Motor set #4 may be selected by a properly configured input terminal.</p> <p>For proper motor operation, the Base Frequency should be set for the name-plated frequency of the motor.</p>	<p>Direct Access Number — F178</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 60.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 25.0</p> <p>Maximum — 299.0</p> <p>Units — Hz</p>
<p>Motor #4 Max Output Voltage</p> <p>Program ⇒ Motor Parameters ⇒ Motor Set #4</p> <p>The Motor #3 Maximum Output Voltage is the Motor #4 output voltage at the Base Frequency (F178). Regardless of the programmed value, the output voltage cannot be higher than the input voltage.</p> <p>The actual output voltage will be influenced by the input voltage of the ASD and the Supply Voltage Compensation setting (F307).</p> <p>This parameter is used only when the parameters for motor set #4 are configured and selected. Motor set #4 may be selected by a properly configured input terminal.</p>	<p>Direct Access Number — F179</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 600.0</p> <p>Units — Volts</p>
<p>Motor #4 Torque Boost</p> <p>Program ⇒ Motor Parameters ⇒ Motor Set #4</p> <p>The Motor #4 Torque Boost function is used to increase the low frequency torque for high inertia loads by increasing the output voltage at frequencies below ½ of the #4 Base Frequency setting (F178).</p> <p>See parameter F016 (Motor #1 Torque Boost) for an explanation of torque boost.</p> <p>This parameter is used only when the parameters for motor set #4 are configured and selected. Motor set #4 may be selected by a properly configured input terminal.</p>	<p>Direct Access Number — F180</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 30.0</p> <p>Units — %</p>

<div>Electronic Thermal Protection #4</div> <div>Program ⇒ Motor Parameters ⇒ Motor Set #4</div> <div><p>The Motor #4 Electronic Thermal Protection parameter specifies the motor overload current level for motor set #4. This value is entered as either a percentage of the full load rating of the ASD or as the FLA of the motor.</p><p>The unit of measurement for this parameter may be set to Amps (V/A) or it may be set as a percentage of the ASD rating. The name-plated FLA of the motor may be entered directly when Amps is selected as the unit of measurement (see F701 to change the display unit).</p><p>Electronic Thermal Protection settings (#1 – #4) will be displayed in Amps if the EOI display units are set to V/A rather than %.</p></div>	<div>Direct Access Number — F181</div> <div>Parameter Type — Numerical</div> <div>Factory Default — 100.0</div> <div>Changeable During Run — Yes</div> <div>Minimum — 10.0</div> <div>Maximum — 100.0</div> <div>Units — %</div>
<div>V/f Adjustment Coefficient</div> <div>Program ⇒ Special Control ⇒ Special Parameters</div> <div><p>This parameter may be used in the Constant Torque or the Variable Torque modes only and should be adjusted gradually to improve the application-specific torque requirements. The Torque Boost setting (F016) may be adjusted to improve the low-frequency torque performance.</p><p><i>Note: The Torque Boost setting should be adjusted gradually before attempting performance corrections using this parameter.</i></p></div>	<div>Direct Access Number — F183</div> <div>Parameter Type — Numerical</div> <div>Factory Default — 32</div> <div>Changeable During Run — Yes</div> <div>Minimum — 0</div> <div>Maximum — 255</div>
<div>Custom V/f Five-Point Setting #1 Frequency</div> <div>Program ⇒ Special Control ⇒ V/f Five-Point Setting</div> <div><p>The Custom V/f Five-Point Setting #1 Frequency setting establishes the frequency that is to be associated with the voltage setting of F191 (Custom V/f Five-Point Setting #1 Voltage).</p><p>The V/f five-point settings define a custom volts per hertz relationship for the startup output of the ASD.</p><p>To enable this function, set the V/f Pattern (F015) selection to Custom V/f Curve.</p><p>Custom V/f Curves may be useful in starting high inertia loads such as rotary drum vacuum filters.</p></div>	<div>Direct Access Number — F190</div> <div>Parameter Type — Numerical</div> <div>Factory Default — 0.0</div> <div>Changeable During Run — No</div> <div>Minimum — 0.0</div> <div>Maximum — 299</div> <div>Units — Hz</div>



Custom V/f Five-Point Setting #1 Voltage Program ⇒ Special Control ⇒ V/f Five-Point Setting The Custom V/f Five-Point Setting #1 Voltage establishes the percentage of the output voltage that is to be associated with the frequency setting of (Custom V/f Five-Point Setting #1 Frequency) . See F190 for additional information on custom V/f curves.	Direct Access Number — F191 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — No Minimum — 0.0 Maximum — 100.0 Units — %
Custom V/f Five-Point Setting #2 Frequency Program ⇒ Special Control ⇒ V/f Five-Point Setting The Custom V/f Five Point Setting #2 Frequency sets the frequency to be associated with parameter F193 (Custom V/f Five Point Setting #2 Voltage). See F190 for additional information on custom V/f curves.	Direct Access Number — F192 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — No Minimum — 0.0 Maximum — 299 Units — Hz
Custom V/f Five-Point Setting #2 Voltage Program ⇒ Special Control ⇒ V/f Five-Point Setting The Custom V/f Five-Point Setting #2 Voltage establishes the percentage of the output voltage that is to be associated with the frequency setting of F192 (Custom V/f Five Point Setting #2 Frequency). See F190 for additional information on custom V/f curves.	Direct Access Number — F193 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — No Minimum — 0.0 Maximum — 100.0 Units — %
Custom V/f Five-Point Setting #3 Frequency Program ⇒ Special Control ⇒ V/f Five-Point Setting The Custom V/f Five Point Setting #3 Frequency sets the frequency to be associated with parameter F195 (Custom V/f Five Point Setting #3 Voltage). See F190 for additional information on custom V/f curves.	Direct Access Number — F194 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — No Minimum — 0.0 Maximum — 299 Units — Hz
Custom V/f Five-Point Setting #3 Voltage Program ⇒ Special Control ⇒ V/f Five-Point Setting The Custom V/f Five-Point Setting #3 Voltage establishes the percentage of the output voltage that is to be associated with the frequency setting of F194 (Custom V/f Five Point Setting #3 Frequency). See F190 for additional information on custom V/f curves.	Direct Access Number — F195 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — No Minimum — 0.0 Maximum — 100.0 Units — %
Custom V/f Five-Point Setting #4 Frequency Program ⇒ Special Control ⇒ V/f Five-Point Setting The Custom V/f Five Point Setting #4 Frequency sets the frequency to be associated with parameter F197 (Custom V/f Five Point Setting #4 Voltage). See F190 for additional information on custom V/f curves.	Direct Access Number — F196 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — No Minimum — 0.0 Maximum — 299 Units — Hz

Custom V/f Five-Point Setting #4 Voltage Program ⇒ Special Control ⇒ V/f Five-Point Setting The Custom V/f Five-Point Setting #4 Voltage establishes the percentage of the output voltage that is to be associated with the frequency setting of F196 (Custom V/f Five Point Setting #4 Frequency). See F190 for additional information on custom V/f curves.	Direct Access Number — F197 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — No Minimum — 0.0 Maximum — 100.0 Units — %
Custom V/f Five-Point Setting #5 Frequency Program ⇒ Special Control ⇒ V/f Five-Point Setting The Custom V/f Five Point Setting #5 Frequency sets the frequency to be associated with parameter F199 (Custom V/f Five Point Setting #5 Voltage). See F190 for additional information on custom V/f curves.	Direct Access Number — F198 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — No Minimum — 0.0 Maximum — 299 Units — Hz
Custom V/f Five-Point Setting #5 Voltage Program ⇒ Special Control ⇒ V/f Five-Point Setting The Custom V/f Five-Point Setting #5 Voltage establishes the percentage of the output voltage that is to be associated with the frequency setting of F198 (Custom V/f Five Point Setting #5 Frequency). See F190 for additional information on custom V/f curves.	Direct Access Number — F199 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — No Minimum — 0.0 Maximum — 100.0 Units — %

Reference Priority Selection

Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Reference Priority Selection

Either **Frequency Mode #1** or **Frequency Mode #2** may control the output frequency of the ASD. This parameter determines which of the two will control the output frequency and the conditions in which control will be switched from one to the other.

Settings:

- 0 — Frequency Source #1
- 1 — Frequency Source #2
- 2 — Frequency Source #1 Priority
- 3 — Frequency Source #2 Priority
- 4 — Frequency Source Priority Switching

The **Frequency Source #1** or **#2** setting specifies the source of the input frequency command signal. These settings are performed in **F004** and **F207**, respectively.

If **Frequency Source #1** is selected here, the ASD will follow the settings of **F004**. If **Frequency Source #2** is selected here, the ASD will follow the settings of **F207**.

The **Frequency Source #1 Priority** and **Frequency Source #2 Priority** selections are used in conjunction with the **Mode #1/#2 Switching Frequency** setting (**F208**). Parameter **F208** establishes a threshold frequency that will be used as a reference when determining when to switch output control between the **Frequency Mode #1** setting and the **Frequency Mode #2** setting.

If **Frequency Source #1 Priority** is selected here and the commanded frequency of **Frequency Source #1** exceeds the **F208** setting, the **Frequency Mode #1** setting has priority over the **Frequency Mode #2** setting.

If **Frequency Source #2 Priority** is selected here and the commanded frequency of **Frequency Source #2** exceeds the **F208** setting, the **Frequency Mode #2** setting has priority over **Frequency Mode #1** setting.

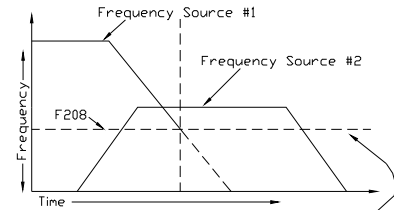
Frequency Source Priority Switching allows for a preconfigured input terminal to activate **Frequency Source #1** or **Frequency Source #2**. Any unused programmable discrete input terminals may be programmed as the **Frequency Priority** switching terminal.

Direct Access Number — **F200**

Parameter Type — **Selection List**

Factory Default — **Frequency Source #1**

Changeable During Run — **Yes**



Once the commanded frequency exceeds the F208 value, the setting of parameter F200 determines if the #1 or the #2 frequency command source controls the ASD output.

VI/II Speed Reference #1

Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ VI/II

This parameter is used to set the gain and bias of the **VI/II** input terminal when the **VI/II** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

Note: See note on pg. 50 for further information on the VI/II terminal.

VI/II Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **VI/II** input terminal:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **VI/II**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ Use **Terminal Board**.
- Set **VI/II Speed Reference #1** (F201) — the input signal level that represents **VI/II Speed Frequency #1**.
- Set **VI/II Speed Frequency #1** (F202).
- Set **VI/II Speed Reference #2** (F203) — the input signal level that represents **VI/II Speed Frequency #2**.
- Set **VI/II Speed Frequency #2** (F204).
- Provide a **Run** command (F and/or R).

Once set, as the **VI** input voltage or the **II** current changes, the output frequency of the ASD will vary in accordance with the above settings.

This parameter sets **VI/II Speed Reference #1** and is the input signal level that is associated with the setting of **VI/II Speed Frequency #1** while operating in the **Speed Control** mode.

VI/II Input Torque Control Setup

Perform the following setup to allow the system to receive **Torque** control input at the **VI/II** input terminal:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **VI/II**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ Use **Terminal Board**.
- Set **VI/II Speed Reference #1** (F201) — the input signal level that represents **VI/II Torque Reference Setpoint #1**.
- Set **VI/II Torque Reference Setpoint #1** (F205).
- Set **VI/II Speed Reference #2** (F203) — the input signal level that represents **VI/II Torque Reference Setpoint #2**.
- Set **VI/II Torque Reference Setpoint #2** (F206).
- Provide a **Run** command (F and/or R).

Once set, as the **VI** input voltage or the **II** current changes, the output torque of the ASD will vary in accordance with the above settings.

This parameter sets **VI/II Speed Reference #1** and is the input signal level that is associated with the setting of **VI/II Torque Reference Setpoint #1** while operating in the **Torque Control** mode.

Direct Access Number — **F201**

Parameter Type — **Numerical**

Factory Default — **20.0**

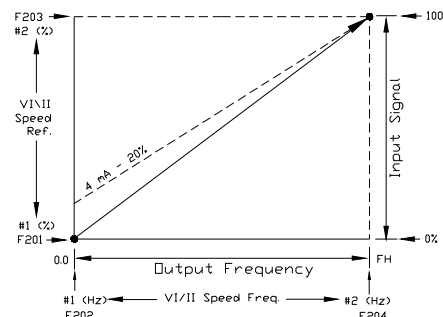
Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 100.0

Units — %

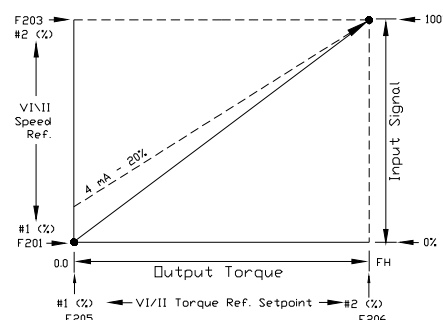
Frequency Settings



Note: The default value for parameter is **F201** 20%. The **II** input is commonly used for the 4 – 20 mA current loop signal where 4 mA equals 20% of a 20 mA signal. If the **VI** input is used (0 – 10 VDC input), this parameter may be changed to 0.0% (of the input signal).

Note: The speed control response may be further trimmed by adjusting the **Bias** and **Gain** settings.

Torque Settings



VI/II Speed Frequency #1 Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ VI/II <p>This parameter is used to set the gain and bias of the VI/II input terminal when the VI/II terminal is used as the control input while operating in the Speed Control mode.</p> <p>See VI/II Speed Reference #1 (F201) for further information on this setting.</p> <p>This parameter sets VI/II Speed Frequency #1 and is the frequency that is associated with the setting of VI/II Speed Reference #1 while operating in the Speed Control mode.</p>	Direct Access Number — F202 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — Max. Freq. (F011) Units — Hz
VI/II Speed Reference #2 Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ VI/II <p>This parameter is used to set the gain and bias of the VI/II input terminal when the VI/II terminal is used as the control input while operating in the Speed Control mode or the Torque Control mode.</p> <p>See VI/II Speed Reference #1 for further information on this setting when used for Speed control or Torque control.</p> <p>This parameter sets the VI/II input level that is associated with VI/II Speed Frequency #2 while operating in the Speed control mode or is associated with the VI/II Torque Reference Setpoint #2 while operating in the Torque control mode.</p>	Direct Access Number — F203 Parameter Type — Numerical Factory Default — 100.00 Changeable During Run — Yes Minimum — 0.0 Maximum — 100.0 Units — %
VI/II Speed Frequency #2 Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ VI/II <p>This parameter is used to set the gain and bias of the VI/II input terminal when the VI/II terminal is used as the control input while operating in the Speed Control mode.</p> <p>See VI/II Speed Reference #1 for further information on this setting when used for Speed control.</p> <p>This parameter sets the output frequency that is associated with VI/II Speed Reference #2 setting while operating in the Speed control mode.</p>	Direct Access Number — F204 Parameter Type — Numerical Factory Default — 80.00 Changeable During Run — Yes Minimum — 0.0 Maximum — Max. Freq. (F011) Units — Hz
VI/II Torque Reference Setpoint #1 Program ⇒ Torque Setting ⇒ Setpoints ⇒ VI/II <p>This parameter is used to set the gain and bias of the VI/II input terminal when the VI/II terminal is used as the control input while operating in the Torque Control mode.</p> <p>This is accomplished by establishing an associated V/f output pattern for a given VI/II input level.</p> <p>See VI/II Speed Reference #1 for further information on this setting.</p> <p>This parameter sets VI/II Torque Reference Setpoint #1 and is the output torque value that is associated with the setting of VI/II Speed Reference #1 while operating in the Torque control mode.</p>	Direct Access Number — F205 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 250.0 Units — %

VI/II Torque Reference Setpoint #2

Program ⇒ Torque Setting ⇒ Setpoints ⇒ VI/II

This parameter is used to set the gain and bias of the **VI/II** input terminal when the **VI/II** terminal is used as the control input while operating in the **Torque Control** mode.

This is accomplished by establishing an associated **V/f** output pattern for a given **VI/II** input level.

See **VI/II Speed Reference #1** for further information on this setting.

This parameter sets **VI/II Torque Reference Setpoint #2** and is the output torque value that is associated with setting of **VI/II Speed Reference #2** while operating in the **Torque** control mode.

Direct Access Number — F206

Parameter Type — **Numerical**

Factory Default — **100.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 250.0

Units — %

Frequency Mode #2

Program ⇒ Fundamentals ⇒ Standard Mode Selection

This parameter selects the source of the frequency command signal to be used as **Frequency Mode #2** in the event that **Frequency Mode #1** is disabled or if **Frequency Mode #2** is set up as the primary control parameter. See [F004](#) and [F200](#) for additional information on this setting.

Settings:

- 1 — Use VI/II
- 2 — Use RR
- 3 — Use RX
- 4 — Use Option Card RX2
- 5 — Use CN8 Option (Not Used)
- 6 — Use Binary/BCD Input
- 7 — Use Common Serial (TTL)
- 8 — Use RS232/RS485
- 9 — Use Communication Card
- 10 — Use Motorized Pot. Simulation
- 11 — Use Pulse Input Option

Direct Access Number — F207

Parameter Type — **Selection List**

Factory Default — **VI/II**

Changeable During Run — **Yes**

Mode #1/#2 Switching Frequency

Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Mode #1/#2 Switching Frequency

This parameter sets the threshold frequency that will be used in [F200](#) to determine if **Frequency Source #1** or **#2** will control the output of the ASD.

See [F200](#) for additional information on this setting.

Direct Access Number — F208

Parameter Type — **Numerical**

Factory Default — **1.0**

Changeable During Run — **Yes**

Minimum — 0.1

Maximum — **Max. Freq. (F011)**

Units — Hz

Analog Input Filter

Program ⇒ Frequency Setting ⇒ Analog Filter

Analog filtering is applied after the analog reference signal is converted to a digital signal. The type of filtering used is **Rolling Average** over time.

Settings:

- 0 — None
- 1 — Small
- 2 — Medium
- 3 — Large

The analog input signal is sampled and converted to a digital signal. With no filtering applied, the digital value from the conversion is scaled for use by the microprocessor of the ASD.

If the filtering selection is **Small**, the ASD averages the last 5 sampled (digital) values. The rolling average is updated (every 4 μ S) and scaled for use by the microprocessor.

If the filtering selection is **Medium**, the ASD averages the last 20 sampled (digital) values. The rolling average is updated (every 4 μ S) and scaled for use by the microprocessor.

If the filtering selection is **Large**, the ASD averages the last 50 sampled (digital) values. The rolling average is updated (every 4 μ S) and scaled for use by the microprocessor.

False responses to electrical noise are eliminated with no loss in bandwidth because the value used by the drive is the average value of several samples.

Direct Access Number — F209

Parameter Type — **Selection List**

Factory Default — **None**

Changeable During Run — **Yes**

RR Speed Reference #1

Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RR

This parameter is used to set the gain and bias of the **RR** input terminal when the **RR** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

RR Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **RR** input terminal:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **RR**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ **Use Terminal Board**.
- Set **RR Speed Reference #1 (F210)** — the input signal level that represents **RR Speed Frequency #1**.
- Set **RR Speed Frequency #1 (F211)**.
- Set **RR Speed Reference #2 (F212)** — the input signal level that represents **RR Speed Frequency #2**.
- Set **RR Speed Frequency #2 (F213)**.
- Provide a **Run** command (**F** and/or **R**).

Once set, as the **RR** input changes, the output frequency of the ASD will vary in accordance with the above settings.

This parameter sets **RR Speed Reference #1** and is the input signal level that is associated with the setting of **RR Speed Frequency #1** while operating in the **Speed Control** mode.

RR Input Torque Control Setup

Perform the following setup to allow the system to receive **Torque** control input at the **RR** input terminal:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **RR**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ **Use Terminal Board**.
- Set **RR Speed Reference #1 (F210)** — the input signal level that represents **RR Torque Reference Setpoint #1**.
- Set **RR Torque Reference Setpoint #1 (F214)**.
- Set **RR Speed Reference #2 (F212)** — the input signal level that represents **RR Torque Reference Setpoint #2**.
- Set **RR Torque Reference Setpoint #2 (F215)**.
- Provide a **Run** command (**F** and/or **R**).

Once set, as the **RR** input changes, the output torque of the ASD will vary in accordance with the above settings.

This parameter sets **RR Speed Reference #1** and is the input signal level that is associated with the setting of **RR Torque Reference Setpoint #1** while operating in the **Torque Control** mode.

Direct Access Number — **F210**

Parameter Type — **Numerical**

Factory Default — **0.0**

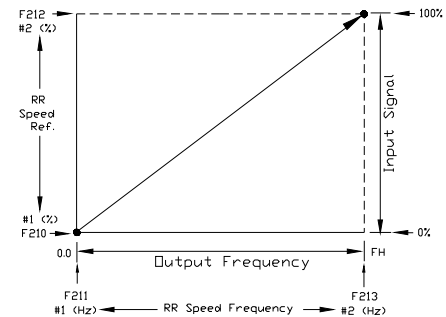
Changeable During Run — **Yes**

Minimum — **0.0**

Maximum — **100.0**

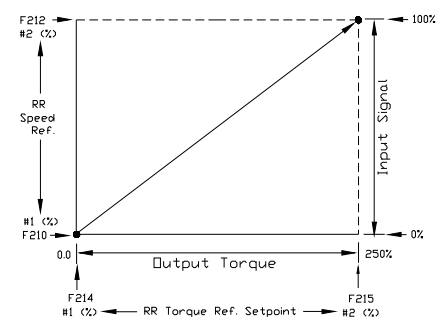
Units — **%**

Frequency Settings



Note: The speed control response may be further trimmed by adjusting the Bias and Gain settings.

Torque Settings



<p>RR Speed Frequency #1</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RR</p> <p>This parameter is used to set the gain and bias of the RR input terminal when the RR terminal is used as the control input while operating in the Speed Control mode.</p> <p>See RR Speed Reference #1 (F210) for further information on this setting.</p> <p>This parameter sets RR Speed Frequency #1 and is the frequency that is associated with the setting of RR Speed Reference #1 while operating in the Speed Control mode.</p>	<p>Direct Access Number — F211</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>RR Speed Reference #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RR</p> <p>This parameter is used to set the gain and bias of the RR input terminal when the RR terminal is used as the control input while operating in the Speed Control mode or the Torque Control mode.</p> <p>See RR Speed Reference #1 for further information on this setting when used for Speed control or Torque control.</p> <p>This parameter sets the RR input level that is associated with RR Speed Frequency #2 while operating in the Speed control mode or is associated with the RR Torque Reference Setpoint #2 while operating in the Torque control mode.</p>	<p>Direct Access Number — F212</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 100.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 100.0</p> <p>Units — %</p>
<p>RR Speed Frequency #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RR</p> <p>This parameter is used to set the gain and bias of the RR input terminal when the RR terminal is used as the control input while operating in the Speed Control mode.</p> <p>See RR Speed Reference #1 for further information on this setting when used for Speed control.</p> <p>This parameter sets RR Speed Frequency #2 and is the frequency that is associated with the setting of RR Speed Reference #2 while operating in the Speed Control mode.</p>	<p>Direct Access Number — F213</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 80.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>RR Torque Reference Setpoint #1</p> <p>Program ⇒ Torque Setting ⇒ Setpoints ⇒ RR</p> <p>This parameter is used to set the gain and bias of the RR input terminal when the RR terminal is used as the control input while operating in the Torque Control mode.</p> <p>This is accomplished by establishing an associated V/f output pattern for a given RR input level.</p> <p>See RR Speed Reference #1 for further information on this setting.</p> <p>This parameter sets RR Torque Reference Setpoint #1 and is the output torque value that is associated with the setting of RR Speed Reference #1 while operating in the Torque control mode.</p>	<p>Direct Access Number — F214</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 250.0</p> <p>Units — %</p>

RR Torque Reference Setpoint #2

Program ⇒ Torque Setting ⇒ Setpoints ⇒ RR

This parameter is used to set the gain and bias of the **RR** input terminal when the **RR** terminal is used as the control input while operating in the **Torque Control** mode.

This is accomplished by establishing an associated **V/f** output pattern for a given **RR** input level.

See **RR Speed Reference #1** for further information on this setting.

This parameter sets **RR Torque Reference Setpoint #2** and is the output torque value that is associated with setting of **RR Speed Reference #2** while operating in the **Torque** control mode.

Direct Access Number — F215

Parameter Type — Numerical

Factory Default — 100.00

Changeable During Run — Yes

Minimum — 0.00

Maximum — 250.0

Units — %

RX Speed Reference #1

Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX

This parameter is used to set the gain and bias of the **RX** input terminal when the **RX** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

RX Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **RX** input terminal:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **RX**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ **Use Terminal Board**.
- Set **RX Speed Reference #1 (F216)** — the input signal level that represents **RX Speed Frequency #1**.
- Set **RX Speed Frequency #1 (F217)**.
- Set **RX Speed Reference #2 (F218)** — the input signal level that represents **RX Speed Frequency #2**.
- Set **RX Speed Frequency #2 (F219)**.
- Provide a **Run** command (**F** and/or **R**).

Once set, as the **RX** input changes, the output frequency of the ASD will vary in accordance with the above settings.

This parameter sets **RX Speed Reference #1** and is the input signal level that is associated with the setting of **RX Speed Frequency #1** while operating in the **Speed Control** mode.

RX Input Torque Control Setup

Perform the following setup to allow the system to receive **Torque** control input at the **RX** input terminal:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **RX**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ **Use Terminal Board**.
- Set **RX Speed Reference #1 (F216)** — the input signal level that represents **RX Torque Reference Setpoint #1**.
- Set **RX Torque Reference Setpoint #1 (F220)**.
- Set **RX Speed Reference #2 (F218)** — the input signal level that represents **RX Torque Reference Setpoint #2**.
- Set **RX Torque Reference Setpoint #2 (F221)**.
- Provide a **Run** command (**F** and/or **R**).

Once set, as the **RX** input changes, the output torque of the ASD will vary in accordance with the above settings.

This parameter sets **RX Speed Reference #1** and is the input signal level that is associated with the setting of **RX Torque Reference Setpoint #1** while operating in the **Torque Control** mode.

Direct Access Number — **F216**

Parameter Type — **Numerical**

Factory Default — **00.0**

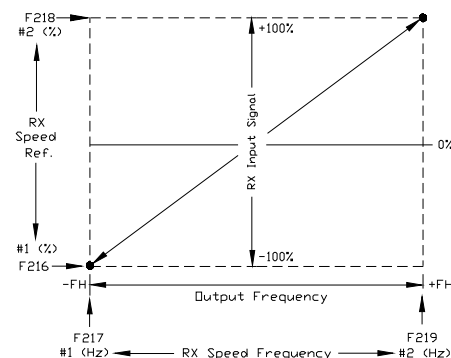
Changeable During Run — **Yes**

Minimum — **-100.0**

Maximum — **100.0**

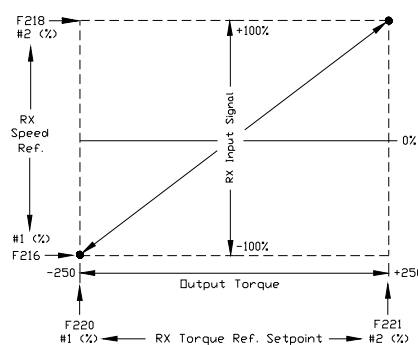
Units — **%**

Frequency Settings



Note: The speed control response may be further trimmed by adjusting the Bias and Gain settings.

Torque Settings



<p>RX Speed Frequency #1</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX</p> <p>This parameter is used to set the gain and bias of the RX input terminal when the RX terminal is used as the control input while operating in the Speed Control mode.</p> <p>See RX Speed Reference #1 (F216) for further information on this setting.</p> <p>This parameter sets RX Speed Frequency #1 and is the frequency that is associated with the setting of RX Speed Reference #1 while operating in the Speed Control mode.</p>	<p>Direct Access Number — F217</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — -Max. Freq. (F011)</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>RX Speed Reference #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX</p> <p>This parameter is used to set the gain and bias of the RX input terminal when the RX terminal is used as the control input while operating in the Speed Control mode or the Torque Control mode.</p> <p>See RX Speed Reference #1 for further information on this setting when used for Speed control or Torque control.</p> <p>This parameter sets the RX input level that is associated with RX Speed Frequency #2 while operating in the Speed control mode or is associated with the RX Torque Reference Setpoint #2 while operating in the Torque control mode.</p>	<p>Direct Access Number — F218</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 100.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -100.0</p> <p>Maximum — 100.0</p> <p>Units — %</p>
<p>RX Speed Frequency #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX</p> <p>This parameter is used to set the gain and bias of the RX input terminal when the RX terminal is used as the control input while operating in the Speed Control mode.</p> <p>See RX Speed Reference #1 for further information on this setting when used for Speed control.</p> <p>This parameter sets RX Speed Frequency #2 and is the frequency that is associated with the setting of RX Speed Reference #2 while operating in the Speed Control mode.</p>	<p>Direct Access Number — F219</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 80.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -Max. Freq. (F011)</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>RX Torque Reference Setpoint #1</p> <p>Program ⇒ Torque Setting ⇒ Setpoints ⇒ RX</p> <p>This parameter is used to set the gain and bias of the RX input terminal when the RX terminal is used as the control input while operating in the Torque Control mode.</p> <p>This is accomplished by establishing an associated V/f output pattern for a given RX input level.</p> <p>See RX Speed Reference #1 for further information on this setting.</p> <p>This parameter sets RX Torque Reference Setpoint #1 and is the output torque value that is associated with the setting of RX Speed Reference #1 while operating in the Torque control mode.</p>	<p>Direct Access Number — F220</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -250.00</p> <p>Maximum — 250.00</p> <p>Units — %</p>

RX Torque Reference Setpoint #2

Program ⇒ Torque Setting ⇒ Setpoints ⇒ RX

This parameter is used to set the gain and bias of the **RX** input terminal when the **RX** terminal is used as the control input while operating in the **Torque Control** mode.

This is accomplished by establishing an associated **V/f** output pattern for a given **RX** input level.

See **RX Speed Reference #1** for further information on this setting.

This parameter sets **RX Torque Reference Setpoint #2** and is the output torque value that is associated with setting of **RX Speed Reference #2** while operating in the **Torque** control mode.

Direct Access Number — F221

Parameter Type — Numerical

Factory Default — 100.00

Changeable During Run — Yes

Minimum — -250.00

Maximum — 250.00

Units — %

RX2 Speed Reference #1

Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX2

This parameter is used to set the gain and bias of the **RX2** input terminal when the **RX2** terminal is used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

RX2 Input Speed Control Setup

Perform the following setup to allow the system to receive **Speed** control input at the **RX2** input terminal:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **RX2**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ **Use Terminal Board**.
- Set **RX2 Speed Reference #1 (F222)** — the input signal level that represents **RX2 Speed Frequency #1**.
- Set **RX2 Speed Frequency #1 (F223)**.
- Set **RX2 Speed Reference #2 (F224)** — the input signal level that represents **RX2 Speed Frequency #2**.
- Set **RX2 Speed Frequency #2 (F225)**.
- Provide a **Run** command (**F** and/or **R**).

Once set, as the **RX2** input changes, the output frequency of the ASD will vary in accordance with the above settings.

This parameter sets **RX2 Speed Reference #1** and is the input signal level that is associated with the setting of **RX2 Speed Frequency #1** while operating in the **Speed Control** mode.

RX2 Input Torque Control Setup

Perform the following setup to allow the system to receive **Torque** control input at the **RX2** input terminal:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **RX2**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ **Use Terminal Board**.
- Set **RX2 Speed Reference #1 (F222)** — the input signal level that represents **RX2 Torque Reference Setpoint #1**.
- Set **RX2 Torque Reference Setpoint #1 (F226)**.
- Set **RX2 Speed Reference #2 (F224)** — the input signal level that represents **RX2 Torque Reference Setpoint #2**.
- Set **RX2 Torque Reference Setpoint #2 (F227)**.
- Provide a **Run** command (**F** and/or **R**).

Once set, as the **RX2** input changes, the output torque of the ASD will vary in accordance with the above settings.

This parameter sets **RX2 Speed Reference #1** and is the input signal level that is associated with the setting of **RX2 Torque Reference Setpoint #1** while operating in the **Torque Control** mode.

Direct Access Number — **F222**

Parameter Type — **Numerical**

Factory Default — **00.0**

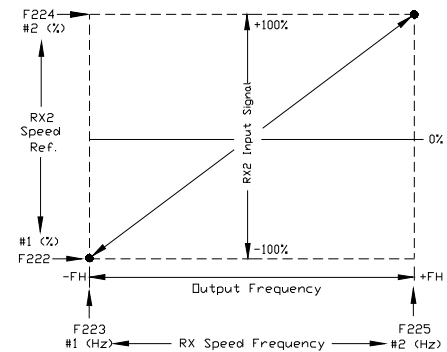
Changeable During Run — **Yes**

Minimum — **-100.0**

Maximum — **100.0**

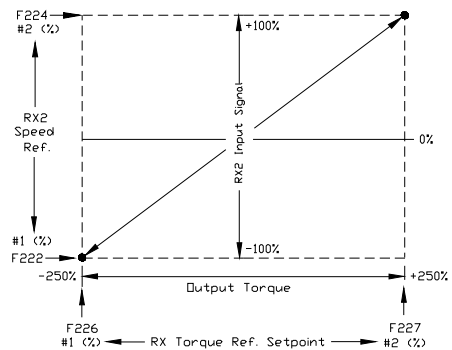
Units — **%**

Frequency Settings



Note: The speed control response may be further trimmed by adjusting the Bias and Gain settings.

Torque Settings



<p>RX2 Speed Frequency #1</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX2</p> <p>This parameter is used to set the gain and bias of the RX2 input terminal when the RX2 terminal is used as the control input while operating in the Speed Control mode.</p> <p>See RX2 Speed Reference #1 (F222) for further information on this setting.</p> <p>This parameter sets RX2 Speed Frequency #1 and is the frequency that is associated with the setting of RX2 Speed Reference #1 while operating in the Speed Control mode.</p>	<p>Direct Access Number — F223</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — -Max. Freq. (F011)</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>RX2 Speed Reference #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX2</p> <p>This parameter is used to set the gain and bias of the RX2 input terminal when the RX2 terminal is used as the control input while operating in the Speed Control mode or the Torque Control mode.</p> <p>See RX2 Speed Reference #1 for further information on this setting when used for Speed control or Torque control.</p> <p>This parameter sets the RX2 input level that is associated with RX2 Speed Frequency #2 while operating in the Speed control mode or is associated with the RX2 Torque Reference Setpoint #2 while operating in the Torque control mode.</p>	<p>Direct Access Number — F224</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 100.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -100.0</p> <p>Maximum — 100.0</p> <p>Units — %</p>
<p>RX2 Speed Frequency #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX2</p> <p>This parameter is used to set the gain and bias of the RX2 input terminal when the RX2 terminal is used as the control input while operating in the Speed Control mode.</p> <p>See RX2 Speed Reference #1 for further information on this setting when used for Speed control.</p> <p>This parameter sets RX2 Speed Frequency #2 and is the frequency that is associated with the setting of RX2 Speed Reference #2 while operating in the Speed Control mode.</p>	<p>Direct Access Number — F225</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 80.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -Max. Freq. (F011)</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>RX2 Torque Reference Setpoint #1</p> <p>Program ⇒ Torque Setting ⇒ Setpoints ⇒ RX2</p> <p>This parameter is used to set the gain and bias of the RX2 input terminal when the RX2 terminal is used as the control input while operating in the Torque Control mode.</p> <p>This is accomplished by establishing an associated V/f output pattern for a given RX2 input level.</p> <p>See RX2 Speed Reference #1 for further information on this setting.</p> <p>This parameter sets RX2 Torque Reference Setpoint #1 and is the output torque value that is associated with the setting of RX2 Speed Reference #1 while operating in the Torque control mode.</p>	<p>Direct Access Number — F226</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -250.00</p> <p>Maximum — 250.00</p> <p>Units — %</p>

RX2 Torque Reference Setpoint #2

Program ⇒ Torque Setting ⇒ Setpoints ⇒ RX2

This parameter is used to set the gain and bias of the **RX2** input terminal when the **RX2** terminal is used as the control input while operating in the **Torque Control** mode.

This is accomplished by establishing an associated **V/f** output pattern for a given **RX2** input level.

See **RX2 Speed Reference #1** for further information on this setting.

This parameter sets **RX2 Torque Reference Setpoint #2** and is the output torque value that is associated with setting of **RX2 Speed Reference #2** while operating in the **Torque** control mode.

Direct Access Number — F227

Parameter Type — Numerical

Factory Default — 100.00

Changeable During Run — Yes

Minimum — -250.00

Maximum — 250.00

Units — %

BIN Speed Reference #1

Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ BIN

This parameter is used to set the gain and bias of the binary input when the discrete input terminals are used as the control input while operating in the **Speed Control** mode or the **Torque Control** mode.

BIN Input Control Setup

Perform the following setup to allow the system to receive control input at the binary input terminals:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **Use Binary/BCD Input**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ **Use Terminal Board**.
- Program ⇒ Terminal Selection ⇒ **Input Terminals**; select and set the desired discrete input terminals to **Binary Bit(s) 0 – 7** (or 0 – MSB) (see [Table 14 on pg. 194](#)). The binary input can control the direction, speed, and/or torque of the motor.

Note: 255_D is the decimal equivalent of the 8-bit BIN word with all input terminals set to one (255 decimal = 11111111 binary).

BIN Speed Control Setup

- Set **BIN Speed Reference #1 (F228)** — the input signal that represents **BIN Speed Frequency #1**.
- Set **BIN Speed Frequency #1 (F229)**.
- Set **BIN Speed Reference #2 (F230)** — the input signal that represents **BIN Speed Frequency #2**.
- Set **BIN Speed Frequency #2 (F231)**.
- Provide a **Run** command (F and/or R).

Once set, as the binary input signal changes, the output signal of the ASD will vary in accordance with the above settings.

This parameter sets **BIN Speed Reference #1** and is the input signal that is associated with the setting of **BIN Speed Frequency #1** while operating in the **Speed Control** mode.

Direct Access Number — F228

Parameter Type — Numerical

Factory Default — 0.00

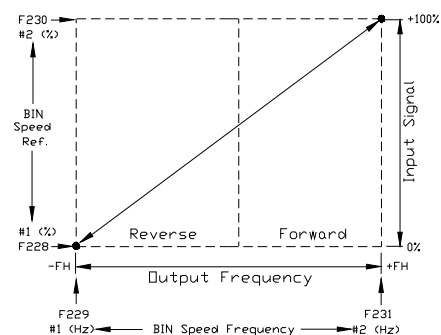
Changeable During Run — Yes

Minimum — 0.0

Maximum — 100.0

Units — %

Frequency Settings



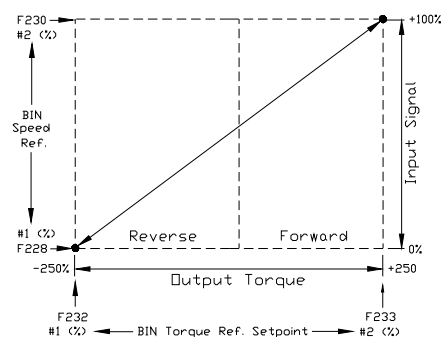
BIN Torque Control Setup

- Set **BIN Speed Reference #1 (F228)** — the input signal level that represents **BIN Torque Reference Setpoint #1**.
- Set **BIN Torque Reference Setpoint #1 (F232)**.
- Set **BIN Speed Reference #2 (F230)** — the input signal level that represents **BIN Torque Reference Setpoint #2**.
- Set **BIN Torque Reference Setpoint #2 (F233)**.
- Provide a **Run** command (F and/or R).

Once set, as the binary input signal changes, the output signal of the ASD will vary in accordance with the above settings.

This parameter sets **BIN Speed Reference #1** and is the input signal that is associated with the setting of **BIN Torque Reference Setpoint #1** while operating in the **Torque Control** mode.

Torque Settings



<p>BIN Speed Frequency #1</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ BIN</p> <p>This parameter is used to set the gain and bias of the binary input when the discrete input terminals are used as the control input while operating in the Speed Control mode.</p> <p>This parameter sets BIN Speed Frequency #1 and is the frequency that is associated with the setting of BIN Speed Reference #1 while operating in the Speed Control mode.</p> <p>See BIN Speed Reference #1 (F228) for further information on this setting.</p>	<p>Direct Access Number — F229</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — -Max. Freq. (F011)</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>BIN Speed Reference #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ BIN</p> <p>This parameter is used to set the gain and bias of the binary input when the discrete input terminals are used as the control input while operating in the Speed Control mode or the Torque Control mode.</p> <p>See BIN Speed Reference #1 for further information on this setting when used for Speed control or Torque control.</p> <p>This parameter sets BIN Speed Reference #2 and is the input signal that is associated with the setting of BIN Speed Frequency #1 while operating in the Speed Control mode or is associated with the BIN Torque Reference Setpoint #2 while operating in the Torque control mode.</p>	<p>Direct Access Number — F230</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 100.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 100.0</p> <p>Units — %</p>
<p>BIN Speed Frequency #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ BIN</p> <p>This parameter is used to set the gain and bias of the binary input when the discrete input terminals are used as the control input while operating in the Speed Control mode.</p> <p>This parameter sets BIN Speed Frequency #2 and is the frequency that is associated with the setting of BIN Speed Reference #1 while operating in the Speed Control mode.</p> <p>See BIN Speed Reference #1 (F228) for further information on this setting.</p>	<p>Direct Access Number — F231</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 80.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -Max. Freq. (F011)</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>BIN Torque Reference Setpoint #1</p> <p>Program ⇒ Torque Setting ⇒ Setpoints ⇒ BIN</p> <p>This parameter is used to set the gain and bias of the binary input when the discrete input terminals are used as the control input while operating in the Torque Control mode.</p> <p>This is accomplished by establishing an associated V/f output pattern for a given binary input signal.</p> <p>See BIN Speed Reference #1 for further information on this setting.</p> <p>This parameter sets BIN Torque Reference Setpoint #1 and is the output torque value that is associated with the setting of BIN Speed Reference #1 while operating in the Torque control mode.</p>	<p>Direct Access Number — F232</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -250.0</p> <p>Maximum — 250.0</p> <p>Units — %</p>

BIN Torque Reference Setpoint #2

Program ⇒ Torque Setting ⇒ Setpoints ⇒ BIN

This parameter is used to set the gain and bias of the binary input when the discrete input terminals are used as the control input while operating in the **Torque Control** mode.

This is accomplished by establishing an associated **V/f** output pattern for a given binary input signal.

See **BIN Speed Reference #1** for further information on this setting.

This parameter sets **BIN Torque Reference Setpoint #2** and is the output torque value that is associated with setting of **BIN Speed Reference #2** while operating in the **Torque** control mode.

Direct Access Number — F233

Parameter Type — Numerical

Factory Default — 100.00

Changeable During Run — Yes

Minimum — -250.0

Maximum — 250.0

Units — %

PG Speed Reference #1

Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ PG

This parameter is used to set the gain and bias of the **PG** input terminal when a shaft-mounted encoder is used as the feedback transducer while operating in the **Speed Control** mode.

Note: The ASD-Multicom Option Board and the HS35 Encoder is required for system operation using the PG input speed control.

Direct Access Number — F234

Parameter Type — Numerical

Factory Default — 0.00

Changeable During Run — Yes

Minimum — -100.0

Maximum — 100.0

Units — %

PG Input Speed Control Setup

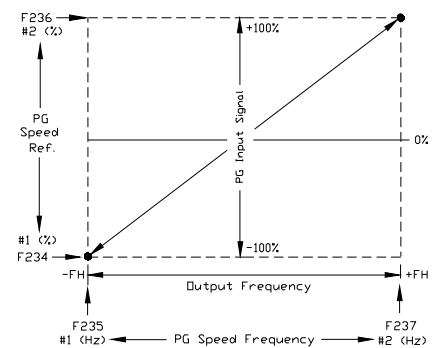
Perform the following setup to allow the system to receive **Speed** control input at the **PG** input terminal:

- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Frequency Mode #1 ⇒ **Pulse Input Option**.
- Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Command Mode ⇒ (any setting).
- Set **PG Speed Reference #1 (F234)** — the input pulse count rate that represents **PG Speed Frequency #1**.
- Set **PG Speed Frequency #1 (F235)**.
- Set **PG Speed Reference #2 (F236)** — the input pulse count rate that represents **PG Speed Frequency #2**.
- Set **PG Speed Frequency #2 (F237)**.
- Provide a **Run** command (**F** and/or **R**).

Once set, as the **PG** pulse count rate changes, the output frequency of the ASD will vary in accordance with the above settings.

This parameter sets **PG Speed Reference #1** and is the input pulse count rate that is associated with the setting of **PG Speed Frequency #1** while operating in the **Speed Control** mode.

Frequency Settings



<p>PG Speed Frequency #1</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ PG</p> <p>This parameter is used to set the gain and bias of the PG input terminal when a shaft-mounted encoder is used as the feedback transducer while operating in the Speed Control mode.</p> <p>See PG Speed Reference #1 (F234) for further information on this setting.</p> <p>This parameter sets PG Speed Frequency #1 and is the frequency that is associated with the setting of PG Speed Reference #1 while operating in the Speed Control mode.</p>	<p>Direct Access Number — F235</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -Max. Freq. (F011)</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>PG Speed Reference #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ PG</p> <p>This parameter is used to set the gain and bias of the PG input terminal when a shaft-mounted encoder is used as the feedback transducer while operating in the Speed Control mode.</p> <p>See PG Speed Reference #1 for further information on this setting when used for Speed control.</p> <p>This parameter sets the PG input level that is associated with PG Speed Frequency #2 while operating in the Speed control mode.</p>	<p>Direct Access Number — F236</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 100.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -100.0</p> <p>Maximum — 100.0</p> <p>Units — %</p>
<p>PG Speed Frequency #2</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ PG</p> <p>This parameter is used to set the gain and bias of the PG input terminal when a shaft-mounted encoder is used as the feedback transducer while operating in the Speed Control mode.</p> <p>See PG Speed Reference #1 for further information on this setting when used for Speed control.</p> <p>This parameter sets PG Speed Frequency #2 and is the frequency that is associated with the setting of PG Speed Reference #2 while operating in the Speed Control mode.</p>	<p>Direct Access Number — F237</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 80.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — -Max. Freq. (F011)</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>Startup Frequency</p> <p>Program ⇒ Special Control ⇒ Frequency Control</p> <p>The output of the drive will remain at 0.0 Hz until the programmed speed value exceeds this setting during startup. Once exceeded during startup, the output frequency of the drive will accelerate to the programmed setting.</p> <p>Output frequencies below the Startup Frequency will not be output from the drive during startup. However, once reaching the Startup Frequency, speed values below the Startup Frequency may be output from the drive.</p>	<p>Direct Access Number — F240</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.10</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 10.0</p> <p>Units — Hz</p>

<p>Run Frequency</p> <p>Program ⇒ Special Control ⇒ Frequency Control</p> <p>This parameter establishes a center frequency (Run Frequency) of a frequency band.</p> <p>Parameter F242 provides a plus-or-minus value for the Run Frequency; thus, establishing a frequency band.</p> <p>During acceleration, the drive will not output a signal to the motor until the lower level of the band is reached.</p> <p>During deceleration, the drive will continue to output the programmed deceleration output signal to the motor until the lower level of the band is reached; at which time the output will go to 0.0 Hz.</p>	<p>Direct Access Number — F241</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>Run Frequency Hysteresis</p> <p>Program ⇒ Special Control ⇒ Frequency Control</p> <p>This parameter provides a plus-or-minus value for the Run Frequency setting (F241).</p>	<p>Direct Access Number — F242</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 30.0</p> <p>Units — Hz</p>
<p>End Frequency</p> <p>Program ⇒ Special Control ⇒ Frequency Control</p> <p>This parameter sets the lowest frequency that the drive will recognize during deceleration before the drive goes to 0.0 Hz.</p>	<p>Direct Access Number — F243</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 30.0</p> <p>Units — Hz</p>
<p>0 Hz Dead Band Signal</p> <p>Program ⇒ Special Control ⇒ Special Parameters</p> <p>This parameter sets an output frequency threshold that, until the commanded frequency surpasses this setting, the ASD will output 0 Hz to the motor.</p> <p>Note: <i>This setting will override the Startup Frequency setting (F240) if this setting has a higher value.</i></p>	<p>Direct Access Number — F244</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 5.0</p> <p>Units — Hz</p>

<p>DC Injection Braking Start Frequency</p> <p>Program ⇒ Protection ⇒ DC Braking</p> <p>During deceleration this is the frequency at which DC Injection braking will start.</p> <p>DC Injection Braking</p> <p>DC Injection Braking is a braking system used with three-phase motors. Unlike conventional brakes, there is no physical contact between the rotating shaft and a stationary brake pad or drum. When braking is required, the drive outputs a DC current that is applied to the windings of the motor to quickly brake the motor. The braking current stops when the time entered in times out.</p> <p>The intensity of the DC current used while braking determines how fast the motor will come to a stop and may be set at F251. The intensity setting is entered as a percentage of the full load current of the ASD.</p> <p>DC Injection Braking is also used to preheat the motor or to keep the rotor from spinning freely when the motor is off by providing a pulsating DC current into the motor at the Carrier Frequency. This feature may be enabled at F254.</p>	<p>Direct Access Number — F250</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 120.0</p> <p>Units — Hz</p>
<p>DC Injection Braking Current</p> <p>Program ⇒ Protection ⇒ DC Braking</p> <p>This parameter sets the percentage of the rated current of the drive that will be used for DC Injection braking. A larger load will require a higher setting.</p>	<p>Direct Access Number — F251</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 50.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 100.0</p> <p>Units — %</p>
<p>DC Injection Braking Time</p> <p>Program ⇒ Protection ⇒ DC Braking</p> <p>This parameter is used to set the on-time duration of the DC Injection Braking.</p>	<p>Direct Access Number — F252</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 1.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 10.00</p> <p>Units — Seconds</p>
<p>Motor Shaft Fixing Control</p> <p>Program ⇒ Protection ⇒ DC Braking</p> <p>This parameter determines if DC Injection braking is to be used during a change in the direction of the motor.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Enabled (box checked) 1 — Disabled 	<p>Direct Access Number — F253</p> <p>Parameter Type — Check Box</p> <p>Factory Default — Disabled</p> <p>Changeable During Run — Yes</p>

<hr/> Motor Shaft Stationary Control Program ⇒ Protection ⇒ DC Braking This parameter Enables/Disables a continuous DC injection at half of the amperage setting of F251 into a stopped motor. This feature is useful in preheating the motor or to keep the rotor from spinning freely. Motor Shaft Stationary Control starts after the DC injection brake stops the motor and continues until ST – CC is opened, power is turned off, receiving an Emergency Off command, or this parameter is changed. Enabling this feature will also require a non-zero entry at F250 . Settings: 0 — Enabled (box checked) 1 — Disabled	<hr/> Direct Access Number — F254 Parameter Type — Check Box Factory Default — Disabled Changeable During Run — Yes
<hr/> 0 Hz Command Function Program ⇒ Special Control ⇒ Special Parameters This parameter selects the go-to-zero method to be used by the ASD when the ASD is commanded to go to zero Hz. Settings: 0 — Standard (DC Injection Braking) 1 — 0 Hz Command	<hr/> Direct Access Number — F255 Parameter Type — Selection List Factory Default — Standard (DC Injection Braking) Changeable During Run — No

Jog Run Frequency

Program ⇒ Frequency Setting ⇒ Jog Settings

This parameter sets the output frequency of the drive during a **Jog**. **Jogging** is the term used to describe turning the motor on for small increments of time and is used when precise positioning of motor-driven equipment is required.

Enabling the **Jog Window** allows for the **Manual Jog** window to be among the screens accessed during repeated **MON/PRG** entries. This screen must be displayed when **Jogging** using the EOI.

The **Jog** function may be initiated from the EOI or remotely via the **Terminal Board** or using **Communications** (for further information on using **Communications** for **Jogging**, see the **Communications** manual).

To perform a **Jog**, set this parameter (F260) to the desired **Jog** frequency.

Select a **Jog Stop** method (F261).

Direct Access Number — F260

Parameter Type — Numerical

Factory Default — 0.00

Changeable During Run — Yes

Minimum — 0.00

Maximum — 20.00

Units — Hz

Jog Setup Using the EOI

To initiate a **Jog** from the EOI perform the following:

1. Place a check in the **Enable Jog Window** box (Program ⇒ Frequency Setting ⇒ Jog Settings ⇒ **Enable Jog Window**).

Note: *The **Jog Window** must be displayed on the EOI to perform the **Jog** function using the EOI.*

2. Press **MON/PRG** to access the **Jog Window**.
3. Using the **Up/Down** arrow keys of the EOI, select **Reverse** or **Forward**.
4. Place the system in the **Local** mode (**Local|Remote** LED is on).
5. Press and hold the **Run** key for the desired **Jog** duration.

Jog Setup Using the Terminal Board

To initiate a **Jog** from the **Terminal Board** perform the following:

1. Assign a discrete input terminal to the **Jog** function (see [Table 14 on pg. 194](#)).
2. Assign a discrete input terminal to the **F (Forward)** function (and **Reverse** if required) (see [Table 14 on pg. 194](#)).
3. Provide a **Forward** and/or **Reverse** command from the **Terminal Board**.
4. From the **Jog Window**, use the **Up/Down** arrow keys of the EOI to select **Reverse** or **Forward** (Program ⇒ Frequency Setting ⇒ Jog Settings ⇒ **Enable Jog Window**). Press **MON/PRG** to access the **Jog Window**.
5. Place the system in the **Remote** mode (**Local|Remote** LED is off).
6. Connect the assigned **Jog** terminal (from step 1) to CC for the desired **Jog** duration.

Jog Stop Control Program ⇒ Frequency Setting ⇒ Jog Settings This parameter sets the stopping method used while operating in the Jog mode. Settings: 0 — Deceleration Stop 1 — Coast Stop 2 — DC Injection Braking Stop	Direct Access Number — F261 Parameter Type — Selection List Factory Default — Deceleration Stop Changeable During Run — Yes
Jump Frequency #1 Program ⇒ Special Control ⇒ Jump Frequencies In conjunction with parameter F271 , this parameter establishes a user-defined frequency range: the Jump Frequency and a plus-or-minus value. During acceleration, the output frequency of the drive will hold at the frequency of the lower level of the Jump Frequency range until the programmed acceleration ramp reaches the upper level of the Jump Frequency range. Then, the output frequency of the drive will accelerate to the upper level of the Jump Frequency range and continue upward as programmed. During deceleration, the output frequency of the drive will hold at the frequency of the upper level of the Jump Frequency range until the programmed deceleration ramp reaches the lower level of the Jump Frequency range. Then, the output frequency of the drive will decelerate to the lower level of the Jump Frequency range and continue downward as programmed. Once set up and enabled, it is on in all control modes. User-selected frequencies may be jumped to avoid the negative effects of mechanical resonance.	Direct Access Number — F270 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — Max. Freq. (F011) Units — Hz
Jump Frequency #1 Bandwidth Program ⇒ Special Control ⇒ Jump Frequencies This parameter establishes a plus-or-minus value for Jump Frequency #1 (see F270).	Direct Access Number — F271 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 30.00 Units — Hz
Jump Frequency #2 Program ⇒ Special Control ⇒ Jump Frequencies Same as Jump Frequency #1 (F270) and is used when multiple frequencies are to be jumped (see the plus-or-minus value setting at F273). When multiple jump frequencies overlap, the system will recognize the lowest and the highest frequencies as one jump range.	Direct Access Number — F272 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — Max. Freq. (F011) Units — Hz
Jump Frequency #2 Bandwidth Program ⇒ Special Control ⇒ Jump Frequencies This parameter establishes a plus-or-minus value for Jump Frequency #2 (F272).	Direct Access Number — F273 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 30.0 Units — Hz

Jump Frequency #3 Program ⇒ Special Control ⇒ Jump Frequencies Same as Jump Frequency #1 (F270) and is used when multiple frequencies are to be jumped (see the plus-or-minus value setting at F275). When multiple jump frequencies overlap, the system will recognize the lowest and the highest frequencies as one jump range.	Direct Access Number — F274 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — Max. Freq. (F011) Units — Hz
Jump Frequency #3 Bandwidth Program ⇒ Special Control ⇒ Jump Frequencies This parameter establishes a plus-or-minus value for Jump Frequency #3 (F274) .	Direct Access Number — F275 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 30.0 Units — Hz
Jump Frequency Processing Program ⇒ Special Control ⇒ Jump Frequencies This parameter determines if the output frequency of the ASD or the PID feedback signal will be used as a reference for determining the Jump Frequency range. See F270 for further information on the Jump Frequency settings. Settings: 0 — Process Amount (use PID feedback) 1 — Output Frequency	Direct Access Number — F276 Parameter Type — Selection List Factory Default — Process Amount Changeable During Run — Yes
Preset Speed #8 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 1000 and is identified as Preset Speed #8 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F287 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #9 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 1001 and is identified as Preset Speed #9 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F288 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz

Preset Speed #10 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 1010 and is identified as Preset Speed #10 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F289 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #11 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 1011 and is identified as Preset Speed #11 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F290 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #12 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 1100 and is identified as Preset Speed #12 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F291 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #13 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 1101 and is identified as Preset Speed #13 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F292 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #14 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 1110 and is identified as Preset Speed #14 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F293 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz
Preset Speed #15 Program ⇒ Pattern Run ⇒ Preset Speeds This parameter assigns an output frequency to binary number 1111 and is identified as Preset Speed #15 . The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Speed (see F018 for further information on this parameter).	Direct Access Number — F294 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — Lower Limit (F013) Maximum — Upper Limit (F012) Units — Hz

PWM Carrier Frequency

Program ⇒ Special Control

This parameter sets the frequency of the pulse width modulation signal applied to the motor.

Note: The carrier frequency must be 2.2 kHz or above except while operating in the **Constant Torque**, **Variable Torque**, or the **5-Point Setting** modes.

Note: The maximum **Carrier Frequency** setting allowed is 5.0 kHz for the following ASDs:
460-volt ⇒ 150 HP – 350 HP.

The maximum **Carrier Frequency** setting allowed for all other ASDs is 15 kHz.

Setting the Carrier Frequency above the Derate Threshold frequency for a given ASD will reduce the capability of the ASD.

Contact

Direct Access Number — F300

Parameter Type — **Numerical**

Factory Default — **2.200**

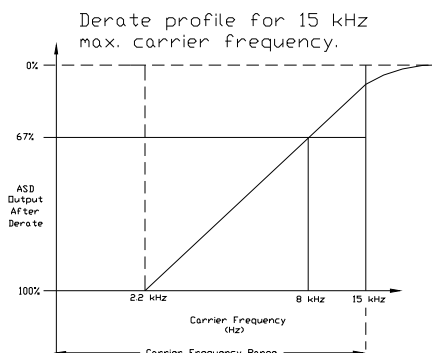
Changeable During Run — **No**

Minimum — 0.500

Maximum — (ASD dependent)

Units — kHz

Example



Break/Make ST

Program ⇒ Protection ⇒ Retry/Restart

This parameter **Enables/Disables** the ability of the drive to start into a spinning motor when the **ST – CC** connection opens momentarily and is then closed (Break/Make ST) or after a power interruption (momentary power failure). This parameter also **Enables/Disables** F312 and F313.

Settings:

- 0 — Enabled (box checked)
- 1 — Disabled

Direct Access Number — F301

Parameter Type — **Check Box**

Factory Default — **Disabled**

Changeable During Run — **Yes**

Ridethrough Mode

Program ⇒ Protection ⇒ Undervoltage/Ridethrough

This parameter determines the motor-control response of the drive in the event of a momentary power outage.

Settings:

- 0 — Off
- 1 — Ridethrough
- 2 — Stop

Direct Access Number — F302

Parameter Type — **Selection List**

Factory Default — **Off**

Changeable During Run — **Yes**

Number of Retries

Program ⇒ Protection ⇒ Retry/Restart

After a trip has occurred, this parameter sets the number of times that an automatic system restart is attempted for a qualified trip.

The trip conditions listed below will not initiate the automatic **Retry/Restart** function:

- U, V, W Phase Short Circuit,
- DBR Resistor Overcurrent,
- Input Phase Loss (Input Phase Failure),
- Output Phase Loss (Output Phase Failure),
- Overcurrent During Acceleration (Startup Overcurrent),
- Earth Fault (Ground Fault),
- EMG (Emergency Off),
- EEPROM Data Fault (EEPROM Fault),
- Flash Memory/Gate Array/RAM-ROM Fault,
- CPU Fault,
- Communication Error,
- Option Fault,
- Output Current Protection Fault,
- Sink/Source Setting Error,
- Over-Speed Error, or
- Key Error.

See the section titled [General Safety Information on pg. 1](#) for further information on this setting.

Direct Access Number — F303

Parameter Type — **Numerical**

Factory Default — **00**

Changeable During Run — **Yes**

Minimum — 00

Maximum — 10

Dynamic Braking Enable (Not Used)

Program ⇒ Protection ⇒ Dynamic Braking

This parameter **Enables/Disables** the **Dynamic Braking** system.

Settings:

- 0 — Enabled with Overload (**DO NOT ENABLE THIS FUNCTION**)
- 1 — Disabled

Dynamic Braking

Dynamic Braking uses the inertial energy of the load to produce a braking force or it may be used to reduce the bus voltage in an attempt to preclude an over-voltage trip during deceleration. The inertial energy of the load drives the rotor and induces a current into the stator of the motor.

The induced stator current (energy) is dissipated through a resistive load. The resistive load is connected across terminals **PA** and **PB** (non-polarized). Using a low-value, high-wattage resistance as a load for the generated current, the resistive load dissipates the induced energy. The dissipated energy is the energy that would otherwise have caused the rotor to continue to rotate.

Dynamic Braking helps to slow the load quickly; it cannot act as a holding brake.

The **Dynamic Braking** function may be setup and enabled by connecting a braking resistor from terminal **PA** to **PB** of the drive and providing the proper information at [F304](#), [F308](#), and [F309](#).

For additional information on selecting the proper resistance value for a given application contact the **Toshiba Customer Support Center**.

Direct Access Number — F304

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

Over-Voltage Stall

Program ⇒ Protection ⇒ Stall

This parameter **Enables/Disables** the **Over-Voltage Stall** function. When enabled, this function causes the drive to extend the decel time when the DC bus voltage increases due to transient voltage spikes, regeneration, supply voltage out of specification, etc. in an attempt to reduce the bus voltage.

Note: This parameter must be set to **Disabled (1)** for the regeneration function to operate.

Settings:

- 0 — Enabled
- 1 — Disabled
- 2 — Enabled (Forced Shorted Deceleration)

Direct Access Number — F305Parameter Type — **Selection List**Factory Default — **Enabled**Changeable During Run — **Yes**

Motor #1 Max Output Voltage

Program ⇒ Motor Parameters ⇒ Motor Set #1

This parameter sets the maximum value of the output voltage of the drive. The **Motor #1 Maximum Output Voltage** is the **Motor #1** output voltage at the **Base Frequency (F014)**. Regardless of the programmed value, the output voltage cannot be higher than the input voltage.

The actual output voltage will be influenced by the input voltage of the ASD and the **Supply Voltage Compensation** setting (F307).

Direct Access Number — F306Parameter Type — **Numerical**

Factory Default — (ASD dependent)

Changeable During Run — **Yes**

Minimum — 0.0

Maximum — 600.0

Units — Volts

Supply Voltage Compensation

Program ⇒ Protection ⇒ Base Frequency Voltage

This parameter **Enables/Disables** the **Voltage Compensation** function. This function provides an output waveform adjustment that compensates for changes in the input voltage.

Settings:

- 0 — Enabled (box checked)
- 1 — Disabled

Direct Access Number — F307Parameter Type — **Check Box**Factory Default — **Enabled**Changeable During Run — **No**

Dynamic Braking Resistance (Not Used)

Program ⇒ Protection ⇒ Dynamic Braking

This parameter is used to input the resistive value of the **Dynamic Braking Resistor**.

For additional information on selecting the proper resistance value for a given application contact **Toshiba Customer Support Center**.

Note: Using a resistor value that is too low may result in system damage.

Direct Access Number — F308Parameter Type — **Numerical**

Factory Default — (ASD dependent)

Changeable During Run — **No**

Minimum — 1.0

Maximum — 1000.0

Units — Ω

<p>Dynamic Braking Resistance Capacity (Not Used)</p> <p>Program ⇒ Protection ⇒ Dynamic Braking</p> <p>This parameter is used to input the wattage of the Dynamic Braking Resistor. For additional information on selecting the proper resistor wattage value for a given application contact Toshiba Customer Support Center.</p> <p><i>Note: Using a resistor with a wattage rating that is too low may result in system damage.</i></p>	<p>Direct Access Number — F309</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — No</p> <p>Minimum — 0.01</p> <p>Maximum — 600.0</p> <p>Units — kW</p>
<p>Ridethrough Time</p> <p>Program ⇒ Protection ⇒ Retry/Restart</p> <p>In the event of a momentary power outage, this parameter determines the length of the Ridethrough time. During a Ridethrough, regenerative energy is used to maintain the control circuitry settings; it is not used to drive the motor.</p> <p>The Ridethrough will be maintained for the number of seconds set using this parameter.</p> <p><i>Note: The actual Ridethrough Time is load-dependent.</i></p>	<p>Direct Access Number — F310</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 2.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 320.0</p> <p>Units — Seconds</p>
<p>Disable Forward Run/Disable Reverse Run</p> <p>Program ⇒ Frequency Setting ⇒ Forward/Reverse Disable</p> <p>This parameter Enables/Disables the Forward Run or Reverse Run mode.</p> <p>If either direction is disabled (box checked), commands received for the disabled direction will not be recognized.</p> <p>If both directions are disabled (both boxes checked), the received direction command will determine the direction of the motor rotation.</p> <p>Settings:</p> <p>0 — Disabled</p> <p>1 — Enabled</p>	<p>Direct Access Number — F311</p> <p>Parameter Type — Check Box</p> <p>Factory Default — Disabled</p> <p>Changeable During Run — No</p>
<p>Scan Rate</p> <p>Program ⇒ Protection ⇒ Retry/Restart</p> <p>In the event of a momentary power outage, the output signal of the drive will cease. Upon restoration of power, the drive will output a low-level signal that will be used to determine the rotation speed of the rotor.</p> <p>The low-level signal will start scanning the motor at FH and decrease until it reaches 0.0 Hz or it matches the signal produced by the turning rotor. Once the rate of rotation is determined, the drive will provide the normal output to engage the motor from its present speed.</p> <p>This parameter determines the rate at which the scanning signal goes from FH to 0.0 Hz. See F301 for additional information on this parameter.</p>	<p>Direct Access Number — F312</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — No</p> <p>Minimum — 0.50</p> <p>Maximum — 2.50</p>
<p>Lock-on Rate</p> <p>Program ⇒ Protection ⇒ Retry/Restart</p> <p>After a momentary power outage, the ASD may have to startup into a spinning motor. The Lock On Rate is the difference between the time that the RPM of the motor is determined by the ASD and the time that the ASD outputs a drive signal to the motor.</p> <p>See F301 for additional information on this parameter.</p>	<p>Direct Access Number — F313</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — No</p> <p>Minimum — 0.50</p> <p>Maximum — 2.50</p>

Search Method

Program ⇒ Protection ⇒ Retry/Restart

In the event of a momentary power outage, this parameter may be used to set the starting point (frequency) of the scanning signal that is used to determine the rotor speed or this parameter may be used to select the method used to search for the speed of the rotor. See [F301](#) and [F314](#) for additional information on this parameter.

Settings:

- 0 — Normal
- 1 — Start from 0.0 Hz
- 2 — Start from Running Frequency
- 3 — Option Board (ASD-SS)
- 4 — PG

Direct Access Number — F314

Parameter Type — **Selection List**

Factory Default — **Normal**

Changeable During Run — **No**

Search Inertia

Program ⇒ Protection ⇒ Retry/Restart

After a momentary power loss or the momentary loss of the **ST-to-CC** connection, this parameter sets the time for the commanded torque to reach its programmed setting during the automatic restart. This function is in effect so long as the **Retry/Restart** feature is enabled at [F301](#).

Settings:

- 0 — 0.5 Sec. (fast)
- 1 — 1.0 Sec. (standard)
- 2 — 1.5 Sec.
- 3 — 2.0 Sec.
- 4 — 2.5 Sec.
- 5 — 3.0 Sec.
- 6 — 3.5 Sec.
- 7 — 4.0 Sec.
- 8 — 4.5 Sec.
- 9 — 5.0 Sec. (slow)

Direct Access Number — F315

Parameter Type — **Selection List**

Factory Default — **1.0**

Changeable During Run — **No**

Units — Seconds

Drooping Gain

Program ⇒ Feedback Parameters ⇒ Drooping Control

This parameter sets the effective 100% output torque level while operating in the **Drooping Control** mode. This value is the upper torque limit of the motor being driven by a given ASD while operating in the **Drooping Control** mode.

Drooping

Drooping Control, also called **Load Share**, is used to share the load among two or more mechanically coupled motors. Unlike **Stall**, which reduces the output frequency in order to limit the load once the load reaches a preset level, **Drooping** can decrease or increase the V/f setting of a motor to maintain a balance between the output torque levels of mechanically coupled motors.

Because of variances in gearboxes, sheaves, belts, motors, and since the speed of the motor is constrained by the mechanical system, one motor may experience more load than its counterpart and may become overloaded.

Drooping Control allows the overloaded motor to slow down, thus shedding load and encouraging a lightly-loaded motor to pick up the slack. The goal of **Drooping Control** is to have the same torque ratios for mechanically coupled motors.

Direct Access Number — F320

Parameter Type — **Numerical**

Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 100.0

Units — %

Speed at Drooping Gain 0% Program ⇒ Feedback Parameters ⇒ Drooping Control This parameter sets the motor speed when at the 0% output torque gain while operating in the Drooping Control mode. This function determines the lowest speed that Drooping will be in effect for motors that share the same load.	Direct Access Number — F321 Parameter Type — Numerical Factory Default — 60.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 320.0 Units — Hz
Speed at Drooping Gain 100% Program ⇒ Feedback Parameters ⇒ Drooping Control This parameter sets the motor speed when at the 100% output torque gain while operating in the Drooping Control mode. This function determines the speed of the individual motors at the 100% Drooping Gain setting for motors that share the same load.	Direct Access Number — F322 Parameter Type — Numerical Factory Default — 60.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 320.0 Units — Hz
Drooping Insensitive Torque Range Program ⇒ Feedback Parameters ⇒ Drooping Control This parameter defines a torque range in which the Drooping Control settings will be ignored and the programmed torque settings will be followed.	Direct Access Number — F323 Parameter Type — Numerical Factory Default — 10.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 100.0 Units — %
Drooping Output Filter Program ⇒ Feedback Parameters ⇒ Drooping Control This parameter is used to set the rate of output change allowed while operating in the Drooping Control mode. Jerky operation may be decreased by increasing this setting.	Direct Access Number — F324 Parameter Type — Numerical Factory Default — 100.0 Changeable During Run — Yes Minimum — 0.1 Maximum — 200.0
Load Inertia (Acc/Dec Torque) Program ⇒ Feedback Parameters ⇒ Drooping Control This parameter is used for calculating accel/decel torque when compensating for load inertia while operating in the Drooping Control mode.	Direct Access Number — F325 Parameter Type — Numerical Factory Default — 1.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 1000.0
Load Torque Filter (Acc/Dec Torque) Program ⇒ Feedback Parameters ⇒ Drooping Control This parameter is used to set the response sensitivity when calculating the accel/decel torque. This setting applies to load inertia compensation while operating in the Drooping Control mode. This parameter should be gradually adjusted to provide smoother Drooping Control operation while operating with heavy loads.	Direct Access Number — F326 Parameter Type — Numerical Factory Default — 200.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 200.0

Drooping Reference

Program ⇒ Feedback Parameters ⇒ Drooping Control

This parameter sets the method to be used in determining the output torque while operating in the **Drooping Control** mode.

Settings:

- 0 — Total Torque Calculated by the Detection Current.
- 1 — Torque without Acc/Dec Torque Calculated by Detection Current.
- 2 — Total Torque Calculated by the Command Current.
- 3 — Torque without Acc/Dec Torque Calculated by the Command Current.

Direct Access Number — F327

Parameter Type — **Selection List**

Factory Default — **Total torque calculated by the detection current**

Changeable During Run — **Yes**

Light-Load High-Speed Operation Selection

Program ⇒ Special Control ⇒ Crane/Hoist Load

This parameter enables the **Light-Load High-Speed** function by selecting an operating mode. The **Light-Load High-Speed** function accelerates the output frequency of the ASD from the programmed speed to the setting established at [F341](#).

This parameter may be disabled.

If either of the other selections are made and configured, and after the criteria of [F331 – F333](#) are met, the **Light-Load High-Speed** function is enabled and this parameter determines the operating mode of the **Light-Load High-Speed** function.

Settings:

- 0 — Disabled
- 1 — Reserved
- 2 — Automatic Enable - Automatic Speed ([F341](#))
- 3 — Automatic Enable - Preset Speed (Preset ID_{Bin} is OR'ed w/1000_{Bin})
- 4 — Discrete Enable - Automatic Speed ([F341](#)) (see item 120 of [Table 14 on pg. 194](#))
- 5 — Discrete Enable - Preset Speed (Preset ID_{Bin} is OR'ed w/1000_{Bin}) (see item 120 of [Table 14 on pg. 194](#))

Direct Access Number — F330

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

Minimum — 30.0

Maximum — Upper Limit ([F012](#))

Units — Hz

Light-Load High-Speed Operation Switching Lower-Limit Frequency

Program ⇒ Special Control ⇒ Crane/Hoist Load

This parameter sets an output frequency threshold that, once surpassed, allows the **Light-Load High-Speed** function to be used.

The **Light-Load High-Speed** function may be used if the frequency threshold ([F331](#)) and the following conditions are met:

- 1) **Light-Load High-Speed Operation Enable** is configured at [F330](#).
- 2) The output torque is less than the setting established in [F335](#) when reaching the frequency setting here.

Direct Access Number — F331

Parameter Type — **Numerical**

Factory Default — **40.00**

Changeable During Run — **Yes**

Minimum — 30.0

Maximum — Upper Limit ([F012](#))

Units — Hz

Light-Load High-Speed Operation Load Wait Time Program ⇒ Special Control ⇒ Crane/Hoist Load After the time setting of F333 times out, this parameter determines the length of time that the Light-Load High-Speed criteria must be met until the Light-Load High-Speed function engages.	Direct Access Number — F332 Parameter Type — Numerical Factory Default — 1.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 10.0 Units — Seconds
Light-Load High-Speed Operation Load Detection Time Program ⇒ Special Control ⇒ Crane/Hoist Load This parameter determines the length of time that the load requirement must meet the Light-Load High-Speed criteria before the Light-Load High-Speed Enable (F330) is recognized. Once recognized, the timer setting of F332 must expire to engage the Light-Load High-Speed function.	Direct Access Number — F333 Parameter Type — Yes Factory Default — 1.0 Changeable During Run — Numerical Minimum — 0.0 Maximum — 10.0 Units — Seconds
Light-Load High-Speed Operation Heavy-Load Detection Time Program ⇒ Special Control ⇒ Crane/Hoist Load While operating in the Light-Load High-Speed mode, this parameter determines the length of time that a load exceeding the Light-Load High-Speed operation criteria may exist before the Light-Load High-Speed mode is terminated and normal operation resumes.	Direct Access Number — F334 Parameter Type — Numerical Factory Default — 5.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 10.0 Units — Seconds
Switching Load Torque During Forward Run Program ⇒ Special Control ⇒ Crane/Hoist Load While running forward, this parameter establishes the threshold torque level that is used to determine if the Light-Load High-Speed (F331) operation may engage or remain engaged if active. If the Light-Load High-Speed operation is terminated, normal operation resumes.	Direct Access Number — F335 Parameter Type — Numerical Factory Default — 50 Changeable During Run — No Minimum — 0 Maximum — 250 Units — %
Heavy-Load Torque During Forward Acceleration Program ⇒ Special Control ⇒ Crane/Hoist Load During forward acceleration, this parameter establishes the threshold torque level that is used to determine if the Light-Load High-Speed (F331) operation may engage or remain engaged if active. If the Light-Load High-Speed operation is terminated, normal operation resumes.	Direct Access Number — F336 Parameter Type — Numerical Factory Default — 150 Changeable During Run — Yes Minimum — 0 Maximum — 250 Units — %
Heavy-Load Torque During Fixed Speed Forward Run Program ⇒ Special Control ⇒ Crane/Hoist Load While running forward at a fixed speed, this parameter establishes the threshold torque level that is used to determine if the Light-Load High-Speed (F331) operation may engage or remain engaged if active. If the Light-Load High-Speed operation is terminated, normal operation resumes.	Direct Access Number — F337 Parameter Type — Numerical Factory Default — 100 Changeable During Run — Yes Minimum — 0 Maximum — 250 Units — %

Switching Load Torque During Reverse Run Program ⇒ Special Control ⇒ Crane/Hoist Load While running in reverse, this parameter establishes the threshold torque level that is used to determine if the Light-Load High-Speed (F331) operation may engage or remain engaged if active. If the Light-Load High-Speed operation is terminated, normal operation resumes.	Direct Access Number — F338 Parameter Type — Numerical Factory Default — 50 Changeable During Run — Yes Minimum — 0 Maximum — 250 Units — %
Heavy-Load Torque During Reverse Acceleration Program ⇒ Special Control ⇒ Crane/Hoist Load During reverse acceleration, this parameter establishes the threshold torque level that is used to determine if the Light-Load High-Speed (F331) operation may engage or remain engaged if active. If the Light-Load High-Speed operation is terminated, normal operation resumes.	Direct Access Number — F339 Parameter Type — Numerical Factory Default — 150 Changeable During Run — Yes Minimum — 0 Maximum — 250 Units — %
Heavy-Load Torque During Fixed Speed Reverse Run Program ⇒ Special Control ⇒ Crane/Hoist Load While running in reverse at a fixed speed, this parameter establishes the threshold torque level that is used to determine if the Light-Load High-Speed (F331) operation may engage or remain engaged if active. If the Light-Load High-Speed operation is terminated, normal operation resumes.	Direct Access Number — F340 Parameter Type — Numerical Factory Default — 100 Changeable During Run — Yes Minimum — 0 Maximum — 250 Units — %
Frequency for Automatic High-Speed Operation at Light-Load Program ⇒ Special Control ⇒ Crane/Hoist Load This parameter establishes the speed that the ASD will ramp to when operating in the Light-Load High-Speed mode.	Direct Access Number — F341 Parameter Type — Numerical Factory Default — 80 Changeable During Run — Yes Minimum — 0.00 Maximum — 80.00 Units — %
On-Trip Powerline Switching Program ⇒ Terminal Selection ⇒ Line Power Switching This parameter Enables/Disables the On Trip Powerline Switching feature. When enabled, the system is instructed to discontinue using the output of the drive and to switch to the commercial power in the event of a trip. Settings: 0 — Disabled 1 — Enabled (box checked)	Direct Access Number — F354 Parameter Type — Check Box Factory Default — Disabled Changeable During Run — No

At-Frequency Powerline Switching

Program ⇒ Terminal Selection ⇒ Line Power Switching

When enabled (F354), this parameter sets the frequency at which the **At Frequency Powerline Switching** function engages. The **At Frequency Powerline Switching** function commands the system to discontinue using the output of the drive and to switch to commercial power once reaching the frequency set here.

Direct Access Number — F355

Parameter Type — Numerical

Factory Default — 60.00

Changeable During Run — Yes

Minimum — 0.00

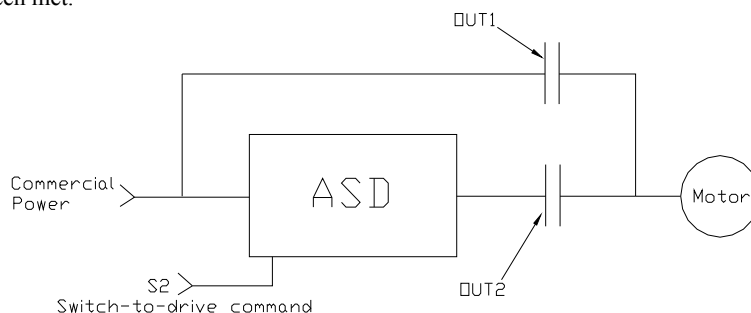
Maximum — Max. Freq. (F011)

Units — Hz

ASD-Side Switching Wait Time

Program ⇒ Terminal Selection ⇒ Line Power Switching

This parameter determines the amount of time that the drive will wait before outputting a signal to the motor once the switch-to-drive-output criteria has been met.



Direct Access Number — F356

Parameter Type — Numerical

Factory Default — (ASD dependent)

Changeable During Run — Yes

Minimum — 0.01

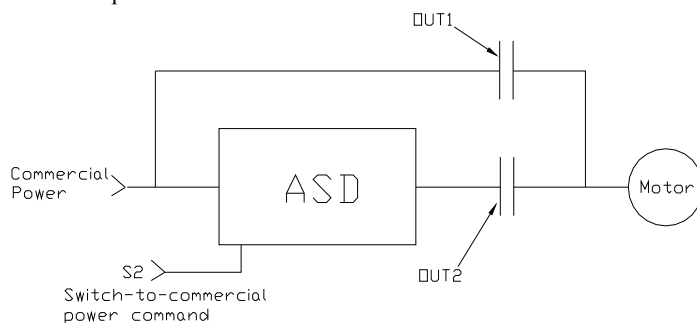
Maximum — 10.00

Units — Seconds

Commercial Power Wait Time

Program ⇒ Terminal Selection ⇒ Line Power Switching

This parameter determines the amount of time that the drive will wait before allowing commercial power to be applied to the motor once the switch-to-commercial-power criteria has been met.



Direct Access Number — F357

Parameter Type — Numerical

Factory Default — 0.62

Changeable During Run — Yes

Minimum — (ASD dependent)

Maximum — 10.00

Units — Seconds

Commercial Power Switching Freq. Hold Time

Program ⇒ Terminal Selection ⇒ Line Power Switching

This parameter determines the amount of time that the connection to commercial power is maintained once the switch-to-drive-output criteria has been met.

Direct Access Number — F358

Parameter Type — Numerical

Factory Default — 2.00

Changeable During Run — Yes

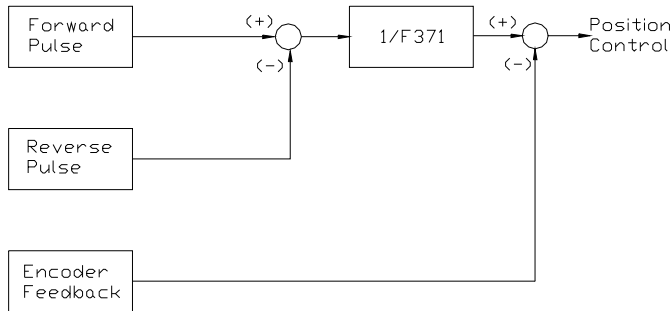
Minimum — 0.10

Maximum — 10.00

Units — Seconds

Feedback Source Program ⇒ Feedback Parameters ⇒ Feedback Settings This parameter Enables/Disables PID feedback control. When enabled, this parameter determines the source of the motor-control feedback. Settings: 0 — PID Control Disabled 1 — VI/II 2 — RR 3 — RX 4 — RX2 (option) Proportional-Integral-Derivative (PID) — 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.	Direct Access Number — F360 Parameter Type — Selection List Factory Default — Control Disabled Changeable During Run — Yes
Feedback Source Delay Filter Program ⇒ Feedback Parameters ⇒ Feedback Settings This parameter determines the delay in the ASD output response to the motor-control feedback signal (signal source is selected at F360).	Direct Access Number — F361 Parameter Type — Numerical Factory Default — 0 Changeable During Run — Yes Minimum — 0 Maximum — 255
Proportional (P) Gain Program ⇒ Feedback Parameters ⇒ Feedback Settings This parameter determines the degree that the Proportional function affects the output signal. The larger the value entered here, the quicker the drive responds to changes in feedback.	Direct Access Number — F362 Parameter Type — Numerical Factory Default — 0.10 Changeable During Run — Yes Minimum — 0.01 Maximum — 100.0
Integral (I) Gain Program ⇒ Feedback Parameters ⇒ Feedback Settings This parameter determines the degree that the Integral function affects the output signal. The smaller the value here, the more pronounced the effect of the integral function on the output signal.	Direct Access Number — F363 Parameter Type — Numerical Factory Default — 0.10 Changeable During Run — Yes Minimum — 0.01 Maximum — 100.0
Upper Deviation Limits Program ⇒ Feedback Parameters ⇒ Feedback Settings This parameter determines the maximum amount that the feedback may increase the output signal.	Direct Access Number — F364 Parameter Type — Numerical Factory Default — 50.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 50.00 Units — %

Lower Deviation Limits Program ⇒ Feedback Parameters ⇒ Feedback Settings This parameter determines the maximum amount that the feedback may decrease the output signal.	Direct Access Number — F365 Parameter Type — Numerical Factory Default — 50.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 50.00 Units — %
Feedback Settings Differential (D) Gain Program ⇒ Feedback Parameters ⇒ Feedback Settings This parameter determines the degree that the Differential function affects the output signal. The larger the value entered here, the more pronounced the affect of the differential function for a given feedback signal level.	Direct Access Number — F366 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.0 Maximum — 2.55
Number of PG Input Pulses Program ⇒ Feedback Parameters ⇒ PG Settings This parameter is used to set the end-of-travel range when using an encoder on a motor-driven positioning system (e.g., hoist/crane, etc.).	Direct Access Number — F367 Parameter Type — Numerical Factory Default — 500 Changeable During Run — No Minimum — 1 Maximum — 9999 Units — Pulse Count
PG Input Phases Program ⇒ Feedback Parameters ⇒ PG Settings This parameter determines the type of information that is supplied by the phase encoder. Settings: 1 — Speed 2 — Speed and Direction	Direct Access Number — F368 Parameter Type — Selection List Factory Default — 2 Changeable During Run — No Minimum — 1 Maximum — 2 Units — Phase Count
PG Disconnect Detection Program ⇒ Feedback Parameters ⇒ PG Settings This parameter Enables/Disables the system's monitoring of the PG connection status when using encoders with line driver outputs. <i>Note: The ASD-Multicom-J option board is required to use this feature.</i> Settings: 0 — Disabled 1 — Enabled	Direct Access Number — F369 Parameter Type — Selection List Factory Default — Disabled Changeable During Run — No
Electronic Gear Setting Program ⇒ Feedback Parameters ⇒ PG Settings This parameter sets the number of pulses per revolution when using a shaft-mounted encoder and the PG Option Board for closed loop speed control.	Direct Access Number — F370 Parameter Type — Numerical Factory Default — 1000 Changeable During Run — No Minimum — 100 Maximum — 4000

<p>Position Loop Gain</p> <p>Program ⇒ Feedback Parameters ⇒ PG Settings</p> <p>This parameter provides a divisor for the pulse input when operating in the Pulse Control mode.</p> 	<p>Direct Access Number — F371</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 4.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 100.0</p>
<p>Position Completion Range</p> <p>Program ⇒ Feedback Parameters ⇒ PG Settings</p> <p>During a deceleration ramp, this parameter sets a speed range that must be attained before the Stop command may be executed.</p>	<p>Direct Access Number — F372</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 100</p> <p>Changeable During Run — Yes</p> <p>Minimum — 1</p> <p>Maximum — 4000</p>
<p>Frequency Limit at Position</p> <p>Program ⇒ Feedback Parameters ⇒ PG Settings</p> <p>While operating in the Position-Control mode and using PG feedback, this setting determines the maximum acceleration rate in Hz/second.</p>	<p>Direct Access Number — F373</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 800</p> <p>Changeable During Run — Yes</p> <p>Minimum — 1</p> <p>Maximum — 8001</p> <p>Units — Hz/Second</p>
<p>Current Control Proportional Gain</p> <p>Program ⇒ Feedback Parameters ⇒ PG Settings</p> <p>This parameter sets the sensitivity of the drive when monitoring the output current to control speed. The larger the value entered here, the more sensitive the drive is to changes in the received feedback.</p>	<p>Direct Access Number — F374</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — No</p> <p>Minimum — 100.0</p> <p>Maximum — 1000</p>
<p>Current Control Integral Gain</p> <p>Program ⇒ Feedback Parameters ⇒ PG Settings</p> <p>This parameter sets the degree and rate at which the output frequency will be allowed to change when prompted by changes in the output current.</p> <p>The larger the value entered here, the quicker/more the drive responds to changes in feedback.</p>	<p>Direct Access Number — F375</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — No</p> <p>Minimum — 100.0</p> <p>Maximum — 1250</p>

Speed Loop Proportional Gain Program ⇒ Feedback Parameters ⇒ PG Settings This parameter sets the Proportional Gain (sensitivity) of the drive when monitoring the PG signal to control speed. The larger the value entered here, the more sensitive the drive is to changes in the received feedback and the quicker it responds.	Direct Access Number — F376 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 3.2 Maximum — 1000
Speed Loop Integral Gain Program ⇒ Feedback Parameters ⇒ PG Settings This parameter sets the response time of the Speed Loop Integral Gain . The smaller the value here, the more pronounced (quicker) the effect of the integral function.	Direct Access Number — F377 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 10.0 Maximum — 200.0
Motor Counter Data Program ⇒ Feedback Parameters ⇒ PG Settings This parameter sets the pulses-per-revolution displayed at the Monitor screen when using a shaft-mounted encoder for speed control. This setting is used for display purposes only and does not affect the speed control of the system. If zero is selected here then the setting at F370 (Electronic Gear Setting) determines the pulses-per-revolution to be displayed at the Monitor screen. Settings: Selection 0 — F370 setting Selection 1 — 256 pulses/revolution Selection 2 — 512 pulses/revolution Selection 3 — 1024 pulses/revolution Selection 4 — 2048 pulses/revolution Selection 5 — 4096 pulses/revolution	Direct Access Number — F378 Parameter Type — Selection List Factory Default — Selection 0 Changeable During Run — No Minimum — Selection 0 Maximum — Selection 5
Speed Loop Parameter Ratio Program ⇒ Feedback Parameters ⇒ PG Settings Not used with this product.	Direct Access Number — F379 Parameter Type — Numerical Factory Default — 1.00 Changeable During Run — No Minimum — 0.01 Maximum — 10.00
Use Speed Mode Program ⇒ Pattern Run ⇒ Preset Speed Mode This parameter Enables/Disables the Use Speed mode. When enabled, the system uses all of the parameter settings of the Preset Speed being run. Otherwise, only the frequency setting is used. Settings: 0 — Disabled 1 — Enabled (box checked)	Direct Access Number — F380 Parameter Type — Check Box Factory Default — Disabled Changeable During Run — No

Preset Speed Direction #1 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #1 Preset Speed (F018) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F381 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #2 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #2 Preset Speed (F019) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F382 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #3 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #3 Preset Speed (F020) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F383 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #4 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #4 Preset Speed (F021) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F384 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #5 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #5 Preset Speed (F022) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F385 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #6 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #6 Preset Speed (F023) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F386 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No

Preset Speed Direction #7 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #7 Preset Speed (F024) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F387 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #8 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #8 Preset Speed (F287) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F388 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #9 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #9 Preset Speed (F288) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F389 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #10 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #10 Preset Speed (F289) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F390 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #11 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #11 Preset Speed (F290) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F391 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #12 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #12 Preset Speed (F291) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F392 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No

Preset Speed Direction #13 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #13 Preset Speed (F292) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F393 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #14 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #14 Preset Speed (F293) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F394 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Preset Speed Direction #15 Program ⇒ Pattern Run ⇒ Preset Speeds Determines the forward/reverse setting for the #15 Preset Speed (F294) . Settings: 0 — Forward 1 — Reverse	Direct Access Number — F395 Parameter Type — Selection List Factory Default — Forward Changeable During Run — No
Vector Motor Model Autotune Command Program ⇒ Motor Parameters ⇒ Vector Motor Model This parameter sets the Autotune command status. Settings: 0 — Autotune Disabled 1 — Reset Motor Defaults 2 — Enable Autotune on Run Command	Direct Access Number — F400 Parameter Type — Selection List Factory Default — Autotune Disabled Changeable During Run — No
Vector Motor Model Slip Frequency Gain Program ⇒ Motor Parameters ⇒ Vector Motor Model This parameter provides a degree of slip compensation for a given load. A higher setting here decreases the slip allowed for a given load/ASD output ratio.	Direct Access Number — F401 Parameter Type — Numerical Factory Default — 0.60 Changeable During Run — Yes Minimum — 0.00 Maximum — 2.55
Motor Constant 1 (primary resistance) Program ⇒ Motor Parameters ⇒ Vector Motor Model This parameter is the measurement of the stator resistance and is considered a Motor Constant (unchanging). This value is used in conjunction with other constants to tune the motor. To use Vector Control , Automatic Torque Boost , or Automatic Energy-Saving , the Motor Constant setting (motor tuning) is required.	Direct Access Number — F402 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — No Minimum — 0.0 Maximum — 100,000 MΩ Units — Ω

Motor Constant 2 (secondary resistance) Program ⇒ Motor Parameters ⇒ Vector Motor Model This parameter is the measurement of the rotor resistance and is considered a Motor Constant (unchanging). This value is used in conjunction with other constants to tune the motor. This setting (motor tuning) is required to use the Vector Control , Automatic Torque Boost , or Automatic Energy-Saving functions.	Direct Access Number — F403 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — No Minimum — 0.00 Maximum — Open Units — Ω
Motor Constant 3 (exciting inductance) Program ⇒ Motor Parameters ⇒ Vector Motor Model This parameter is used to input the excitation inductance for the motor. This value is used in conjunction with other constants to tune the motor. This setting (motor tuning) is required to use the Vector Control , Automatic Torque Boost , or Automatic Energy-Saving functions.	Direct Access Number — F404 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — No Minimum — 0.00 Maximum — 6500.0 Units — μH
Motor Constant 4 (load inertia) Program ⇒ Motor Parameters ⇒ Vector Motor Model This parameter is used to control the load inertia during speed changes. Acceleration and deceleration overshoot may be reduced by increasing this value. This setting (motor tuning) is required to use the Vector Control , Automatic Torque Boost , or Automatic Energy-Saving functions.	Direct Access Number — F405 Parameter Type — Numerical Factory Default — 1.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 100.0
Motor Constant 5 (leakage inductance) Program ⇒ Motor Parameters ⇒ Vector Motor Model This parameter provides slight increases in the output voltage of the drive at the high speed range. This setting (motor tuning) is required to use the Vector Control , Automatic Torque Boost , or Automatic Energy-Saving functions.	Direct Access Number — F410 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — No Minimum — 0.00 Maximum — 650.0
Number of Poles of Motor Program ⇒ Motor Parameters ⇒ Motor Settings This parameter identifies the number of motor poles.	Direct Access Number — F411 Parameter Type — Numerical Factory Default — 4 Changeable During Run — No Minimum — 2 Maximum — 16
Motor Capacity Program ⇒ Motor Parameters ⇒ Motor Settings This parameter identifies the wattage rating of the motor.	Direct Access Number — F412 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — No Minimum — 0.10 Maximum — (ASD dependent) Units — kW

<p>Motor Type</p> <p>Program ⇒ Motor Parameters ⇒ Motor Settings</p> <p>This parameter identifies the type of motor being used.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Toshiba EQP III TEFC 1 — Toshiba EQP III ODP 2 — Toshiba EPACT TEFC 3 — Toshiba EPACT ODP 4 — Other Motor 	<p>Direct Access Number — F413</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Toshiba EQP III TEFC</p> <p>Changeable During Run — No</p>
<p>Motor Constant 3 Enable</p> <p>Program ⇒ Motor Parameters ⇒ Vector Motor Model</p> <p>This parameter Enables/Disables tuning of Motor Constant 3 during an Autotune.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Disabled 1 — Enabled (box checked) 	<p>Direct Access Number — F414</p> <p>Parameter Type — Check Box</p> <p>Factory Default — Enable</p> <p>Changeable During Run — No</p>
<p>Torque Command</p> <p>Program ⇒ Torque Setting ⇒ Torque Control</p> <p>When operating in the Torque Control mode, this parameter allows the user to select the source of the torque command signal.</p> <p>Settings:</p> <ul style="list-style-type: none"> 1 — VI/II 2 — RR 3 — RX 4 — RX2 (option) 5 — CN8 Option (Not Used) 6 — Binary/BCD Input 7 — Common Serial (TTL) 8 — RS232/RS485 9 — Communication Card 	<p>Direct Access Number — F420</p> <p>Parameter Type — Selection List</p> <p>Factory Default — RX</p> <p>Changeable During Run — Yes</p>
<p>Torque Command Filter</p> <p>Program ⇒ Torque Setting ⇒ Torque Control</p> <p>This parameter reduces the motor vibration caused by large-inertia loads. A small value will have a great effect while an increased value will have a lesser effect.</p>	<p>Direct Access Number — F421</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 200.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 10.0</p> <p>Maximum — 200.0</p>

Synchronized Torque Bias Input

Program ⇒ Torque Setting ⇒ Torque Control

This parameter **Enables/Disables** the **Synchronized Torque Bias** input function. When enabled, this parameter identifies the source of the **Synchronized Torque Bias** input signal.

Settings:

- 0 — Disabled
- 1 — VI/II
- 2 — RR
- 3 — RX
- 4 — RX2 (option)
- 5 — CN8 Option (Not Used)
- 6 — Binary/BCD Input
- 7 — Common Serial (TTL)
- 8 — RS232/RS485
- 9 — Communication Card

Direct Access Number — F422Parameter Type — **Selection list**Factory Default — **Disabled**Changeable During Run — **Yes**

Tension Torque Bias Input

Program ⇒ Torque Setting ⇒ Torque Control

This parameter **Enables/Disables** the **Tension Torque Bias** input function and identifies the source of the **Tension Torque Bias** input signal when enabled.

Settings:

- 0 — Disabled
- 1 — VI/II
- 2 — RR
- 3 — RX
- 4 — RX2 (option)
- 5 — CN8 Option (Not Used)
- 6 — Binary/BCD Input
- 7 — Common Serial (TTL)
- 8 — RS232/RS485
- 9 — Communication Card

Direct Access Number — F423Parameter Type — **Selection List**Factory Default — **Disabled**Changeable During Run — **Yes**

Load Sharing Gain Input

Program ⇒ Torque Setting ⇒ Torque Control

This parameter **Enables/Disables** the **Load Sharing Gain** input function and is enabled by selecting a **Load Sharing Gain** input signal source.

Settings:

- 0 — Disabled
- 1 — VI/II
- 2 — RR
- 3 — RX
- 4 — RX2 (option)
- 5 — CN8 Option (Not Used)
- 6 — Binary/BCD Input
- 7 — Common Serial (TTL)
- 8 — RS232/RS485
- 9 — Communication Card

Direct Access Number — F424Parameter Type — **Selection List**Factory Default — **Disabled**Changeable During Run — **Yes**

Forward Speed Limit Input Program ⇒ Torque Setting ⇒ Torque Speed Limit This parameter Enables/Disables the Forward Speed Limit Input control function. When enabled and operating in the Torque Control mode, the forward speed limit is controlled by the terminal selected here. If Setting is selected, the value set at F426 is used as the Forward Speed Limit input. Settings: 0 — Disabled 1 — VI/II 2 — RR 3 — RX 4 — RX2 (option) 5 — Setting (of F426)	Direct Access Number — F425 Parameter Type — Selection List Factory Default — Disabled Changeable During Run — Yes
Forward Speed Limit Level Program ⇒ Torque Setting ⇒ Torque Control This parameter provides a value to be used as the Forward Speed Limit setting if Setting is selected at F425 .	Direct Access Number — F426 Parameter Type — Numerical Factory Default — 80.0 Changeable During Run — Yes Minimum — 0.00 Maximum — Upper Limit (F012) Units — Hz
Reverse Speed Limit Input Program ⇒ Torque Setting ⇒ Torque Control This parameter Enables/Disables the Reverse Speed Limit Input control function. When enabled and operating in the Torque Control mode, the reverse speed limit is controlled by the terminal selected here. If Setting is selected, the value set at F428 is used as the Reverse Speed Limit input. Settings: 0 — Disabled 1 — VI/II 2 — RR 3 — RX 4 — RX2 (option) 5 — Setting (of F428)	Direct Access Number — F427 Parameter Type — Selection List Factory Default — Disabled Changeable During Run — Yes
Reverse Speed Limit Level Program ⇒ Torque Setting ⇒ Torque Control This parameter provides a value to be used as the Reverse Speed Limit setting if Setting is selected at F427 .	Direct Access Number — F428 Parameter Type — Numerical Factory Default — 80.0 Changeable During Run — Yes Minimum — 0.00 Maximum — Upper Limit (F012) Units — Hz

Torque Command Mode Program ⇒ Torque Setting ⇒ Torque Speed Limit This parameter specifies whether the torque command function is to be used in one direction or both (F/R). Settings: 0 — Fixed Direction 1 — F/R Permitted	Direct Access Number — F429 Parameter Type — Selection List Factory Default — Fixed Direction Changeable During Run — No
Speed Limit (torque) Reference Program ⇒ Torque Setting ⇒ Torque Speed Limit The system has the ability to limit the amount that the speed may vary as a function of a changing load while operating in the Torque Control mode. This parameter sets the input terminal that will be used to control the allowable speed variance. Settings: 0 — None 1 — VI/II 2 — RR 3 — RX 4 — RX2 (option) 5 — Fixed	Direct Access Number — F430 Parameter Type — Selection List Factory Default — None Changeable During Run — Yes
Speed Limit Torque Level Program ⇒ Torque Setting ⇒ Torque Speed Limit The system has the ability to limit the amount that the speed may vary as a function of a changing load while operating in the Torque Control mode. This parameter sets the targeted speed. The plus-or-minus value (range) for this setting may be set at F432 .	Direct Access Number — F431 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — Max. Freq. (F011) Units — Hz
Speed Limit Torque Range Program ⇒ Torque Setting ⇒ Torque Speed Limit The system has the ability to limit the amount that the speed may vary as a function of a changing load while operating in the Torque Control mode. This parameter sets a plus-or-minus value (range) for the Speed Limit Torque Level (F431).	Direct Access Number — F432 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — Max. Freq. (F011) Units — Hz
Speed Limit Torque Recovery Program ⇒ Torque Setting ⇒ Torque Speed Limit The system has the ability to limit the amount that the speed may vary as a function of a changing load while operating in the Torque Control mode. This parameter sets the response time of the system to torque change requirements.	Direct Access Number — F433 Parameter Type — Numerical Factory Default — 0.20 Changeable During Run — No Minimum — 0.00 Maximum — 2.50 Units — Seconds

<p>Power Running (Driving) Torque Limit #1</p> <p>Program ⇒ Torque Setting ⇒ Torque Limit Settings</p> <p>This parameter determines the source of the control signal for the positive torque limit setting. If Setting is selected, the value set at F441 is used as the Power Running Torque Limit #1 input.</p> <p>Settings:</p> <ul style="list-style-type: none"> 1 — VI/II 2 — RR 3 — RX 4 — RX2 (option) 5 — Setting (of F441) 	<p>Direct Access Number — F440</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Setting</p> <p>Changeable During Run — Yes</p>
<p>Driving Torque Limit #1 Setting</p> <p>Program ⇒ Torque Setting ⇒ Manual Torque Limit</p> <p>This parameter provides a value for the Power Running Torque Limit #1 setting if Setting is selected at F440. This value provides the positive torque upper limit for the #1 motor.</p>	<p>Direct Access Number — F441</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 250.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 250.0</p> <p>Units — %</p>
<p>Regeneration Torque Limit #1</p> <p>Program ⇒ Torque Setting ⇒ Torque Limit Settings</p> <p>This parameter determines the source of the Regenerative Torque Limit control signal. If Setting is selected, the value set at F443 is used for this parameter.</p> <p>Settings:</p> <ul style="list-style-type: none"> 1 — VI/II 2 — RR 3 — RX 4 — RX2 (option) 5 — Setting (of F443) 	<p>Direct Access Number — F442</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Setting</p> <p>Changeable During Run — Yes</p>
<p>Regeneration Torque Limit Setting #1</p> <p>Program ⇒ Torque Setting ⇒ Torque Limit Settings ⇒ Manual Settings</p> <p>This parameter provides a value to be used as the Regeneration Torque Limit #1 if Setting is selected at F442.</p>	<p>Direct Access Number — F443</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 250.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 250.0</p> <p>Units — %</p>
<p>Driving Torque Limit #2</p> <p>Program ⇒ Torque Setting ⇒ Manual Torque Limit</p> <p>This parameter is used to set the positive torque upper limit for the #2 motor profile when multiple motors are controlled by a single drive or when a single motor is to be controlled by multiple profiles.</p>	<p>Direct Access Number — F444</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 250.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 250.0</p> <p>Units — %</p>

Regeneration Torque Limit #2 Program ⇒ Torque Setting ⇒ Manual Torque Limit This parameter is used to set the negative torque upper limit for the #2 motor profile when multiple motors are controlled by a single drive or when a single motor is to be controlled by multiple profiles.	Direct Access Number — F445 Parameter Type — Numerical Factory Default — 250.0 Changeable During Run — Yes Minimum — 0.00 Maximum — 250.0 Units — %
Driving Torque Limit #3 Program ⇒ Torque Setting ⇒ Manual Torque Limit This parameter is used to set the positive torque upper limit for the #3 motor profile when multiple motors are controlled by a single drive or when a single motor is to be controlled by multiple profiles.	Direct Access Number — F446 Parameter Type — Numerical Factory Default — 250.0 Changeable During Run — Yes Minimum — 0.00 Maximum — 250.0 Units — %
Regeneration Torque Limit #3 Program ⇒ Torque Setting ⇒ Manual Torque Limit This parameter is used to set the negative torque upper limit for the #3 motor profile when multiple motors are controlled by a single drive or when a single motor is to be controlled by multiple profiles.	Direct Access Number — F447 Parameter Type — Numerical Factory Default — 250.0 Changeable During Run — Yes Minimum — 0.00 Maximum — 250.0 Units — %
Driving Torque Limit #4 Program ⇒ Torque Setting ⇒ Manual Torque Limit This parameter is used to set the positive torque upper limit for the #4 motor profile when multiple motors are controlled by a single drive or when a single motor is to be controlled by multiple profiles.	Direct Access Number — F448 Parameter Type — Numerical Factory Default — 250.0 Changeable During Run — Yes Minimum — 0.00 Maximum — 250.0 Units — %
Regeneration Torque Limit #4 Program ⇒ Torque Setting ⇒ Manual Torque Limit This parameter is used to set the negative torque upper limit for the #4 motor profile when multiple motors are controlled by a single drive or when a single motor is to be controlled by multiple profiles.	Direct Access Number — F449 Parameter Type — Numerical Factory Default — 250.0 Changeable During Run — Yes Minimum — 0.00 Maximum — 250.0 Units — %

Torque Limit Mode Program ⇒ Torque Setting ⇒ Torque Limit Settings This parameter sets the operating condition in which the torque limit settings of F440 and F442 are applied to the motor. If Driving/Regen is selected here the torque limit set at F440 applies when driving the motor (F or R) and the setting of F442 applies during regenerative operation. If Positive/Negative is selected here the torque limit set at F440 applies when driving the motor forward only and the setting of F442 applies when driving the motor in reverse only. Settings: 0 — Driving/Regen 1 — Positive/Negative	Direct Access Number — F450 Parameter Type — Selection List Factory Default — Driving/Regen Changeable During Run — No
Torque Limit Mode (Speed Dependent) Program ⇒ Torque Setting ⇒ Torque Limit Settings This parameter allows for either wide or very limited speed fluctuations while operating in the Torque Control mode. The ASD output follows the commanded speed when No Speed Cooperation is selected and has a very limited speed fluctuation range when Standard is selected. Settings: 0 — Standard 1 — No Speed Cooperation	Direct Access Number — F451 Parameter Type — Selection List Factory Default — Standard Changeable During Run — Yes
Continued Stall Period Program ⇒ Protection ⇒ Stall This parameter allows the user to extend the Over-Voltage Stall (F305) and the Over-Current Stall (F017) time settings.	Direct Access Number — F452 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 1.00 Units — Seconds
Stall Prevention During Regeneration Program ⇒ Protection ⇒ Stall This parameter Enables/Disables the Over-Voltage Stall (F305) and the Over-Current Stall (F017) function during regeneration <u>only</u> . Application-specific conditions may occur that warrant disabling the Stall function during regeneration. Settings: 0 — With Stall Prevention 1 — Without Stall Prevention	Direct Access Number — F453 Parameter Type — Selection List Factory Default — With Stall Prevention. Changeable During Run — Yes

Current Differential Gain Program ⇒ Special Control ⇒ Special Parameters This parameter determines the degree that the current differential function affects the output signal. The larger the value entered here, the more pronounced the Current Differential Gain .	Direct Access Number — F454 Parameter Type — Numerical Factory Default — 1.23 Changeable During Run — Yes Minimum — 0.00 Maximum — 327.6
VI/II Bias Adjust Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ VI/II This parameter is used to fine-tune the bias of the VI/II input terminals. <i>Note: See note on pg. 50 for further information on the VI/II terminal.</i> This setting may be used to ensure that the zero level of the input source (pot, pressure transducer, flow meter, etc.) is also the zero level setting of the ASD system. This is accomplished by setting the input source to zero and either increasing or decreasing this setting to provide an output of zero from the ASD.	Direct Access Number — F470 Parameter Type — Numerical Factory Default — 100 Changeable During Run — Yes Minimum — 0.0 Maximum — 255
VI/II Gain Adjust Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ VI/II This parameter is used to fine tune the gain of the VI/II input terminals. <i>Note: See note on pg. 50 for further information on the VI/II terminal.</i> This setting may be used to ensure that the 100% level of the input source (pot, pressure transducer, flow meter, etc.) is also the 100% level setting of the ASD system. This is accomplished by setting the input source to 100% and either increasing or decreasing this setting to provide an output of 100% from the ASD.	Direct Access Number — F471 Parameter Type — Numerical Factory Default — 50 Changeable During Run — Yes Minimum — 0.0 Maximum — 255
RR Bias Adjust Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RR This parameter is used to fine tune the bias of the RR input terminal when this terminal is used as the control input while operating in the Speed Control or the Torque Control mode. This setting may be used to ensure that the zero level of the input source (pot, pressure transducer, flow meter, etc.) is also the zero level setting of the ASD system. This is accomplished by setting the input source to zero and either increasing or decreasing this setting to provide an output of zero from the ASD.	Direct Access Number — F472 Parameter Type — Numerical Factory Default — 120 Changeable During Run — Yes Minimum — 0.0 Maximum — 255

<p>RR Gain Adjust</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RR</p> <p>This parameter is used to fine tune the gain of the RR input terminal when this terminal is used as the control input while operating in the Speed Control or the Torque Control mode.</p> <p>This setting may be used to ensure that the 100% level of the input source (pot, pressure transducer, flow meter, etc.) is also the 100% level setting of the ASD system.</p> <p>This is accomplished by setting the input source to 100% and either increasing or decreasing this setting to provide an output of 100% from the ASD.</p>	<p>Direct Access Number — F473</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 61</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 255</p>
<p>RX Bias Adjust</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX</p> <p>This parameter is used to fine tune the bias of the RX input terminal when this terminal is used as the control input while operating in the Speed Control or the Torque Control mode.</p> <p>This setting may be used to ensure that the zero level of the input source (pot, pressure transducer, flow meter, etc.) is also the zero level setting of the ASD system.</p> <p>This is accomplished by setting the input source to zero and either increasing or decreasing this setting to provide an output of zero from the ASD.</p>	<p>Direct Access Number — F474</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 99</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 255</p>
<p>RX Gain Adjust</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX</p> <p>This parameter is used to fine tune the gain of the RX input terminal when this terminal is used as the control input while operating in the Speed Control or the Torque Control mode.</p> <p>This setting may be used to ensure that the 100% level of the input source (pot, pressure transducer, flow meter, etc.) is also the 100% level setting of the ASD system.</p> <p>This is accomplished by setting the input source to 100% and either increasing or decreasing this setting to provide an output of 100% from the ASD.</p>	<p>Direct Access Number — F475</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 141</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 255</p>
<p>RX2 Bias Adjust</p> <p>Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX2</p> <p>This parameter is used to fine tune the bias of the RX2 input terminal when this terminal is used as the control input while operating in the Speed Control or the Torque Control mode.</p> <p>This setting may be used to ensure that the zero level of the input source (pot, pressure transducer, flow meter, etc.) is also the zero level setting of the ASD system.</p> <p>This is accomplished by setting the input source to zero and either increasing or decreasing this setting to provide a zero output from the ASD.</p>	<p>Direct Access Number — F476</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 99</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — 255</p>

RX2 Gain Adjust Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ RX2 This parameter is used to fine tune the gain of the RX2 input terminal when this terminal is used as the control input while operating in the Speed Control or the Torque Control mode. This setting may be used to ensure that the 100% level of the input source (pot, pressure transducer, flow meter, etc.) is also the 100% level setting of the ASD system. This is accomplished by setting the input source to 100% and either increasing or decreasing this setting to provide an output of 100% from the ASD.	Direct Access Number — F477 Parameter Type — Numerical Factory Default — 141 Changeable During Run — Yes Minimum — 0.0 Maximum — 255
Exciting Strengthening Coefficient Program ⇒ Special Control ⇒ Special Parameters This parameter determines the rate at which the excitation current is allowed to go from zero to saturation and is enabled at F481 .	Direct Access Number — F480 Parameter Type — Numerical Factory Default — 64 Changeable During Run — Yes Minimum — 0 Maximum — 255
Over-Exciting Cooperation Program ⇒ Special Control ⇒ Special Parameters This parameter determines the method used to control the rate that the excitation current is allowed to reach saturation. If Effective is selected, the preset Torque Control or Speed Control settings will determine the rate that the motor reaches excitation saturation. Settings: 0 — Effective 1 — Applied by F480	Direct Access Number — F481 Parameter Type — Selection List Factory Default — Effective Changeable During Run — Yes
Current Vector Control Program ⇒ Special Control ⇒ Special Parameters This parameter establishes the control margin of modulation when operating in the Current Vector Control mode.	Direct Access Number — F482 Parameter Type — Numerical Factory Default — 90.0 Changeable During Run — Yes Minimum — 80.0 Maximum — 300.0 Units — %
Voltage Vector Control Program ⇒ Special Control ⇒ Special Parameters This parameter establishes the control margin of modulation while operating in the Voltage Vector Control mode.	Direct Access Number — F483 Parameter Type — Numerical Factory Default — 105.0 Changeable During Run — Yes Minimum — 80.0 Maximum — 300.0 Units — %

Constant Vector Control Program ⇒ Special Control ⇒ Special Parameters This parameter establishes the control margin of modulation while operating in the Constant Vector Control mode.	Direct Access Number — F484 Parameter Type — Numerical Factory Default — 105.0 Changeable During Run — Yes Minimum — 80.0 Maximum — 300.0 Units — %
Stall Cooperation Gain at Field Weakening Zone Program ⇒ Special Control ⇒ Special Parameters This parameter determines the degree that the Stall function is effective while operating the motor in the field weakening zone.	Direct Access Number — F485 Parameter Type — Numerical Factory Default — 128 Changeable During Run — Yes Minimum — 0 Maximum — 255
Excitation Starting Rate Program ⇒ Special Control ⇒ Special Parameters This parameter establishes the rate of increase in the excitation current from a zero output of the ASD.	Direct Access Number — F486 Parameter Type — Numerical Factory Default — 163.8 Changeable During Run — Yes Minimum — 1.64 Maximum — 327.6
Compensation Coefficient for Iron Loss Program ⇒ Special Control ⇒ Special Parameters This parameter compensates for losses in the rotor-to-stator coupling of the excitation and torque current energy.	Direct Access Number — F487 Parameter Type — Numerical Factory Default — 105.0 Changeable During Run — Yes Minimum — 0 Maximum — 255
Voltage Compensation Coefficient for Dead Time Program ⇒ Special Control ⇒ Special Parameters This parameter adjusts the degree of voltage compensation during dead time by increasing or decreasing the on-time of the programmed PWM just prior to the start of the dead time.	Direct Access Number — F488 Parameter Type — Numerical Factory Default — 163.8 Changeable During Run — Yes Minimum — 1.64 Maximum — 327.6
Dead Time Compensation (Enable) Program ⇒ Special Control ⇒ Special Parameters This parameter Enables/Disables the Dead Time Compensation function. The Dead Time Compensation feature provides a smoothing of the on-off IGBT signal that feeds the Gate Driver board during the off portion of the on-off cycle. Settings: 0 — Enabled 1 — Disabled	Direct Access Number — F489 Parameter Type — Selection List Factory Default — Enabled Changeable During Run — Yes

Dead-time Compensation Bias Program ⇒ Special Control ⇒ Special Parameters This parameter sets a bias for the Dead-time Compensation function. The Dead-time Compensation feature provides a smoothing of the on-off IGBT signal that feeds the Gate Driver board.	Direct Access Number — F490 Parameter Type — Numerical Factory Default — 0.000 Changeable During Run — Yes Minimum — -32.768 Maximum — 32.767
Switching Frequency of Current/Voltage Control Program ⇒ Special Control ⇒ Special Parameters This parameter sets the threshold frequency at which ASD control is switched between Current-control and Voltage -control.	Direct Access Number — F491 Parameter Type — Numerical Factory Default — 40.00 Changeable During Run — Yes Minimum — 10.00 Maximum — 60.00 Units — Hz
Accel #2 Time Program ⇒ Special Control ⇒ Accel/Decel #1-#4 This parameter specifies the time in seconds for the drive to go from 0.0 Hz to the Maximum Frequency for the #2 Acceleration profile. The accel/decel pattern may be set using F502 . The minimum accel/decel time may be set using F508 . This setting is also used to determine the acceleration rate of the Motorized Pot function. Note: <i>An acceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. Automatic Accel/Decel and Stall settings may lengthen the acceleration time.</i>	Direct Access Number — F500 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 0.1 Maximum — 6000 Units — Seconds
Decel #2 Time Program ⇒ Special Control ⇒ Accel/Decel #1 – #4 This parameter specifies the time in seconds for the drive to go from the Maximum Frequency to 0.0 Hz for the #2 Deceleration profile. The accel/decel pattern may be set using F502 . The minimum accel/decel time may be set using F508 . This setting is also used to determine the deceleration rate of the Motorized Pot function. Note: <i>A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. Automatic Accel/Decel and Stall settings may lengthen the acceleration time.</i>	Direct Access Number — F501 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 0.1 Maximum — 6000 Units — Seconds

Accel/Decel Pattern #1Program \Rightarrow Special Control \Rightarrow Accel/Decel #1 – #4

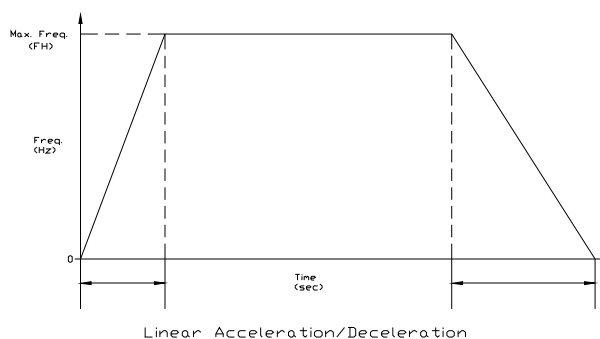
This parameter enables a user-selected preprogrammed output profile that controls the acceleration and deceleration pattern for the **#1 Accel/Decel** parameter.

Settings:

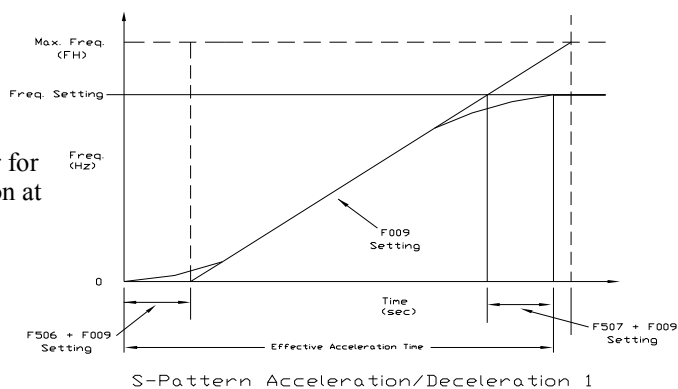
- 0 — Linear
- 1 — S-Pattern 1
- 2 — S-Pattern 2

The figures below provide a profile of the available accel/decel patterns.

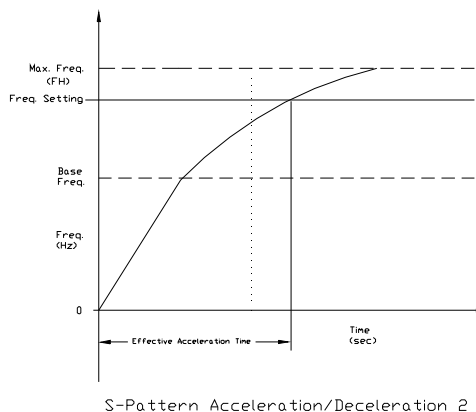
Linear acceleration and deceleration is the default pattern and is used on most applications.



S-pattern 1 is used for applications that require quick acceleration and deceleration. This setting is also popular for applications that require shock absorption at the start of acceleration or deceleration.



S-pattern 2 acceleration and deceleration decreases the rate of change above the base frequency.



Accel/Decel Pattern #2 Program ⇒ Special Control ⇒ Accel/Decel #1 – #4 This parameter enables a user-selected preprogrammed output profile that controls the acceleration and deceleration pattern for the #2 Accel/Decel parameter. Settings: 0 — Linear 1 — S-Pattern 1 2 — S-Pattern 2	Direct Access Number — F503 Parameter Type — Selection List Factory Default — Linear Changeable During Run — Yes
Accel/Decel Group No path available (Direct Access Only) While operating using the CN8 Option (Not Used) this parameter selects the accel/decel profile to be used during a multiple-accel/decel profile configuration. The accel/decel setting for selections 1 – 4 may be found at F009 , F500 , F510 , and F514 , respectively. Settings: 1 — Group 1 2 — Group 2 3 — Group 3 4 — Group 4	Direct Access Number — F504 Parameter Type — Selection List Factory Default — 1 Changeable During Run — Yes
<p>Note: Press ESC from the <i>Frequency Command</i> screen to access this parameter.</p>	
Acc/Dec Switching Frequency #1 Program ⇒ Special Control ⇒ Accel/Decel Special This parameter sets the frequency at which the acceleration control is switched from the Accel #1 profile to the Accel #2 profile during a multiple-acceleration profile configuration.	Direct Access Number — F505 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — Max. Freq. (F011) Units — Hz
S-Pattern Lower Limit Adjustment Program ⇒ Special Control ⇒ Accel/Decel Special Sets the lower limit of S-pattern 1 and 2 .	Direct Access Number — F506 Parameter Type — Numerical Factory Default — 25.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 50.00 Units — %
S-Pattern Upper Limit Adjustment Program ⇒ Special Control ⇒ Accel/Decel Special Sets the upper limit frequency of S-pattern 1 and 2 .	Direct Access Number — F507 Parameter Type — Numerical Factory Default — 25.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 50.00 Units — %

Accel/Decel Lower Limit Time Program ⇒ Special Control ⇒ Accel/Decel Special This parameter sets the lower limit of the Accel/Decel time.	Direct Access Number — F508 Parameter Type — Numerical Factory Default — 0.10 Changeable During Run — Yes Minimum — 0.01 Maximum — 10.00 Units — Seconds
Accel #3 Time Program ⇒ Special Control ⇒ Accel/Decel #1 – #4 This parameter specifies the time in seconds for the drive to go from 0.0 Hz to the Maximum Frequency for the #3 Acceleration profile. The accel/decel pattern may be set using F502 . The minimum accel/decel time may be set using F508 . <i>Note: An acceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. Automatic Accel/Decel and Stall settings may lengthen the acceleration time.</i>	Direct Access Number — F510 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 0.1 Maximum — 6000 Units — Seconds
Decel #3 Time Program ⇒ Special Control ⇒ Accel/Decel #1 – #4 This parameter specifies the time in seconds for the drive to go from the Maximum Frequency to 0.0 Hz for the #3 Deceleration profile. The accel/decel pattern may be set using F502 . The minimum accel/decel time may be set using F508 . <i>Note: A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. Automatic Accel/Decel and Stall settings may lengthen the deceleration time.</i>	Direct Access Number — F511 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 0.1 Maximum — 6000 Units — Seconds
Accel/Decel Pattern #3 Program ⇒ Special Control ⇒ Accel/Decel #1 – #4 This parameter enables a user-selected preprogrammed output profile that controls the acceleration and deceleration pattern for the #3 Accel/Decel parameter. Settings: 0 — Linear 1 — S-Pattern 1 2 — S-Pattern 2	Direct Access Number — F512 Parameter Type — Selection List Factory Default — Linear Changeable During Run — Yes
Accel/Decel Switching Frequency #2 Program ⇒ Special Control ⇒ Accel/Decel Special This parameter sets the frequency at which the acceleration control is switched from the Accel #2 profile to the Accel #3 profile during a multiple-acceleration profile configuration.	Direct Access Number — F513 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — Max. Freq. (F011) Units — Hz

<p>Accel #4 Time</p> <p>Program ⇒ Special Control ⇒ Accel/Decel #1 – #4</p> <p>This parameter specifies the time in seconds for the drive to go from 0.0 Hz to the Maximum Frequency for the #4 Acceleration profile. The accel/decel pattern may be set using F502. The minimum accel/decel time may be set using F508.</p> <p>Note: <i>An acceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. Automatic Accel/Decel and Stall settings may lengthen the acceleration time.</i></p>	<p>Direct Access Number — F514</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.1</p> <p>Maximum — 6000</p> <p>Units — Seconds</p>
<p>Decel #4 Time</p> <p>Program ⇒ Special Control ⇒ Accel/Decel #1 – #4</p> <p>This parameter specifies the time in seconds for the drive to go from the Maximum Frequency to 0.0 Hz for the #4 Deceleration profile. The accel/decel pattern may be set using F502. The minimum accel/decel time may be set using F508.</p> <p>Note: <i>A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. Automatic Accel/Decel and Stall settings may lengthen the deceleration time.</i></p>	<p>Direct Access Number — F515</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.1</p> <p>Maximum — 6000</p> <p>Units — Seconds</p>
<p>Accel/Decel Pattern #4</p> <p>Program ⇒ Special Control ⇒ Accel/Decel #1 – #4</p> <p>This parameter enables a user-selected preprogrammed output profile that controls the acceleration and deceleration pattern for the #4 Accel/Decel parameter.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Linear 1 — S-Pattern 1 2 — S-Pattern 2 	<p>Direct Access Number — F516</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Linear</p> <p>Changeable During Run — Yes</p>
<p>Accel/Decel Switching Frequency #3</p> <p>Program ⇒ Special Control ⇒ Accel/Decel Special</p> <p>This parameter sets the frequency at which the acceleration control is switched from the Accel #3 profile to the Accel #4 profile during a multiple-acceleration profile configuration.</p>	<p>Direct Access Number — F517</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>

Pattern Run

Program ⇒ Pattern Run ⇒ Pattern Run

This parameter **Enables/Disables** the **Pattern Run** mode. When enabled, this feature allows up to 15 **Preset Speeds** to be run sequentially for a user-determined duration and number of times.

Settings:

- 0 — Disabled
- 1 — Enabled (box checked)

Pattern Run Description

User-defined **Preset Speeds** are labeled 1 – 15 (see [F018](#)). The ID number of any one of the fifteen frequencies (1 – 15) may be entered into the **Speed #** field of the **Pattern Run** screen and run for the number of times entered into the **Repeat** field (see [F530](#)). The execution of grouped **Preset Speeds** in this manner is called a **Pattern Run**.

Skip may be selected to ignore a **Speed #** field.

Pattern Run Setup

1. Configure an unused discrete input terminal for **Pattern #1** (2, 3, or 4). This terminal will initiate the selected **Pattern Run**. The input terminal settings may be configured via Program ⇒ Terminal Selection ⇒ **Input Terminals** (see [Table 14 on pg. 194](#) for available input terminal settings).
2. Enable the **Pattern Run** mode of operation via Program ⇒ Pattern Run ⇒ Pattern Run ⇒ Pattern Run Mode (**Enable/Disable** check box).
3. Configure the **Preset Speeds** that are to be used as the **Group Speed** set of frequencies via Program ⇒ Pattern Run ⇒ **Preset Speeds** (e.g., Preset Speed #1 on [pg. 85](#)).
4. Configure the **Group Speeds** by associating the **Preset Speeds** that are to be enabled and grouped (from step 3) as **Group Speed 1** (2, 3, or 4) via Program ⇒ Pattern Run ⇒ **Speeds**. Set the **Repeat** field to the number of times that the selected group is to be run. Set unused speed settings to **Skip**.
5. From the **Remote** mode (**Local|Remote** light is off), initiate a **Run** command (e.g., **F** and/or **R** terminal **On**).
6. Connect the input terminal that was configured in step 1 to **CC** and the **Pattern Run** will start and continue as programmed. Open the connection to stop the **Pattern Run** before its conclusion.

See [F018 on pg. 85](#) for further information on this parameter.

Pattern Run Mode Restart Command

Program ⇒ Pattern Run ⇒ Pattern Run

This parameter sets the start condition of subsequent **Pattern Runs** after the initial **Pattern Run** has been terminated or has completed its programming.

Settings:

- 0 — Reset
- 1 — Continue

Direct Access Number — F520

Parameter Type — **Check Box**

Factory Default — **Disabled**

Changeable During Run — **No**

Direct Access Number — F521

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

Group #1 Speed Repeat Factor Program ⇒ Pattern Run ⇒ Speeds This parameter sets the number of times that the pattern defined in Group #1 will be run.	Direct Access Number — F530 Parameter Type — Numerical Factory Default — 1 Changeable During Run — No Minimum — 1 Maximum — Infinite
Group #1 Speed #1 Program ⇒ Pattern Run ⇒ Speeds Up to four groups of Preset Speeds may be setup and run from this screen. The Preset Speed numbers (1 – 15) may be entered into the Speed # field to be run for the number of times entered into the Repeat field (0 – 254) or forever by selecting Infinite . Running multiple Preset Speeds as a group is called a Pattern Run . This parameter allows the user to run the Preset Speeds 1 – 15 as a group and is identified as Group #1 . Skip may be selected to ignore a Preset Speed entry. See F520 for further information on this setting.	Direct Access Number — F531 Parameter Type — Selection List Factory Default — 1 Changeable During Run — No
Group #1 Speed #2 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F532 Parameter Type — Selection List Factory Default — 2 Changeable During Run — No
Group #1 Speed #3 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F533 Parameter Type — Selection List Factory Default — 3 Changeable During Run — No
Group #1 Speed #4 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F534 Parameter Type — Selection List Factory Default — 4 Changeable During Run — No
Group #1 Speed #5 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F535 Parameter Type — Selection List Factory Default — 5 Changeable During Run — No
Group #1 Speed #6 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F536 Parameter Type — Selection List Factory Default — 6 Changeable During Run — No
Group #1 Speed #7 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F537 Parameter Type — Selection List Factory Default — 7 Changeable During Run — No

Group #1 Speed #8 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F538 Parameter Type — Selection List Factory Default — 8 Changeable During Run — No
Group #2 Speed Repeat Factor Program ⇒ Pattern Run ⇒ Speeds This parameter sets the number of times that the enabled preset speeds of Group #2 will be run; 0 – 254 or Infinite .	Direct Access Number — F540 Parameter Type — Selection List Factory Default — 1 Changeable During Run — No
Group #2 Speed #1 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F541 Parameter Type — Selection List Factory Default — 9 Changeable During Run — No
Group #2 Speed #2 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F542 Parameter Type — Selection List Factory Default — 10 Changeable During Run — No
Group #2 Speed #3 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F543 Parameter Type — Selection List Factory Default — 11 Changeable During Run — No
Group #2 Speed #4 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F544 Parameter Type — Selection List Factory Default — 12 Changeable During Run — No
Group #2 Speed #5 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F545 Parameter Type — Selection List Factory Default — 13 Changeable During Run — No
Group #2 Speed #6 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F546 Parameter Type — Selection List Factory Default — 14 Changeable During Run — No
Group #2 Speed #7 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F547 Parameter Type — Selection List Factory Default — 15 Changeable During Run — No
Group #2 Speed #8 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F548 Parameter Type — Selection List Factory Default — Skip Changeable During Run — No

Group #3 Speed Repeat Factor Program ⇒ Pattern Run ⇒ Speeds This parameter sets the number of times that the enabled preset speeds of Group #3 will be run; 0 – 254 or Infinite .	Direct Access Number — F550 Parameter Type — Selection List Factory Default — 1 Changeable During Run — No
Group #3 Speed #1 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F551 Parameter Type — Selection List Factory Default — 1 Changeable During Run — No
Group #3 Speed #2 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F552 Parameter Type — Selection List Factory Default — 2 Changeable During Run — No
Group #3 Speed #3 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F553 Parameter Type — Selection List Factory Default — 3 Changeable During Run — No
Group #3 Speed #4 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F554 Parameter Type — Selection List Factory Default — 4 Changeable During Run — No
Group #3 Speed #5 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F555 Parameter Type — Selection List Factory Default — 5 Changeable During Run — No
Group #3 Speed #6 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F556 Parameter Type — Selection List Factory Default — 6 Changeable During Run — No
Group #3 Speed #7 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F557 Parameter Type — Selection List Factory Default — 7 Changeable During Run — No
Group #3 Speed #8 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F558 Parameter Type — Selection List Factory Default — 8 Changeable During Run — No
Group #4 Speed Repeat Factor Program ⇒ Pattern Run ⇒ Speeds This parameter sets the number of times that the enabled preset speeds of Group #4 will be run; 1 – 254 or Infinite .	Direct Access Number — F560 Parameter Type — Selection List Factory Default — 1 Changeable During Run — No

Group #4 Speed #1 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F561 Parameter Type — Selection List Factory Default — 9 Changeable During Run — No
Group #4 Speed #2 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F562 Parameter Type — Selection List Factory Default — 10 Changeable During Run — No
Group #4 Speed #3 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F563 Parameter Type — Selection List Factory Default — 11 Changeable During Run — No
Group #4 Speed #4 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F564 Parameter Type — Selection List Factory Default — 12 Changeable During Run — No
Group #4 Speed #5 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F565 Parameter Type — Selection List Factory Default — 13 Changeable During Run — No
Group #4 Speed #6 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F566 Parameter Type — Selection List Factory Default — 14 Changeable During Run — No
Group #4 Speed #7 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F567 Parameter Type — Selection List Factory Default — 15 Changeable During Run — No
Group #4 Speed #8 Program ⇒ Pattern Run ⇒ Speeds Same as #1 Group Speed #1 (see F531).	Direct Access Number — F568 Parameter Type — Selection List Factory Default — Skip Changeable During Run — No
Pattern #1 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 1 In conjunction with the setting of F585, this parameter is used to set the run-time of Preset Speed 1 when used as part of a Pattern Run . Settings: <ul style="list-style-type: none"> 0 — Time From Start 1 — Time From Reach 2 — No Limit 3 — Until Next Step 	Direct Access Number — F570 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No

Pattern #2 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 2 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F571 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #3 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 3 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F572 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #4 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 4 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F573 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #5 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 5 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F574 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #6 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 6 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F575 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #7 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 7 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F576 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #8 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 8 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F577 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #9 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 9 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F578 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #10 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 10 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F579 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #11 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 11 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F580 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No

Pattern #12 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 12 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F581 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #13 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 13 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F582 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #14 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 14 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F583 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern #15 Characteristics Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 15 Same as #1 Pattern Characteristics (see F570).	Direct Access Number — F584 Parameter Type — Selection List Factory Default — Time From Start Changeable During Run — No
Pattern Run #1 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 1 This parameter sets the run-time value for the #1 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F585 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #2 Continuation Mode Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 2 This parameter sets the run-time value for the #2 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F586 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #3 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 3 This parameter sets the run-time value for the #3 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F587 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds

Pattern Run #4 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 4 This parameter sets the run-time value for the #4 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F588 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #5 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 5 This parameter sets the run-time value for the #5 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F589 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #6 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 6 This parameter sets the run-time value for the #6 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F590 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #7 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 7 This parameter sets the run-time value for the #7 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F591 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #8 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 8 This parameter sets the run-time value for the #8 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F592 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #9 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 9 This parameter sets the run-time value for the #9 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F593 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds

Pattern Run #10 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 10 This parameter sets the run-time value for the #10 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F594 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #11 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 11 This parameter sets the run-time value for the #11 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F595 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #12 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 12 This parameter sets the run-time value for the #12 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F596 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #13 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 13 This parameter sets the run-time value for the #13 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F597 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #14 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 14 This parameter sets the run-time value for the #14 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F598 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds
Pattern Run #15 Run-Time Setting Program ⇒ Pattern Run ⇒ Preset Speeds ⇒ 15 This parameter sets the run-time value for the #15 Preset Speed mode when used as part of a Pattern Run .	Direct Access Number — F599 Parameter Type — Numerical Factory Default — 5 Changeable During Run — No Minimum — 1 Maximum — 8000 Units — Seconds

Electronic Thermal Protection #1 Program ⇒ Motor Parameters ⇒ Motor Set #1 The Motor #1 Electronic Thermal Protection parameter specifies the motor overload current level for motor set #1. This value is entered as either a percentage of the full load rating of the ASD or as the FLA of the motor. The unit of measurement for this parameter may be set to Amps or it may be set as a percentage of the ASD rating. The name-plated FLA of the motor may be entered directly when Amps is selected as the unit of measurement (see F701 to change the display unit). Electronic Thermal Protection settings (#1 – #4) will be displayed in Amps if the EOI display units are set to V/A rather than % .	Direct Access Number — F600 Parameter Type — Numerical Factory Default — 100.0 Changeable During Run — Yes Minimum — 10.0 Maximum — 100.0 Units — %
Over-Current Stall Level Program ⇒ Protection ⇒ Stall This parameter specifies the output current level at which the output frequency is reduced in an attempt to prevent a trip. The over-current level is entered as a percentage of the maximum rating of the drive. <i>Note: Parameter F017 (Soft Stall) must be enabled to use this feature.</i>	Direct Access Number — F601 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 0.00 Maximum — 200.0 Units — %
Trip Save at Power Down Enable Program ⇒ Protection ⇒ Trip Settings This parameter Enables/Disables the Trip Save at Power Down setting. When enabled, this feature logs the trip event and retains the trip information when the system powers down. The trip information may be viewed from the Monitor screen. When disabled, the trip information will be cleared when the system powers down. Settings: 0 — Disabled 1 — Enabled (box checked)	Direct Access Number — F602 Parameter Type — Check Box Factory Default — Disabled Changeable During Run — No
Emergency Off Mode Settings Program ⇒ Protection ⇒ Emergency Off This parameter determines the method used to stop the motor in the event that an Emergency Off command is received and the system is configured to use this feature. This setting may also be associated with the FL terminals to allow the FL relay to change states when an EOFF condition occurs by setting the FL terminal to Fault FL (all) (see F132). <i>Note: A supplemental emergency stopping system should be used with the ASD. Emergency stopping should not be a task of the ASD alone.</i> Settings: 0 — Coast Stop 1 — Deceleration Stop 2 — DC Injection Braking Stop	Direct Access Number — F603 Parameter Type — Selection List Factory Default — Coast Stop Changeable During Run — No

Emergency Off DC Injection Application Time Program ⇒ Protection ⇒ Emergency Off When DC Injection is used as a function of receiving an Emergency Off command (F603), this parameter determines the time that the DC Injection braking is applied to the motor.	Direct Access Number — F604 Parameter Type — Numerical Factory Default — 0.10 Changeable During Run — Yes Minimum — 0.00 Maximum — 10.00 Units — Seconds
Output Phase Loss Detection Program ⇒ Protection ⇒ Phase Loss This parameter Enables/Disables the monitoring of each phase of the 3-phase output signal (U, V, or W) of the ASD. If either line is missing, inactive, or not of the specified level, the ASD incurs a trip. Settings: 0 — Disabled 1 — Enabled (box checked)	Direct Access Number — F605 Parameter Type — Check Box Factory Default — Disabled Changeable During Run — No
OL Reduction Starting Frequency Program ⇒ Protection ⇒ Overload This parameter is used to reduce the start frequency during very low-speed motor operation. During very low-speed operation the cooling efficiency of the motor decreases. Lowering the start frequency aides in minimizing the generated heat.	Direct Access Number — F606 Parameter Type — Numerical Factory Default — 6.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 30.00 Units — Hz
Motor 150% OL Time Limit Program ⇒ Protection ⇒ Overload This parameter establishes a time that the motor may operate at 150% of its rated current before tripping. This setting applies the time/150% reference to the individual settings of each motor (e.g., this setting references 150% of the F600 setting for the #1 motor). The unit will trip sooner than the time entered here if the overload is greater than 150%.	Direct Access Number — F607 Parameter Type — Numerical Factory Default — 600 Changeable During Run — Yes Minimum — 10 Maximum — 2400 Units — Seconds
Inrush Current Suppression Program ⇒ Protection ⇒ Soft Start The startup inrush current may be suppressed for up to 2.5 seconds. This parameter determines the length of the inrush current suppression.	Direct Access Number — F608 Parameter Type — Numerical Factory Default — 0.30 Changeable During Run — No Minimum — 0.30 Maximum — 2.50 Units — Seconds
Interlock with ST Program ⇒ Protection ⇒ Soft Start This parameter Enables/Disables the ST-to-CC connection dependency on the successful completion of a Soft Start . If enabled, the ST-to-CC connection will happen only after a successful Soft Start .	Direct Access Number — F609 Parameter Type — Check Box Factory Default — Disabled Changeable During Run — No

Low Current Trip Program ⇒ Protection ⇒ Low Current This parameter Enables/Disables the low-current trip feature. When enabled, the drive will trip on a low-current fault if the output current of the drive falls below the level defined at F611 and remains there for the time set at F612 . Settings: 0 — Disabled 1 — Enabled (box checked)	Direct Access Number — F610 Parameter Type — Check Box Factory Default — Disabled Changeable During Run — No
Low Current Trip Threshold Program ⇒ Protection ⇒ Low Current When the low-current monitor is enabled, this function sets the low-current trip threshold. The threshold value is entered as a percentage of the maximum rating of the drive.	Direct Access Number — F611 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 100.0 Units — %
Low Current Trip Threshold Time Program ⇒ Protection ⇒ Low Current When the low-current monitor is enabled, this function sets the time that the low-current condition must exist to cause a trip.	Direct Access Number — F612 Parameter Type — Numerical Factory Default — 0 Changeable During Run — Yes Minimum — 0 Maximum — 255 Units — Seconds
Short Circuit Test Program ⇒ Protection ⇒ Arm Short Check This parameter determines when the system will perform an Output Short Circuit test. Settings: 0 — Every Run 1 — Every Powerup 2 — Never	Direct Access Number — F613 Parameter Type — Selection List Factory Default — Every Run Changeable During Run — No
Short Circuit Test Duration Program ⇒ Protection ⇒ Arm Short Check This parameter sets the pulse width of the ASD output pulse that is applied to the motor during an Output Short Circuit test.	Direct Access Number — F614 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — No Minimum — 1 Maximum — 100 Units — μ S

<p>Over-Torque Trip</p> <p>Program ⇒ Protection ⇒ Over Torque</p> <p>This parameter Enables/Disables the Over-Torque Tripping function.</p> <p>When enabled, the ASD trips if an output torque value greater than the setting of F616 or F617 exists for a time longer than the setting of F618.</p> <p>When disabled, the ASD does not trip due to an over-torque condition.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Disabled 1 — Enabled (box checked) 	<p>Direct Access Number — F615</p> <p>Parameter Type — Check Box</p> <p>Factory Default — Disabled</p> <p>Changeable During Run — No</p>
<p>Over-Torque Trip/Alarm Level (Positive Torque)</p> <p>Program ⇒ Protection ⇒ Over Torque</p> <p>This parameter sets the torque threshold level that is used as a setpoint for over-torque tripping. This setting is a percentage of the maximum rated torque of the drive.</p>	<p>Direct Access Number — F616</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 150.0</p> <p>Changeable During Run — No</p> <p>Minimum — 0.00</p> <p>Maximum — 250.0</p> <p>Units — %</p>
<p>Over-Torque Trip/Alarm Level (Negative Torque)</p> <p>Program ⇒ Protection ⇒ Over Torque</p> <p>This parameter sets the torque threshold level that is used as a setpoint for over-torque tripping during regeneration. This setting is a percentage of the maximum rated torque of the drive.</p>	<p>Direct Access Number — F617</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 150.0</p> <p>Changeable During Run — No</p> <p>Minimum — 0.00</p> <p>Maximum — 250.0</p> <p>Units — %</p>
<p>Over-Torque Detection Time</p> <p>Program ⇒ Protection ⇒ Over Torque</p> <p>This parameter sets the amount of time that the over-torque condition may exceed the tripping threshold level set at F616 and F617 before a trip occurs.</p>	<p>Direct Access Number — F618</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.50</p> <p>Changeable During Run — No</p> <p>Minimum — 0.00</p> <p>Maximum — 100.0</p> <p>Units — Seconds</p>
<p>Cooling Fan Control</p> <p>Program ⇒ Protection ⇒ Cooling Fan</p> <p>This parameter sets the cooling fan run-time command.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Automatic 1 — Always On 2 — Internal and External Temp Controlled 3 — Internal-Auto/External-Temp Controlled 4 — Internal-Temp Controlled/External-Auto 	<p>Direct Access Number — F620</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Automatic</p> <p>Changeable During Run — Yes</p>

Cumulative Run Timer Alarm Setting Program ⇒ Protection ⇒ Cumulative Run Timer This parameter sets a run-time value that, once exceeded, closes a contact. The output signal may be used to control external equipment or used to engage a brake. <i>Note:</i> The time displayed is 1/10th of the actual time (0.1 hr. = 1.0 hr.).	Direct Access Number — F621 Parameter Type — Numerical Factory Default — 175.0 Changeable During Run — Yes Minimum — 0.1 Maximum — 999.9 Units — Hours (X 100)
Abnormal Speed Detection Filter Time Program ⇒ Protection ⇒ Abnormal Speed This parameter sets the time that an over-speed condition must exist to cause a trip.	Direct Access Number — F622 Parameter Type — Numerical Factory Default — 10.0 Changeable During Run — No Minimum — 0.01 Maximum — 100.0 Units — Seconds
Over-Speed Detection Frequency Range Program ⇒ Protection ⇒ Abnormal Speed This parameter sets the upper level of the Base Frequency range that, once exceeded, will cause an Overspeed Detected alert.	Direct Access Number — F623 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 30.0 Units — Hz
Speed Drop Detection Frequency Range Program ⇒ Protection ⇒ Abnormal Speed This parameter sets the lower level of the Base Frequency range that, once exceeded, will cause a Speed Drop Detected alert.	Direct Access Number — F624 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 30.00 Units — Hz
Over-Voltage Stall Level (fast) Program ⇒ Protection ⇒ Stall This parameter sets the upper DC bus voltage threshold that, once exceeded, will cause an Over-Voltage Stall . An Over-Voltage Stall increases the output frequency of the drive during deceleration for a specified time in an attempt to prevent an Over-Voltage Trip . If the over-voltage condition persists for over 250 μS, an Over-Voltage Trip will be incurred. <i>Note:</i> This feature may increase deceleration times.	Direct Access Number — F625 Parameter Type — Numerical Factory Default — (ASD dependent) Changeable During Run — Yes Minimum — 50.00 Maximum — 250.0 Units — %

<p>Over-Voltage Stall Level</p> <p>Program ⇒ Protection ⇒ Stall</p> <p>This parameter sets the upper DC bus voltage threshold that, once exceeded, will cause an Over-Voltage Stall. An Over-Voltage Stall increases the output frequency of the drive during deceleration for a specified time in an attempt to prevent an Over-Voltage Trip.</p> <p>If the over-voltage condition persists for over 4 mS, an Over-Voltage Trip will be incurred.</p> <p><i>Note: This feature may increase deceleration times.</i></p>	<p>Direct Access Number — F626</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — Yes</p> <p>Minimum — 50.0</p> <p>Maximum — 250.0</p> <p>Units — %</p>
<p>Undervoltage Trip</p> <p>Program ⇒ Protection ⇒ Undervoltage/Ridethrough</p> <p>This parameter Enables/Disables the Undervoltage Trip function.</p> <p>With this parameter Enabled, the ASD will trip if the undervoltage condition persists for a time greater than the F628 setting.</p> <p>A user-selected contact may be actuated if so configured.</p> <p>If Disabled the ASD will stop and not trip; the FL contact is not active.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Disabled 1 — Enabled (box checked) 	<p>Direct Access Number — F627</p> <p>Parameter Type — Check Box</p> <p>Factory Default — Disabled</p> <p>Changeable During Run — No</p>
<p>Undervoltage Detection Time</p> <p>Program ⇒ Protection ⇒ Undervoltage/Ridethrough</p> <p>This parameter sets the time that the undervoltage condition must exist to cause an Undervoltage trip when this function is enabled at F627.</p>	<p>Direct Access Number — F628</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.03</p> <p>Changeable During Run — No</p> <p>Minimum — 0.00</p> <p>Maximum — 10.00</p> <p>Units — Seconds</p>
<p>Undervoltage Stall level</p> <p>Program ⇒ Protection ⇒ Undervoltage/Ridethrough</p> <p>This parameter sets the low end of the DC bus voltage threshold that, once it drops below this setting, will activate the setting of F302 (Ridethrough Mode). Activation may be the result of a momentary power loss or an excessive load on the bus voltage. Once activated, the system will attempt to maintain the bus voltage level set here until the motor stops.</p> <p><i>Note: This feature may decrease deceleration times.</i></p>	<p>Direct Access Number — F629</p> <p>Parameter Type — Numerical</p> <p>Factory Default — (ASD dependent)</p> <p>Changeable During Run — Yes</p> <p>Minimum — 50.00</p> <p>Maximum — 100.0</p> <p>Units — %</p>

<p>Brake Trouble Internal Timer</p> <p>Program ⇒ Protection ⇒ Brake Fault Timer</p> <p>This parameter is used in conjunction with the discrete input terminal setting 64 [System Consistent Sequence (BA: braking answer)] (see item 64 of Table 14 on pg. 194 for further information on this feature).</p> <p>After activating the discrete input terminal System Consistent Sequence (B: braking release), the setting of this parameter defines a window of time in which 1) a Braking Answer response must be received or 2) the brake must release.</p> <p>Should this timer setting expire before the Braking Answer is returned or the brake releases, a Brake Fault is incurred. Otherwise, the brake releases and normal motor operations resume.</p>	<p>Direct Access Number — F630</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 10.00</p> <p>Units — Seconds</p>
<p>Position Difference Limit</p> <p>Program ⇒ Feedback Parameters ⇒ Feedback Settings</p> <p>While operating in the Position Control mode, this parameter sets the maximum allowed difference between the commanded position and resulting position as indicated by encoder pulses.</p>	<p>Direct Access Number — F631</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 16.0</p> <p>Changeable During Run — No</p> <p>Minimum — 0.1</p> <p>Maximum — 6553</p>
<p>Release After Run Timer</p> <p>Program ⇒ Protection ⇒ Brake Fault Timer</p> <p>This parameter sets the time that the brake will hold after the Run command criteria has been met.</p>	<p>Direct Access Number — F632</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — No</p> <p>Minimum — 0.00</p> <p>Maximum — 2.50</p> <p>Units — Seconds</p>
<p>Acc/Dec Base Frequency Adjustment</p> <p>Program ⇒ Terminal Selection ⇒ Analog In Functions</p> <p>This parameter Enables/Disables the feature that allows for the external adjustment of the Base Frequency. When enabled, either VI/II or RR may be used as an input source for the modification of the Base Frequency setting.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Disabled 1 — VI/II 2 — RR 	<p>Direct Access Number — F650</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Disabled</p> <p>Changeable During Run — Yes</p>
<p>Upper Limit Frequency Adjustment</p> <p>Program ⇒ Terminal Selection ⇒ Analog In Functions</p> <p>This parameter Enables/Disables the feature that allows for the external adjustment of the Upper Limit. When enabled, either VI/II or RR may be used as an input source for the modification of the Upper Limit setting.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Disabled 1 — VI/II 2 — RR 	<p>Direct Access Number — F651</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Disabled</p> <p>Changeable During Run — Yes</p>

Acceleration Time Adjustment

Program ⇒ Terminal Selection ⇒ Analog In Functions

This parameter **Enables/Disables** the feature that allows for the external adjustment of the **Acceleration Time**. Selecting either **VI/II** or **RR** enables this feature. The selected input is used as a multiplier of the programmed **Acceleration Time** setting. The multiplication factor may be from 1 to 10.

Note: *An acceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads.*

Settings:

- 0 — Disabled
- 1 — VI/II
- 2 — RR

Direct Access Number — F652

 Parameter Type — **Selection List**

 Factory Default — **Disabled**

 Changeable During Run — **Yes**

Deceleration Time Adjustment

Program ⇒ Terminal Selection ⇒ Analog In Functions

This parameter **Enables/Disables** the feature that allows for the external adjustment of the **Deceleration Time**. Selecting either **VI/II** or **RR** enables this feature. The selected input is used as a modifier of the programmed **Deceleration Time** setting.

Note: *A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads.*

Settings:

- 0 — Disabled
- 1 — VI/II
- 2 — RR

Direct Access Number — F653

 Parameter Type — **Selection List**

 Factory Default — **Disabled**

 Changeable During Run — **Yes**

Torque Boost Adjustment

Program ⇒ Terminal Selection ⇒ Analog In Functions

This parameter **Enables/Disables** the feature that allows for the external adjustment of the **Torque Boost** setting. Selecting either **VI/II** or **RR** enables this feature. The selected input is used as a modifier of the programmed **Torque Boost** setting.

Settings:

- 0 — Disabled
- 1 — VI/II
- 2 — RR

Direct Access Number — F654

 Parameter Type — **Selection List**

 Factory Default — **Disabled**

 Changeable During Run — **Yes**

Frequency Override Additive Input

Program ⇒ Feedback Parameters ⇒ Override Control

This parameter **Enables/Disables** the feature that allows for the external adjustment of the **Output Frequency**.

Selecting either of the input methods listed enables this feature. The selected input is used as a modifier of the programmed **Output Frequency**.

Settings:

- 0 — Disabled
- 1 — VI/II
- 2 — RR
- 3 — RX
- 4 — RX2 (option)
- 5 — CN8 Option (Not Used)
- 6 — Binary/BCD Input
- 7 — Common Serial (TTL)
- 8 — RS232/RS485
- 9 — Communication Card
- 10 — Motorized Pot
- 11 — Pulse Input 1

Direct Access Number — F660

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **No**

Frequency Override Multiplying Input

Program ⇒ Feedback Parameters ⇒ Override Control

This parameter **Enables/Disables** the feature that allows for the external adjustment of the **Output Frequency**.

Selecting either of the input methods listed enables this feature. The selected input is used as a multiplier of the programmed **Output Frequency**.

If operating using the **CN8 Option** (Not Used) and **Setting** is selected, the value entered at [F729](#) is used as the multiplier.

Settings:

- 0 — Disabled
- 1 — VI/II
- 2 — RR
- 3 — RX
- 4 — RX2 (option)
- 5 — Setting (CN8 Option Only-Not Used)

Direct Access Number — F661

Parameter Type — **Selection List**

Factory Default — **Disabled**

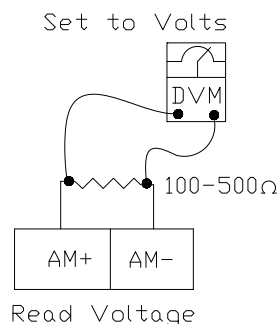
Changeable During Run — **No**

AM Terminal Function

Program ⇒ Terminal ⇒ Analog Output Terminals

This setting determines the output function of the **AM** analog output terminal. The **AM** output terminal produces an output current that is proportional to the magnitude of the function assigned to this terminal. The available assignments for this output terminal are listed in [Table 15 on pg. 198](#).

To read **Voltage** at this terminal, connect a 100 – 500Ω resistor from AM (+) to AM (-). The voltage is read across the 100 – 500Ω resistor.



AM Terminal Setup Parameters

[F670](#) — Set AM Function

[F671](#) — Calibrate AM Terminal

Direct Access Number — F670

Parameter Type — Selection List

Factory Default — Output Frequency

Changeable During Run — Yes

AM Terminal Adjustment

Program ⇒ Meter Terminal Adjustment ⇒ AM

This function is used to calibrate the **AM** analog output terminal.

To calibrate the **AM** analog output, connect a meter (current or voltage) as described at [F670](#). With the drive running at a known frequency, adjust this parameter ([F671](#)) until the running frequency produces the desired DC level output at the **AM** terminal.

Direct Access Number — F671

Parameter Type — Numerical

Factory Default — 512

Changeable During Run — Yes

Minimum — 1

Maximum — 1280

Analog 1 Terminal Setting

Program ⇒ Meter Terminal Adjustment ⇒ Analog 1

This parameter sets the **Analog 1** multifunction programmable terminal to 1 of 33 possible functions and is available on the **ASD Multicom** option board only.

Possible assignments for this output terminal are listed in [Table 15 on pg. 198](#).

Direct Access Number — F672

Parameter Type — Selection List

Factory Default — Output Voltage

Changeable During Run — Yes

Analog 1 Terminal Adjustment

Program ⇒ Meter Terminal Adjustment ⇒ Analog 1

This parameter adjusts the coefficient of the **Analog 1** circuit to obtain an output that corresponds with a known input.

This function is used in the calibration of external signal measuring devices (DVM, counters, etc.).

Direct Access Number — F673

Parameter Type — Numerical

Factory Default — 512

Changeable During Run — Yes

Minimum — 1

Maximum — 1280

Analog 2 Terminal Setting

Program ⇒ Meter Terminal Adjustment ⇒ Analog 2

This parameter sets the **Analog 2** multifunction programmable terminal to 1 of 33 possible functions and is available on the **ASD Multicom** option board only.

Possible assignments for this output terminal are listed in [Table 15 on pg. 198](#).

Direct Access Number — F674

Parameter Type — Selection List

Factory Default — Post-compensation Frequency

Changeable During Run — Yes

Analog 2 Terminal Adjustment Program ⇒ Meter Terminal Adjustment ⇒ Analog 2 This parameter adjusts the coefficient of the circuit to obtain an output that corresponds with a known input. This function is used in the calibration of external signal measuring devices (DVM, counters, etc.).	Direct Access Number — F675 Parameter Type — Numerical Factory Default — 512 Changeable During Run — Yes Minimum — 1 Maximum — 1280
FP Terminal Setting Program ⇒ Terminal Selection ⇒ FP This parameter commands the multifunction programmable FP terminal to monitor the value of 1 of 33 possible system functions. As the monitored function changes in magnitude or frequency, the pulse count of the FP output pulse train changes in direct proportion to changes in the monitored function. As the monitored value goes up so does the pulse count of the FP output. <i>Note: The duty cycle of the output pulse train remains at 65 ±5.0 μS.</i> Possible assignments for this output terminal are listed in Table 15 on pg. 198 .	Direct Access Number — F676 Parameter Type — Selection List Factory Default — Output Frequency Changeable During Run — Yes
FP Terminal Adjustment Program ⇒ Terminal Selection ⇒ FP This parameter sets the full-scale reading of the FP Terminal . The full-scale reading of the monitored variable selected in F676 may be set here.	Direct Access Number — F677 Parameter Type — Numerical Factory Default — 3.840 Changeable During Run — Yes Minimum — 1.000 Maximum — 43.200 Units — kHz
Display Units for Voltage and Current Program ⇒ Utility Parameters ⇒ Display Units This parameter sets the unit of measurement for current and voltage values displayed on the EOI. Settings: 0 — % 1 — V/A	Direct Access Number — F701 Parameter Type — Selection List Factory Default — % Changeable During Run — Yes
Hz Per User-defined Unit Program ⇒ Utility Parameters ⇒ Display Units This parameter allows the user to input a quantity to be displayed on the EOI that is proportional to the output frequency of the drive. This feature is useful when the output of a process is moved along at a rate that is proportional to the output frequency of the drive.	Direct Access Number — F702 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 200.0 Units — Hz/UDU

Frequency Display Resolution Program ⇒ Utility Parameters ⇒ Display Units The parameter sets the number of decimal places to be displayed during non- Accel/Decel functions. Settings: 0 — 1 1 — 0.1 2 — 0.01	Direct Access Number — F703 Parameter Type — Numerical Factory Default — 0.1 Changeable During Run — Yes Minimum — 1 Maximum — 0.01
Accel/Decel Special Display Resolution Program ⇒ Special Control ⇒ Accel/Decel Special This parameter sets the number of decimal places to be displayed for Accel/Decel functions.	Direct Access Number — F704 Parameter Type — Numerical Factory Default — 0.1 Changeable During Run — Yes Minimum — 1 Maximum — 0.01
Prohibit Initializing User Parameters During Typeform Initialization Program ⇒ Special Control ⇒ Special Parameters This parameter Enables/Disables the ability to initialize user parameters during a Type Form initialization. Settings: 0 — Allowed 1 — Prohibited	Direct Access Number — F709 Parameter Type — Selection List Factory Default — Allowed Changeable During Run — Yes
V/f Group No path available (Direct Access Only) While operating using the CN8 Option (Not Used) 1 of 4 V/f groups may be selected and run. Each V/f group is comprised of 4 user-defined variables: Base Frequency , Base Frequency Voltage , Manual Torque Boost , and Electronic Thermal Protection . Settings: 1 — Group 1 2 — Group 2 3 — Group 3 4 — Group 4 Note: Press ESC from the <i>Frequency Command</i> screen to access this parameter.	Direct Access Number — F720 Parameter Type — Selection List Factory Default — 1 Changeable During Run — Yes

Stop Pattern

No path available (Direct Access Only)

While operating using the **CN8 Option** (Not Used) the **Stop Pattern** parameter determines the method used to stop the motor when the stop command is issued via a **Stop** command from the **CN8 Option**.

The **Decel Stop** setting enables the **Dynamic Braking** system that is setup at [F304](#) or the **DC Injection Braking** system that is setup at [F250](#), [F251](#), and [F252](#).

Note: *Dynamic Braking is not used with the GX7R ASD.*

The **Coast Stop** setting allows the motor to stop at the rate allowed by the inertia of the load.

Settings:

- 0 — Decel Stop
- 1 — Coast Stop

Note: *The **Stop Pattern** setting has no effect on the **Emergency Off** settings of [F603](#). Press **ESC** from the **Frequency Command** screen to access this parameter.*

Direct Access Number — F721

Parameter Type — **Selection List**

Factory Default — **Decel Stop**

Changeable During Run — **Yes**

Torque Limit Group

No path available (Direct Access Only)

While operating using the **CN8 Option** (Not Used) this parameter is used to select 1 of 4 preset positive torque limits to apply to the active motor. The settings of profiles 1 – 4 may be setup at [F441](#), [F444](#), [F446](#), and [F448](#), respectively.

Settings:

- 1 — Group 1
- 2 — Group 2
- 3 — Group 3
- 4 — Group 4

Note: *Press **ESC** from the **Frequency Command** screen to access this parameter.*

Direct Access Number — F723

Parameter Type — **Selection List**

Factory Default — **1**

Changeable During Run — **Yes**

Feedback in Panel Mode

No path available (Direct Access Only)

While operating using the **CN8 Option** (Not Used) this parameter **Enables/Disables PID** feedback control.

Settings:

- 0 — Enabled
- 1 — Disabled

Note: *Press **ESC** from the **Frequency Command** screen to access this parameter.*

Direct Access Number — F724

Parameter Type — **Selection List**

Factory Default — **Enabled**

Changeable During Run — **Yes**

CN8 Option (Not Used) Override Multiplication Gain Program ⇒ Feedback Parameters ⇒ Override Control If operating using the CN8 Option (Not Used) this parameter provides a value to be used in the event that Setting is selected for the Frequency Override Multiplying Input (F661).	Direct Access Number — F729 Parameter Type — Numerical Factory Default — 0.00 Changeable During Run — Yes Minimum — -100.00 Maximum — 100.00
LOD Control and Stopping Method Program ⇒ Special Control Parameters ⇒ Low Output Disable Function ⇒ LOD Enables/Disables the Low Output Disable function and, if enabled, selects a stopping method. Settings: Disabled Enabled — Decel Stop Enabled — Coast Stop	Direct Access Number — F731 Parameter Type — Selection List Factory Default — Disabled Changeable During Run — Yes
LOD Start Level (Hz) Program ⇒ Special Control Parameters ⇒ Low Output Disable Function ⇒ LOD Start Level (Hz) The Low Output Disable Start Level sets the output frequency threshold that, if exceeded, will initiate the LOD function if properly configured.	Direct Access Number — F732 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — Max. Freq. Units — Hz
LOD Start Time Program ⇒ Special Control Parameters ⇒ Low Output Disable Function ⇒ LOD Start Time The Low Output Disable Start Time sets the amount of time that the LOD Start Level criteria must be met and maintained for the LOD function to be initiated.	Direct Access Number — F733 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 3600.0 Units — Seconds
LOD Setpoint Boost (Hz) Program ⇒ Special Control Parameters ⇒ Low Output Disable Function ⇒ LOD Setpoint Boost (Hz) The Low Output Disable feature adds the user-input frequency value to the commanded frequency.	Direct Access Number — F734 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — Max. Freq. Units — Hz
LOD Boost Time Program ⇒ Special Control Parameters ⇒ Low Output Disable Function ⇒ LOD Boost Time The Low Output Disable Boost Time sets the on-time timer for the LOD Boost function. Once expired, the LOD Boost function ceases.	Direct Access Number — F735 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 3600.0 Units — Seconds

LOD Feedback Level (Hz) Program ⇒ Special Control Parameters ⇒ Low Output Disable Function ⇒ LOD Feedback Level (Hz) The Low Output Disable Feedback Level sets a frequency level that, until the output of the ASD drops below this setting, the Restart Delay Timer does not start.	Direct Access Number — F736 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — Max. Freq. Units — Hz
LOD Restart Delay Time Program ⇒ Special Control Parameters ⇒ Low Output Disable Function ⇒ LOD Restart Delay Time The Low Output Disable Restart Delay Time sets the time that, once expired and all standard ASD requirements are met, normal ASD operation resumes.	Direct Access Number — F737 Parameter Type — Numerical Factory Default — 0.0 Changeable During Run — Yes Minimum — 0.0 Maximum — 3600.0 Units — Seconds
Earth Fault Alarm Level Program ⇒ Protection ⇒ Earth Fault Alarm Level This parameter sets the threshold level (%) that must be exceeded to meet the Earth Fault Alarm activation criteria.	Direct Access Number — F640 Parameter Type — Numerical Factory Default — 100 Changeable During Run — Yes Minimum — 0 Maximum — 100 Units — %
Earth Fault Alarm Time Program ⇒ Protection ⇒ Earth Fault Alarm Time In the event that the Earth Fault Alarm activation criteria is met, a timer begins to count down to zero. Upon reaching zero, the Earth Fault Alarm is activated. This parameter sets the start-time of the count-down timer.	Direct Access Number — F641 Parameter Type — Numerical Factory Default — 1.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 2.50 Units — Seconds
Earth Fault Trip Level Program ⇒ Protection ⇒ Earth Fault Trip Level This parameter sets the threshold level (%) that must be exceeded to meet the Earth Fault Trip activation criteria.	Direct Access Number — F642 Parameter Type — Numerical Factory Default — 100 Changeable During Run — Yes Minimum — 0.00 Maximum — 100 Units — %
Earth Fault Trip Time Program ⇒ Protection ⇒ Earth Fault Trip Time In the event that the Earth Fault Trip activation criteria is met, a timer begins to count down to zero. Upon reaching zero, the Earth Fault Trip is activated. This parameter sets the start-time of the count-down timer.	Direct Access Number — F643 Parameter Type — Numerical Factory Default — 1.00 Changeable During Run — Yes Minimum — 0.00 Maximum — 2.50 Units — Seconds

<p>Communication Baud Rate (TTL)</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>This parameter plays a role in the setup of the communications network by establishing the Baud Rate of the communications link.</p> <p>The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p>	<p>Direct Access Number — F800</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 9600</p> <p>Changeable During Run — Yes</p> <p>Minimum — 1200</p> <p>Maximum — 9600</p> <p>Units — BPS</p>
<p>Parity</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>This parameter plays a role in the setup of the communications network by establishing the Parity setting of the communications link.</p> <p>The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — No Parity 1 — Even Parity 2 — Odd Parity 	<p>Direct Access Number — F801</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Even Parity</p> <p>Changeable During Run — Yes</p>
<p>ASD Number</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>This parameter plays a role in the setup of the communications network by assigning an identification (ID) number to each ASD in the communications network.</p> <p>The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p>	<p>Direct Access Number — F802</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0</p> <p>Maximum — 255</p>
<p>TTL/RS232/RS485 Communications Time Out Time</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>This parameter plays a role in the setup of the communications network by setting the time that no activity may exist over the communications link before the link is severed (Time Out).</p> <p>The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the ASD.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p>	<p>Direct Access Number — F803</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0</p> <p>Maximum — 100</p> <p>Units — Seconds</p>

<p>RS232/RS485 Communications Time-Out Action</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>This parameter plays a role in the setup of the communications network by determining the action to be taken in the event of a time-out (Time-Out Action).</p> <p>The communications network includes other ASDs and Host/Control computers that monitor the status of the ASD(s), transfers commands, and loads or modifies the parameter settings of the drive.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — No Action 1 — Alarm 2 — Trip 	<p>Direct Access Number — F804</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Trip</p> <p>Changeable During Run — Yes</p>
<p>TTL Communication Interval</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>This parameter sets the Common Serial response delay time.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p>	<p>Direct Access Number — F805</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 2.00</p> <p>Units — Seconds</p>
<p>TTL Master Output</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>In a master/follower configuration, this setting determines the output parameter of the master ASD that will be used to control the applicable follower ASDs.</p> <p>Note: <i>Select No Follower if F826 is configured as a Master Output controller. Otherwise, an EOI failure will result.</i></p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — No Follower (normal operation) 1 — Frequency Reference 2 — Output Command Frequency 3 — Torque Command 4 — Output Torque Command 	<p>Direct Access Number — F806</p> <p>Parameter Type — Selection List</p> <p>Factory Default — No Follower (normal operation)</p> <p>Changeable During Run — Yes</p>

Frequency Point Selection

Program ⇒ Communication ⇒ Communication Reference Adjust

This parameter enables the communications reference for scaling by selecting an input type.

See [F811](#) — [F814](#) for further information on this setting.

Note: *Scaling the communications signal is not required for all applications.*

Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.

Settings:

- 0 — Disabled
- 1 — Common Serial (TTL)
- 2 — RS232/RS485
- 3 — Communication Card

Direct Access Number — **F810**

Parameter Type — **Selection List**

Factory Default — **Disabled**

Changeable During Run — **Yes**

Communications Speed Reference #1

Program ⇒ Communication ⇒ Communication Reference Adjust

When enabled at [F810](#), this parameter is used to allow the user to set the gain and bias of the speed control input to the drive when the speed control signal is received via the source selected at [F810](#).

Communications Input Speed Control Setup

Perform the following setup to allow the system to receive control input via Communications:

- Set **Communications Speed Reference #1** ([F811](#)) — the input signal that represents **BIN Speed Frequency #1**.
- Set **Communications Speed Frequency #1** ([F812](#)).
- Set **Communications Speed Reference #2** ([F813](#)) — the input signal that represents **BIN Speed Frequency #2**.
- Set **Communications Speed Frequency #2** ([F814](#)).
- Provide a **Run** command (**F** and/or **R**).

Once set, as the input signal value changes, the output frequency of the drive will vary in accordance with the above settings.

This parameter sets the **Communications Speed Reference #1** input value that represents **Communications Speed Frequency #1**. This value is entered as 0 to 100% of the **Communications Speed Reference #1** input value range.

Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.

Direct Access Number — **F811**

Parameter Type — **Numerical**

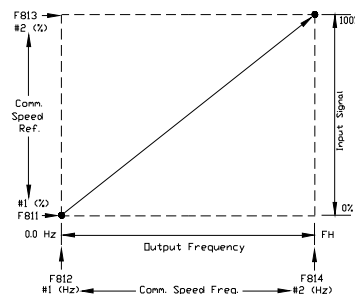
Factory Default — **0.00**

Changeable During Run — **Yes**

Minimum — 0.00

Maximum — 100.0

Units — %



<p>Communications Speed Frequency #1</p> <p>Program ⇒ Communication ⇒ Communication Reference Adjust</p> <p>This parameter is used to set the gain and bias of the Communications Reference speed control input.</p> <p>See F811 for further information on this setting.</p> <p>This parameter sets Communications Speed Frequency #1 and is the frequency that is associated with the setting of Communications Speed Reference #1.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p>	<p>Direct Access Number — F812</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>Communications Speed Reference #2</p> <p>Program ⇒ Communication ⇒ Communication Reference Adjust</p> <p>This parameter is used to set the gain and bias of the Communications Speed Reference #2 speed control input.</p> <p>See F811 for further information on this setting.</p> <p>This parameter sets the Communications Speed Reference #2 input value that represents Communications Speed Frequency #2. This value is entered as 0 to 100% of the Communications Speed Reference #2 input value range.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p>	<p>Direct Access Number — F813</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 100.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 100.0</p> <p>Units — %</p>
<p>Communications Speed Frequency #2</p> <p>Program ⇒ Communication ⇒ Communication Reference Adjust</p> <p>This parameter is used to set the gain and bias of the Communications Speed Reference #2 speed control input.</p> <p>See F811 for further information on this setting.</p> <p>This parameter sets Communications Speed Frequency #2 and is the frequency that is associated with the setting of Communications Speed Reference #2.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p>	<p>Direct Access Number — F814</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 80.0</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.0</p> <p>Maximum — Max. Freq. (F011)</p> <p>Units — Hz</p>
<p>RS232/RS485 Baud Rate</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>This parameter sets the RS232/RS485 baud rate.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — 1200 1 — 2400 2 — 4800 3 — 9600 4 — 19200 5 — 38400 	<p>Direct Access Number — F820</p> <p>Parameter Type — Selection List</p> <p>Factory Default — 9600</p> <p>Changeable During Run — Yes</p>

<p>RS232/RS485 Wire Count</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>This parameter sets the communications protocol to the 2 or 4 wire method.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — 2 wire 1 — 4 wire 	<p>Direct Access Number — F821</p> <p>Parameter Type — Selection List</p> <p>Factory Default — 4</p> <p>Changeable During Run — Yes</p>
<p>RS232/RS485 Response Delay Time</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>This parameter sets the RS232/RS485 response delay time.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p>	<p>Direct Access Number — F825</p> <p>Parameter Type — Numerical</p> <p>Factory Default — 0.00</p> <p>Changeable During Run — Yes</p> <p>Minimum — 0.00</p> <p>Maximum — 2.00</p> <p>Units — Seconds</p>
<p>RS232/RS485 Master Output</p> <p>Program ⇒ Communication ⇒ Communication Settings</p> <p>In a master/follower configuration, this setting determines the output parameter of the master ASD that will be used to control the applicable follower ASDs.</p> <p><i>Note: Select No Follower if F806 is configured as a Master Output controller. Otherwise, an EOI failure will result.</i></p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — No Follower (normal operation) 1 — Frequency Reference 2 — Output Command Frequency 3 — Torque Command 4 — Output Torque Command 	<p>Direct Access Number — F826</p> <p>Parameter Type — Selection List</p> <p>Factory Default — No Follower (normal operation)</p> <p>Changeable During Run — Yes</p>
<p>Communication Error</p> <p>Program ⇒ Communication ⇒ Communication Error</p> <p>In the event of a communication error during a transmission, the command that was transmitted may be cleared or held.</p> <p>Changes made to this parameter require that the power be cycled (Off then On) for the changes to take effect.</p> <p>Settings:</p> <ul style="list-style-type: none"> 0 — Command Request Cleared 1 — Command Request Held 	<p>Direct Access Number — F830</p> <p>Parameter Type — Selection List</p> <p>Factory Default — Command Request Cleared</p> <p>Changeable During Run — Yes</p>

Table 14. Discrete Input Terminal Assignment Selections and Descriptions.

EOI Item No.	Sel. No.		Terminal Selection Descriptions																	
	NO	NC																		
			<p>Note: The EOI Item No. is displayed on the EOI screen adjacent to the selection item when selecting the terminal function.</p> <p>Note:If setting the function of the discrete input terminal via communications, the Selection No. is used to set the Normally Open (NO) or Normally Closed (NC) status of the form A contact for the selected function.</p>																	
0	0	1	Unassigned — No operation.																	
1	2	3	Forward — Activation provides a Forward run command.																	
2	4	5	Reverse — Activation provides a Reverse run command.																	
3	6	7	Standby — Enables the Forward and Reverse operation commands.																	
4	8	9	Reset — Resets the device and any active faults.																	
5	10	11	Preset Speed 1 — LSB of the 4-bit nibble that is used to select a Preset Speed .																	
6	12	13	Preset Speed 2 — Second bit of the 4-bit nibble that is used to select a Preset Speed .																	
7	14	15	Preset Speed 3 — Third bit of the 4-bit nibble that is used to select a Preset Speed .																	
8	16	17	Preset Speed 4 — MSB of the 4-bit nibble that is used to select a Preset Speed .																	
9	18	19	Jog — Activates a Jog for the duration of the activation. The Jog settings may be configured at F260 and F261 .																	
10	20	21	Emergency Off — Terminates the output signal from the ASD and may apply a brake if so configured. The braking method may be selected at F603 .																	
11	22	23	DC Braking — Activation outputs a DC current that is injected into the windings of the motor to quickly brake the motor.																	
12	24	25	<p>AD 1/2 (24 or 25) Switching and AD 3/4 (26 or 27) Switching — Activating combinations of discrete input terminals AD 1/2 Switching and AD 3/4 Switching allow for the selection of Accel/Decel profiles 1 – 4 as shown below.</p> <p>See F504 for more information on this terminal setting.</p> <table><tr><th colspan="2">A/D SW Terminals</th><th rowspan="2">A/D Profile Selection</th></tr><tr><th>#1</th><th>#2</th></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>2</td></tr><tr><td>1</td><td>0</td><td>3</td></tr><tr><td>1</td><td>1</td><td>4</td></tr></table> <p>1 = Terminal Activated</p> <p>The 1 – 4 settings of the A/D Switching selections are performed at parameters</p> <p>A/D 1 — F009 and F010.</p> <p>A/D 2 — F500 and F501.</p> <p>A/D 3 — F510 and F511.</p> <p>A/D 4 — F514 and F515.</p> <p>A/D Switching profiles are comprised of the Acceleration and Deceleration settings.</p>	A/D SW Terminals		A/D Profile Selection	#1	#2	0	0	1	0	1	2	1	0	3	1	1	4
A/D SW Terminals		A/D Profile Selection																		
#1	#2																			
0	0	1																		
0	1	2																		
1	0	3																		
1	1	4																		
13	26	27																		
14	28	29	<p>Motor 1/2 (28 or 29) Switching and Motor 3/4 (30 or 31) Switching — Activating combinations of discrete input terminals Motor 1/2 Switching and Motor 3/4 Switching allow for the selection of a V/f switching profile as listed below.</p> <table><tr><th colspan="2">Motor Switching Terminals</th><th rowspan="2">V/f Selection</th></tr><tr><th>#1</th><th>#2</th></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>2</td></tr><tr><td>1</td><td>0</td><td>3</td></tr><tr><td>1</td><td>1</td><td>4</td></tr></table> <p>1 = Terminal Activated</p> <p>The 1 – 4 settings of the (Motor) V/f Switching selections are performed at parameters:</p> <p>Motor #1 — F014, F016, F306, F600.</p> <p>Motor #2 — F170, F171, F172, F173.</p> <p>Motor #3 — F174, F175, F176, F177.</p> <p>Motor #4 — F178, F179, F180, F181.</p> <p>V/f Switching profiles are comprised of the Base Frequency settings, Maximum Voltage, Torque Boost, and Electronic Thermal Protection.</p>	Motor Switching Terminals		V/f Selection	#1	#2	0	0	1	0	1	2	1	0	3	1	1	4
Motor Switching Terminals		V/f Selection																		
#1	#2																			
0	0	1																		
0	1	2																		
1	0	3																		
1	1	4																		
15	30	31																		

Table 14. Discrete Input Terminal Assignment Selections and Descriptions.(Continued)

EOI Item No.	Sel. No.		Terminal Selection Descriptions																				
	NO	NC																					
			<p><i>Note: The EOI Item No. is displayed on the EOI screen adjacent to the selection item when selecting the terminal function.</i></p> <p><i>Note:If setting the function of the discrete input terminal via communications, the Selection No. is used to set the Normally Open (NO) or Normally Closed (NC) status of the form A contact for the selected function.</i></p>																				
16	32	33	<p>Torque Limit Switching 1/Torque Limit Switching 2 — Activating combinations of discrete input terminals Torque Limit Switching 1 and 2 allow for the selection of a torque limit switching profile as listed below.</p> <table><tr><th colspan="2">Torque Limit Switching Terminal</th><th rowspan="2">Torque Limit Selection</th></tr><tr><th>#1</th><th>#2</th></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>2</td></tr><tr><td>1</td><td>0</td><td>3</td></tr><tr><td>1</td><td>1</td><td>4</td></tr><tr><td colspan="2">1=Terminal Activated</td><td></td></tr></table> <p>The 1 – 4 settings of the Torque Limit Switching selections are performed at parameters:</p> <p>Driving/Regen #1 — F440 – F443.</p> <p>Driving/Regen #2 — F444 and F445.</p> <p>Driving/Regen #3 — F446 and F447.</p> <p>Driving/Regen #4 — F448 and F449.</p> <p>Torque Limit Switching profiles are comprised of the Driving and Regen Torque Limit settings.</p>	Torque Limit Switching Terminal		Torque Limit Selection	#1	#2	0	0	1	0	1	2	1	0	3	1	1	4	1=Terminal Activated		
Torque Limit Switching Terminal		Torque Limit Selection																					
#1	#2																						
0	0	1																					
0	1	2																					
1	0	3																					
1	1	4																					
1=Terminal Activated																							
17	34	35																					
18	36	37	PID Off — Activation terminates PID control for the duration of the activation.																				
19	38	39	Pattern #1 — Initiates the Pattern 1 Pattern Run .																				
20	40	41	Pattern #2 — Initiates the Pattern 2 Pattern Run .																				
21	42	43	Pattern #3 — Initiates the Pattern 3 Pattern Run .																				
22	44	45	Pattern #4 — Initiates the Pattern 4 Pattern Run .																				
23	46	47	Pattern Continue — Initiates a continuation of the last Pattern Run from its stopping point.																				
24	48	49	Pattern Trigger — Initiates the first Preset Speed of a Pattern Run and initiates each subsequent enabled Preset Speed with continued activation(s).																				
25	50	51	Forced Jog Forward — Initiates a forward Jog for the duration of the connection to CC (the status of the F and R terminals is ignored). Use F260 to set the Jog Frequency and use F261 to select the Jog Stop Method .																				
26	52	53	Forced Jog Reverse — Initiates a reverse Jog for the duration of the connection to CC (the status of the F and R terminals is ignored). Use F260 to set the Jog Frequency and use F261 to select the Jog Stop Method .																				
27	54	55	<p>Binary Bit 0 — Bit 0 – 7 may be set up as a speed/torque control register. Speed/torque settings may be applied to this group of terminals in binary form. The required number of input terminals should be set to the respective binary bit settings (0 – MSB). The Frequency Mode setting must be set to Use Binary/BCD input.</p> <p>The gain and bias of the binary input may be set from the following path: Program ⇒ Frequency Setting ⇒ Speed Reference Setpoints ⇒ BIN (see F228).</p>																				
28	56	57	Binary Bit 1 — See selection 54/55 above.																				
29	58	59	Binary Bit 2 — See selection 54/55 above.																				
30	60	61	Binary Bit 3 — See selection 54/55 above.																				
31	62	63	Binary Bit 4 — See selection 54/55 above.																				
32	64	65	Binary Bit 5 — See selection 54/55 above.																				
33	66	67	Binary Bit 6 — See selection 54/55 above.																				
34	68	69	Binary Bit 7 — See selection 54/55 above.																				

Table 14. Discrete Input Terminal Assignment Selections and Descriptions.(Continued)

EOI Item No.	Sel. No.		Terminal Selection Descriptions
	NO	NC	
			<p><i>Note: The EOI Item No. is displayed on the EOI screen adjacent to the selection item when selecting the terminal function.</i></p> <p><i>Note: If setting the function of the discrete input terminal via communications, the Selection No. is used to set the Normally Open (NO) or Normally Closed (NC) status of the form A contact for the selected function.</i></p>
43	86	87	<p>Binary Data Write — This terminal serves two functions:</p> <ol style="list-style-type: none"> 1) While operating in the Use Binary/BCD input mode, each momentary connection of this terminal to CC transfers the speed/torque Binary Bit (0 – MSB) settings to the motor. 2) The Motorized Pot frequency command will be saved during power down or reset by setting F108 to Store and activating this terminal (Binary Data Write). If the drive is running and the Binary Data Write terminal is active when an event occurs (Fault, Power off), the Motorized Pot frequency command will be restored upon power-up or reset.
44	88	89	Motorized Pot Up (MOP) — Activation initiates an increase in motor speed for the duration of the activation until the Upper Limit is reached. The Frequency Mode setting must be set to Motorized Pot. Simulation . The MOP acceleration rate is determined by the F500 setting.
45	90	91	Motorized Pot Down (MOP) — Activation initiates a decrease in motor speed for the duration of the activation until the Lower Limit is reached. The Frequency Mode setting must be set to Motorized Pot. Simulation . The MOP deceleration rate is determined by the F501 setting.
46	92	93	Motorized Pot Clear — Activation clears the last Motorized Pot frequency settings (see F108 for further information on this setting).
47	94	95	Momentary Push Run — Activation starts the motor.
48	96	97	Momentary Push Stop — Activation stops the motor.
49	98	99	Forward/Reverse — This setting operates in conjunction with another terminal being set to the Run/Stop (100/101) function. When configured to Run (Run/Stop terminal active), the activation or deactivation changes the direction of the motor.
50	100	101	Run/Stop — Activation enables the motor to run and deactivation disables the motor.
51	102	103	<p>Line Power Bypass — This function operates in conjunction with the Line Power Switching frequency setting (F355). An enabled check box at Program ⇒ Terminal Selection ⇒ Line Power Switching (At) and activation of this terminal enables this function.</p> <p>Once configured (including activation of this terminal), the frequency setting of Line Power Switching (Hz) establishes the speed at which the drive terminates its output and routes commercial power to the motor.</p>
52	104	105	Frequency Priority — Activation allows for the frequency control to be switched from the frequency command source selected as Frequency Mode #1 to Frequency Mode #2 . This function is enabled by setting the Reference Priority Selection to Frequency Source Priority Switching and is located at Program ⇒ Fundamentals ⇒ Standard Mode Selection ⇒ Reference Priority Selection ⇒ Frequency Source Priority Switching .
53	106	107	VI/II Terminal Priority — Activation assigns command control to the VI/II Terminal and overrides all other Terminal Board input so long as the Command Mode is set to Use Terminal Board .
54	108	109	Command Terminal Board Priority — Activation overrides the F004 setting and assigns speed control to the Terminal Board .
55	110	111	Parameter Editing Enabling — Used with the CN8 Option (Not Used) only. Activation enables parameter editing via the CN8 connector (Not Used).
56	112	113	Control Switch (torque, position) — Activation allows for a system change from speed to torque or position as a function of the V/f setting.
57	114	115	Deviation Counter Clear — Activation clears the Deviation Counter while operating in the Position Control mode.
58	116	117	Position Control Forward Limit LS — Activation stops the drive and holds its position. If the connection remains the drive will time out and trip. This function is normally used for over-travel conditions.

Table 14. Discrete Input Terminal Assignment Selections and Descriptions.(Continued)

EOI Item No.	Sel. No.		Terminal Selection Descriptions
	NO	NC	
			<p><i>Note:</i> The EOI Item No. is displayed on the EOI screen adjacent to the selection item when selecting the terminal function.</p> <p><i>Note:</i> If setting the function of the discrete input terminal via communications, the Selection No. is used to set the Normally Open (NO) or Normally Closed (NC) status of the form A contact for the selected function.</p>
59	118	119	Position Control Reverse Limit LS — Activation stops the drive and holds its position. If the connection remains the drive will time out and trip. This function is normally used for over-travel conditions.
60	120	121	Light-Load High-Speed Operation Enable — Activation sets the lower limit of an output frequency range in which the Light-Load/High-Speed function may be used (see F330). The Light-Load/High-Speed function accelerates the output frequency of the ASD to the speed setting established at F341 for the duration of the activation.
61	122	123	Snap Stop Control Enable — Not Used.
62	124	125	Pre-excite Motor — Activation applies an excitation current to the motor (holds shaft stationary) for the duration of the connection.
63	126	127	System Consistent Sequence (BC: braking command) — Not Used.
64	128	129	<p>System Consistent Sequence (B: braking release) — Activation initiates the brake release command. This setting requires that another discrete input terminal be set to System Consistent Sequence (BA: braking answer)] to complete the brake release command and to convey the status of the braking system to the user or to a dependent subsystem.</p> <p>Once the braking release function is initiated, the Trouble Internal Timer begins to count down (Trouble Internal Timer value is set at F630). Should the count-down timer expire before the brake releases or before the Braking Answer is returned, fault E-11 will occur. Otherwise, the brake releases the motor and normal motor operations resume.</p> <p>The Braking Release function is primarily used at startup; but, may be used when the brake is applied while the motor is running.</p>
65	130	131	<p>System Consistent Sequence (BA: braking answer) — This setting is required when the Braking Release function is used. The function of this input terminal is to receive the returned the status of the braking system. The returned status is either Released or Not Released.</p> <p>If Released is returned within the time setting of F630, normal system function resumes.</p> <p>If Not Released is returned or if the F630 time setting times out before either signal is returned, then fault E-11 occurs.</p> <p>The returned signal may also be used to notify the user or control a dependent subsystem.</p>
66	132	133	System Consistent Sequence (BT: braking test) — Factory use.

Table 15 shows the output selections for the **AM**, **FM**, **FP**, and **Analog 1 & 2** terminals. The magnitude of the **AM** and **FM** output signals at full-scale is selection-specific and may be adjusted to fit application-specific requirements (see F671 and F006).

The column on the right side of Table 19 shows the actual **AM** and **FM** outputs for an EOI display of 100%.

Table 15. Output terminal selections for the AM, FM, FP, and Analog 1 & 2 terminals.

Function	AM/FM Output Value at 100% EOI-Displayed Output
Output Frequency (FM and FP default setting)	Maximum Frequency
Frequency Reference	
Output Current (AM default setting)	150%
DC Bus Voltage	
Output Voltage (Analog 1 default setting)	Maximum Frequency
Post-compensation Frequency (Analog 2 default setting)	
Speed Feedback (realtime)	
Speed Feedback (1 sec filter)	
Torque	150%
Torque Command	
Internal Torque Base	
Torque Current	
Excitation Current	
PID Feedback Value	Maximum Frequency
Motor Overload Ratio	Motor Overload Trip-Point Setting
ASD Overload Ratio	ASD Overload Trip-Point Setting
PBR (DBR) Overload Ratio	DBR Overload Trip Point Setting
PBR (DBR) Load Ratio	Maximum DBR Duty Cycle
Input Power	1.73 * input voltage * ASD rated current
Output Power	
Peak Output Current	150%
Peak DC Bus Voltage	
PG Counter	32767 Encoder Pulses
Position Pulse	
RR Input	100%
VI/II Input	
RX Input	
RX2 Input	
FM Output (used for factory testing only)	
AM Output (used for factory testing only)	
Meter Adjust Value	
Analog Output	
Load Torque	
	150%

Table 16. Discrete Output Terminal Assignment Selections.

	Function		Function
0	Lower Limit (LL)	31	Ready for Operation (including ST and RUN)
1	Upper Limit (UL)	32	Ready for Operation
2	Low (speed setting of F100)	33	POFF Alarm (poor control power supply)
3	RCH (Acc/Dec completion)	34	System Consistent Sequence (BR: brake release)
4	RCH (speed specified at F101)	35	Alarm Active
5	Fault FL (all)	36	Forward Speed Limit (torque control)
6	Fault FL (except EF or OCL)	37	Reverse Speed Limit (torque control)
7	Over-Current Alarm	38	ASD Healthy Output
8	ASD Overload Alarm	39	Abnormal Communication Alarm 2 (internal cause)
9	Motor Alarm	40	Error Code Output 1 (6-bit error output)
10	Over-Heat Alarm	41	Error Code Output 2 (6-bit error output)
11	Over-Voltage Alarm	42	Error Code Output 3 (6-bit error output)
12	DC Voltage Low Alarm	43	Error Code Output 4 (6-bit error output)
13	Low-Current Alarm	44	Error Code Output 5 (6-bit error output)
14	Over-Torque Alarm	45	Error Code Output 6 (6-bit error output)
15	Braking Resistor Overload Alarm	46	Designated Data Output 1 (7-bit transmission output)
16	Emergency Off Active	47	Designated Data Output 2 (7-bit transmission output)
17	Retry Active	48	Designated Data Output 3 (7-bit transmission output)
18	Pattern Operation Switching Output	49	Designated Data Output 4 (7-bit transmission output)
19	PID Deviation Limit	50	Designated Data Output 5 (7-bit transmission output)
20	Start/Stop	51	Designated Data Output 6 (7-bit transmission output)
21	Serious Fault (OCA, OCL, EF, Lost Phase, Short Circuit, or Abnormal Output)	52	Designated Data Output 7 (7-bit transmission output)
22	Light Fault (OL, OC1, 2, 3, OP)	53	Light Load Detection Signal
23	Bypass Output #1	54	Heavy Load Detection Signal
24	Bypass Output #2	55	Positive Torque Limit
25	Fan On/Off	56	Negative Torque Limit
26	Jog Active	57	External Rush Suppression Relay Output
27	Terminal Board Operation Command Mode	58	Over Travel
28	Total-Operation-Hours Alarm	59	Positioning Completion
29	Abnormal Communication Alarm (external cause)	60	Earth Fault Alarm
30	Forward/Reverse Operation	61	Low Output Disable Alarm

Part Numbering Convention

The **GX7R ASD** is a configurable large-horsepower ASD. The GX7R ASD may be ordered in several different configurations. The typical cabinet configurations will include multiple modules. The modules may be single-phase or three-phase.

The part numbering scheme for a given configuration is defined in the following section.

Ordering Information

Use the following part numbering convention when ordering the **GX7R ASD**.

The 30 HP, 480-Volt system with the modular common DC bus system is shown in the heading of [Table 17](#) as an example (i.e., P/N GX7R4300AX).

Table 17. Part Numbering Convention.

GX7	R	4	300	AX	LF
Series					
Regen		Voltage Rating	ASD Rating	Configuration	
4 = 480 VAC			300 = 30 HP 400 = 40 HP 550 = 50 HP 650 = 60 HP 850 = 75 HP 10K = 100 HP 13K = 125 HP 15K = 150 HP	AX = Modular Common DC Connection (Parallel Cabinets) BLANK = Modular Common DC Connection (Stand Alone Cabinet)	Lufkin Specialty Product
Note: Derate the applicable rating by one percent for each degree Celsius above the rated thermal operating capacity.					

Enclosure Weight/Dimensions

Refer to the drawing on [pg. 202](#) for the referenced enclosure figure.

Note: All Toshiba ASD enclosures carry at least an IP20 rating — NEMA 1 listed.

Table 18. GX7R NEMA 3-R Enclosure Dimensions and Weights.

Model Number GX7R4	Shipping Weight Lbs. (kg)	Figure
300	800 (363)	Figure 26 on pg. 202
400		
550		
650		
850		
10K		
13K	900 (408)	Figure 27 on pg. 203
15K		

Figure 26. 480-Volt 30 – 100 HP GX7R ASD.

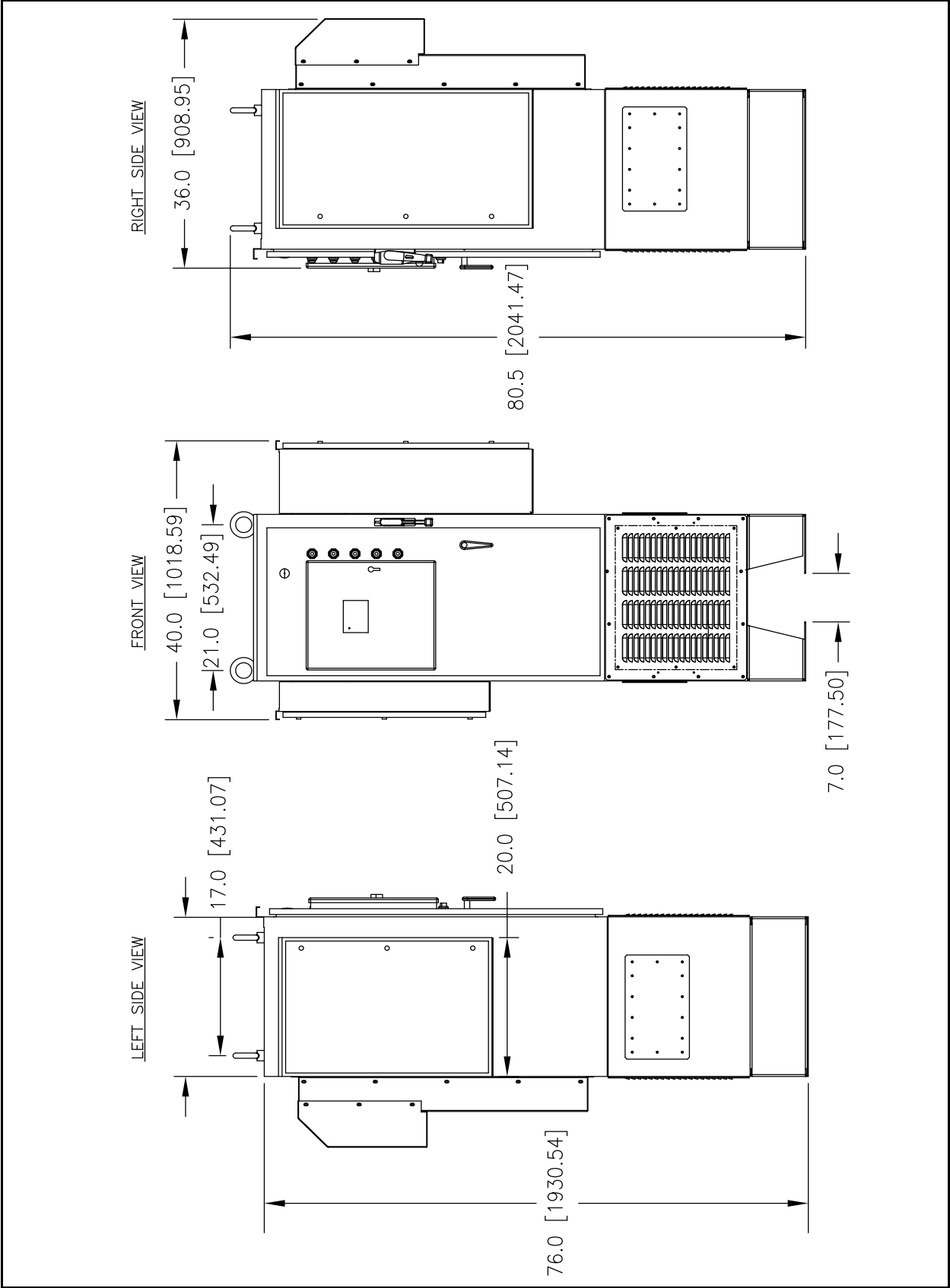
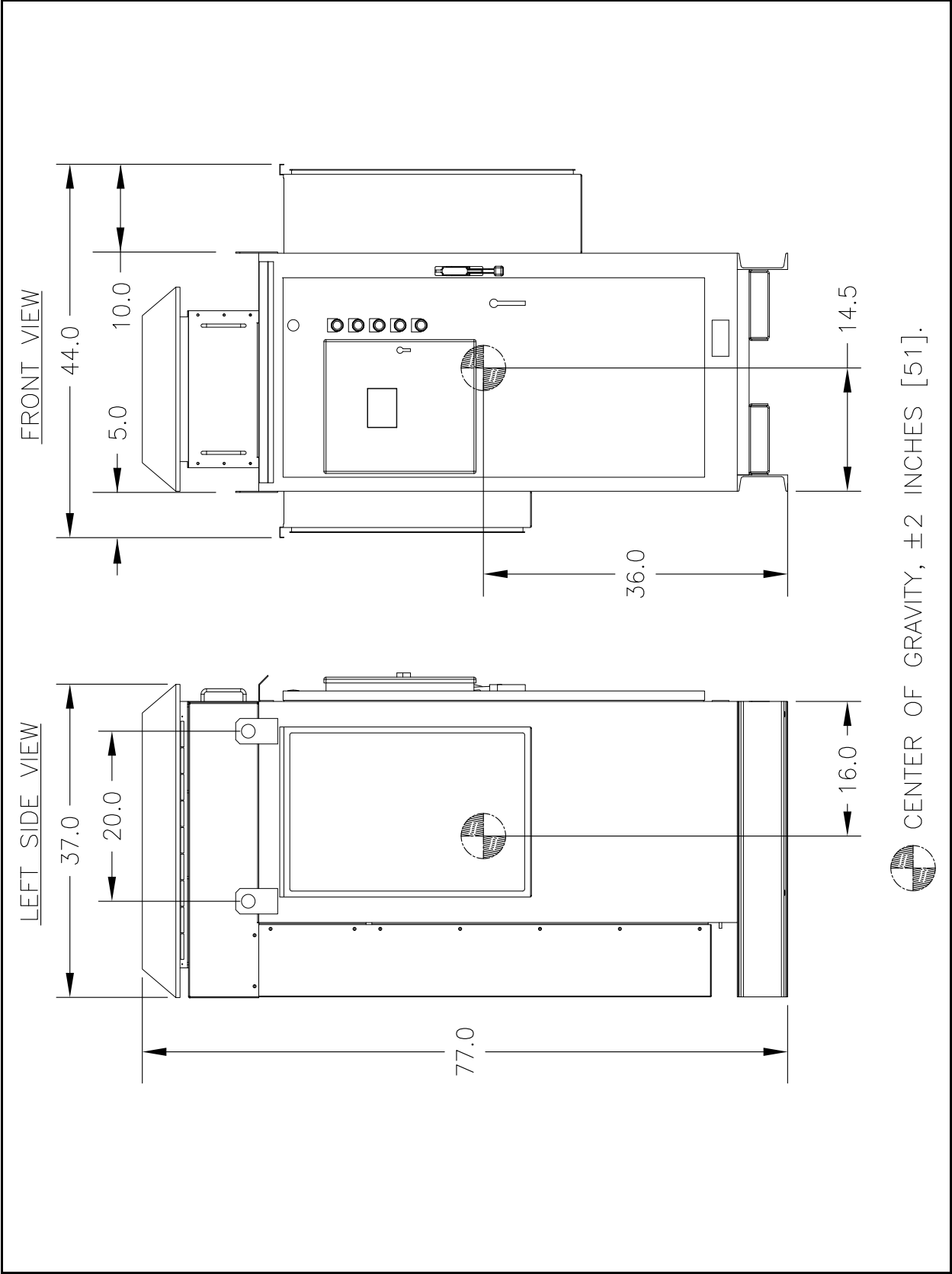


Figure 27. 480-Volt 125 – 150 HP GX7R ASD.



Voltage/Current Specifications

Table 19. GX7R 30 – 150 kVA Voltage/Current Specifications.

Model Number GX7R4	Rated kVA	HP	3-Phase Input 50/60 Hz ±2%	3-Phase Output Variable Frequency	Output Current Amps 100% Cont.	Output Current Amps 150% 60 Secs.
300	30	30	480 VAC (±10%)	0 – 80 Hz	40	60.0
400	40	40			52	78.0
550	55	50			65	97.5
650	65	60			77	115.5
850	85	75			98	144
10K	100	100			124	186
13K	125	125			156	234
15K	150	150			180	270
Note: Derate the applicable rating by one percent for each degree Celsius above the rated thermal operating capacity.						

Cable/Terminal Specifications

Installation should conform to the latest release of the National Electrical Code Article 110 (NEC) (Requirements for Electrical Installations), all regulations of the Occupational Safety and Health Administration, and any other applicable national, regional, or industry codes and standards.

Note: *The following ratings are guidelines and shall not be the sole determining factor of the lug or wire size used with the ASD. Application-specific applicables, wire insulation type, conductor material, ASD rating, and local and regional regulations are but a few of the considerations when selecting the actual wire type and lug to be used with the ASD.*

Note: *Cable/Terminal specifications are based on the rated current of the ASD and **Do Not** include the 10% Service Factor.*

Because the **GX7R ASD** may be commissioned within a wide range of environments and applications, consider the application with each installation.

Cable specifications are to take full-load current and breaker lug accommodations into consideration. Although the cable size recommendations take typical current ratings into consideration, the minimum cable size may not be suitable for an application requiring a current load near the upper end of the cable specification. Please consult the NEC for cable specifications appropriate for your application.

For further installation information on Cable/Terminal selection see the section titled [Installation and Connections on pg. 14](#) or contact your **Toshiba Customer Support Center**.

Table 20. 480-Volt GX7R ASD Cable/Terminal Specifications.

Model GX7R	MCP Rating (Amps)	Typical Wire/Cable Size (AWG or kcmil)			Lug Size Range	
		Input/Output Power		AM, FM, and II Terminals	Control Terminals	Wire-Size/Lug-Capacity for Input/Output Power
		Recommended	Maximum			
4300	75	6	4	20 (3-core shield)	18 (2-core shield)	6 – 500
4400	100	4	4			
4550	100	3	2			
4650	125	2	2			
4850	175	1	**2			
410K	200	2/0	2/0			
413K	250	*1/0	*4/0			
415K	300	*2/0	*4/0			

GX7R Optional Devices

The ASD may be equipped with several options which are used to expand the functionality of the ASD. [Table 21](#) lists the available options and their functions.

Table 21. GX7R Optional devices and functions.

Item	Device Function
ASD7-SIM2	Emulates the input control signals of the GX7R ASD via switches and pots.
ASD-BPC	Provides dust protection for the GX7R when the EOI is removed or mounted remotely.
ASD-CAB-PC	Female 9-pin d-type to RJ-45 (PC to ASD cable).
ASD-EOI-N4	A replacement NEMA-4 EOI (without Rotary Encoder)
ASD-ISO-1	Provides isolation of the Control Board output circuit from the AM/FM output and from the II input.
ASD-MTG-KIT	EOI Remote Mounting Kit. See the section titled EOI Remote Mounting on pg. 189 for further information on this option.
ASD-RTC	The Real Time Clock provides the user with a time stamp of the Start , Run , and Fault events.
ASD-TB1-AC1	Provides 120 VAC discrete terminal activation and additional I/O terminals.
HS35 Encoder	Provides rotational speed and/or directional information. The Encoder is mounted on the motor shaft or the shaft-driven equipment. <i>Note: On ASDs that are rated at 50 HP and above, the ASD-SS (Speed Search) hardware option board cannot be used if using a shaft-mounted encoder.</i>
ASD – Multicom Option Boards	
<i>Note: Multicom boards are identified as ASD-Multicom-A, -B, -F, etc.</i>	
-A	Incorporates the Modbus , Profibus , or Device Net communications protocol for system control and is able to receive and process Vector Control feedback.
-B	Provides a line driver and open collector interface for system control.
-F	The Tosline-F10 interface provides high-speed communication to Toshiba control equipment via twisted pair wiring.
-J	Able to receive and process vector control feedback via line driver or open collector interface.
-S	The Tosline-S20 interface provides high-speed communication to Toshiba control equipment via fiber optics.
-X	Provides extended terminal I/O functions for monitoring, feedback, and control.
<i>Note: See the user manual of the applicable option for further information on each item.</i>	

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