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HAND/
AUTO
ESC
RUN
MODE
STOP
RESET
TOSHIBA
Q9
PLUS
ADJUSTABLE SPEED DRIVE

Toshiba Q9+ Installation & Operation Manual

Adjustable speed drives

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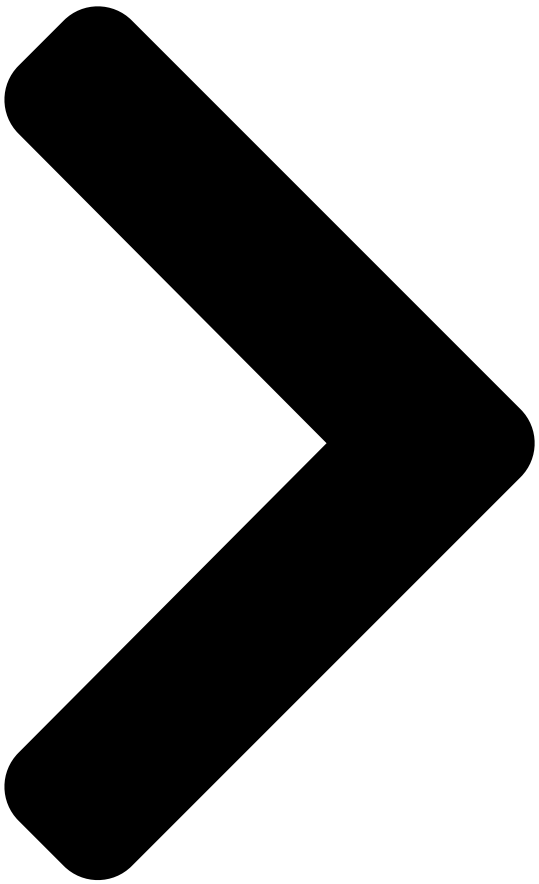

April, 2020

ADJUSTABLE SPEED DRIVES

Q9+

TOSHIBA INTERNATIONAL CORPORATION

DN-68249-003

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Related Manuals for Toshiba Q9+

DC Drives Toshiba TOSVERT VF-P7 Instruction Manual

For parameter f608-f608 (4 pages)

DC Drives Toshiba H7 Operation Manuals

Adjustable speed drive (230 pages)

DC Drives Toshiba T300MVi Interface Manual

Adjustable speed motor drive (56 pages)

DC Drives Toshiba G9 Installation And Operation Manual

(298 pages)

DC Drives Toshiba VF-P7 Instruction Manual

Compliance with ce marking and ul standard 200v class 400v class (12 pages)

DC Drives Toshiba T300MV2 Instruction Manual

Medium voltage adjustable speed motor drive (140 pages)

DC Drives Toshiba SuperMulti Drive Manual

Usb 3.0 portable (2 pages)

DC Drives Toshiba G7 Series Applications Workbook

(59 pages)

DC Drives Toshiba ACE-tronics G9 ASD Installation And Operation Manual

Adjustable speed drive (297 pages)

DC Drives Toshiba G9 Installation And Operation Manual

Asd (289 pages)

DC Drives Toshiba T300BMV2 Instruction Manual

Adjustable speed motor drive (81 pages)

DC Drives Toshiba PDP003Z Manual

Profibus-dp option function (33 pages)

DC Drives Toshiba XM-6201B Installation Manual

Scsi cd-rom drive (18 pages)

DC Drives Toshiba TOSVERT VF-A5 Instruction Manual

Option, parameter writer (20 pages)

Summary of Contents for Toshiba Q9+

Page 1 April, 2020 ADJUSTABLE SPEED DRIVES DN-68249-003...

Page 3 Q9 Plus ASD Installation & Operation Manual ® Document Number: 68249-003 April, 2020...

Page 5 Introduction Congratulations on the purchase of the Q9 Plus Adjustable Speed Drive! The Q9 Plus Adjustable Speed Drive (ASD) is a solid-state AC drive that features Toshiba International Corporation’s (TIC) Virtual Linear Pump Technology, Time-Based Alternation, and Vector Control algorithms. These algorithms provide easy setup, enhanced reliability, and precise control under the most demanding conditions —...

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trade references appearing in this manual are registered trademarks of their respective owners.

Page 7 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 web site at www.toshiba.com/tic/. TOSHIBA INTERNATIONAL CORPORATION Q9 Plus Adjustable Speed Drive Complete the following information and retain for your records.

Page 8 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.

Page 9: Table Of Contents

Power Factor Correction ..... 7 Light Load Conditions .....7 Motor/Load Combinations .....7 Motor Braking ..... 8 Q9 Plus ASD Characteristics .....8 Over-Current Protection ..... 8 ASD Capacity ..... 8 Using Vector Control .....8 Local/Remote Operation ..... 8 https://www.toshiba.com/tic/...

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Page 11 Viewing Trip Information .....271 Trip Record at Monitor Screen .....271 Trip History .....272 Clearing a Trip .....272 Part Numbering Convention ..... 273 Enclosure Dimensions ..... 274 Voltage/Current Specifications .....280 Cable/Terminal Specifications .....282 Short Circuit Protection Recommendations.....284 https://www.toshiba.com/tic/...

Page 12 Table of Contents Q9 Plus ASD Install/Op Manual https://www.toshiba.com/tic/...

Page 13: General Safety Information

https://www.toshiba.com/tic/...

Page 14: Qualified Personnel

Contact your state environmental shipment, if possible. File a claim with the carrier agency for details on disposal of electrical if necessary and immediately notify the TIC Customer Support Center. components and packaging in your area. https://www.toshiba.com/tic/...

Page 15: Installation Precautions

Mounting Requirements The effective value of the capacitor may be increased, reduced, or removed entirely via the • Only Qualified Personnel should install this Selector Switch, Switching Bar, or the Switching equipment. Screw — the type used is typeform-specific. https://www.toshiba.com/tic/...

Page 16: Power Connections

• Ensure the correct phase sequence and the • The failure of external or ancillary components desired direction of motor rotation in the Bypass may cause intermittent system operation (i.e., the mode (if applicable). system may start the motor without warning). https://www.toshiba.com/tic/...

Page 17: Personnel Protection

• Additional warnings and notifications shall be posted at the equipment installation location as • When using the ASD as an integral part of a larger system, it is the responsibility of the deemed required by Qualified Personnel. https://www.toshiba.com/tic/...

Page 18: Dynamic Braking Precaution

• If/when taking a live reading is required are tightened securely. Inspect more frequently (equipment is powered), it is to be performed by when operating in a harsh environment or when Qualified Personnel ONLY. Proper and approved used on a high-output-demand application. https://www.toshiba.com/tic/...

Page 19: Motor Characteristics

When the motor is to be operated at low speed (less than 50% of full speed) and at the rated torque Note: When operating in the Vector Control continuously, a Toshiba VF motor (designed for use mode the carrier frequency should be in conjunction with an ASD) is recommended.

Page 20: Motor Braking

To prevent this condition, before disconnecting the controls a motor which is rated significantly less RJ45 connector, ensure that the Q9 Plus ASD is off. than the maximum current rating of the Q9 Plus ASD, the over-current limit setting will have to be https://www.toshiba.com/tic/...

Page 21: Installation And Connections

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 Q9 Plus ASD is on or while the motor is still turning may cause ASD damage. https://www.toshiba.com/tic/...

Page 22: Mounting The Asd

Plus ASD is 14° to 104° F (-10° to 40° C). An inductor (DCL) may be connected across the When installing multiple ASDs horizontally, Toshiba PO and PA/+ terminals to provide additional recommends at least 5 cm of space between filtering.

Page 23: System Grounding

• Connect a surge suppressor to every shall have its own ground conductor. electromagnetic contactor and every relay installed near the ASD. ASDs produce high-frequency noise — steps must be taken during installation to avoid the negative • Install noise filters as required. https://www.toshiba.com/tic/...

Page 24

Figure 6. The Grounding Capacitor Bar is used on typeforms — 200-volt 75 HP and the 100 HP/ 460-volt 125 HP and the 150 HP. The value may be set to Large or Small (default setting) by connecting or disconnecting the switching bar, respectively. https://www.toshiba.com/tic/...

Page 25: Lead Length Specifications

Exceeding the peak voltage rating or the allowable thermal rise time of the motor insulation will reduce the life expectancy of the motor. When operating in the Vector Control mode the carrier frequency should be set to 2.2 kHz or above. https://www.toshiba.com/tic/...

Page 26: I/O And Control

Output Frequency — Current or Voltage output that is proportional to the output frequency of the ASD or to the magnitude of the function assigned to this terminal (see 255). Select Current or Voltage at F681. Table 10 on page https://www.toshiba.com/tic/...

Page 27: Terminal Descriptions

CC to this terminal (Sink programmed to any of the functions listed in Table 9 mode). This input terminal may be programmed to on page 252 (see F113). any of the functions listed in Table 9 on page 252 https://www.toshiba.com/tic/...

Page 28

Maximum Frequency output or the 0.0 to 250% has a frequency which is proportional to the torque output of the ASD. This is an isolated input magnitude of the Output Frequency (or the function https://www.toshiba.com/tic/...

Page 29

Figure 20. on pg. 19 See the section titled Terminal Descriptions on pg. See the section titled Cable/Terminal Specifications for terminal descriptions. on pg. 282 for information on the proper cable/ terminal sizes and torque specifications when making Terminal Board

connections. https://www.toshiba.com/tic/...

Page 30: Terminal Board I/O Configurations

Figure 11. RR Input. Figure 12. RX Input. Figure 13. V/I Input. Figure 14. P24 Output. Figure 15. PP Output. Figure 16. OUT1/OUT2 Output. Figure 17. FP Output. Figure 18. AM/FM Output. Figure 19. Fault Relay (shown not faulted). https://www.toshiba.com/tic/...

Page 31: Typical Asd Connection Diagram

Terminal Board F681 IICC SW301 Note: The AM, FM, and the +SU analog terminals are referenced to CC. The RR, RX, P24, and the PP analog terminals are referenced to CCA. The isolated V/I analog terminal references IICC. https://www.toshiba.com/tic/...

Page 32: Start Up And Test

• U/T1, V/T2, and W/T3 are connected to the motor. • The 3-phase input voltage is within the specified tolerance. • There are no shorts and all grounds are secure. • All personnel are at a safe distance away from the motor and/or the motor-driven equipment. https://www.toshiba.com/tic/...

Page 33: Electronic Operator Interface

ASD menu selections, change the value of a Prohibited Items, and displayed parameter, and performs the Enter key Save User Settings Information (parameter settings function. Turn the Rotary Encoder either clockwise or counterclockwise to perform the Up or Down may be saved by the user). https://www.toshiba.com/tic/...

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The source of the Fault screen, or cancels changes made to a field if or Alarm must be determined and corrected pressed while still in the reverse video mode (dark before normal ASD operation can resume. https://www.toshiba.com/tic/...

Page 35: Led/Lcd Screens

LCD screen. LCD Screen Display The LCD screen displays the percentage of the Maximum Frequency (if running), running frequency (if running), Ready-to-Run indicator, Main Monitor Selections, and the discrete I/O terminal status. LCD Character/Font Information All alpha-numeric characters are available. https://www.toshiba.com/tic/...

Page 36: Using The Lcd Screen

Active DC Bus Voltage ASD Output Voltage Figure 24. Program Menu Screen (see pg. 40 for more on the Program Menu Screen). Item Number 1 of 15 Program Menu Items Screen Name (only 5 items listed) Primary Menu Items https://www.toshiba.com/tic/...

Page 37: Eoi Remote Mounting

8. Install the Front Panel Connector Assembly to other fluids. the ASD (see Figure 26. on pg. 26). • Turn on the power only after securing the front 9. Connect the Extender Cable from the EOI to the cover of the ASD. Front Panel Assembly. https://www.toshiba.com/tic/...

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EOI Remote Mounting Q9 Plus ASD Install/Op Manual Figure 25. Front Panel Removal/Front Panel Connector Assembly. Figure 26. Remote Mounting Dimensions (inches/millimeters). https://www.toshiba.com/tic/...

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4. Remove the Front Panel Assembly of the ASD — using a flathead screwdriver, release the upper 8. Connect the Extender Cable from the EOI to the retaining tabs of the EOI panel. Then pivot the Front Panel Assembly. Figure 27. EOI Remote Mounting Dimensions (inches/millimeters). https://www.toshiba.com/tic/...

Page 40: System Operation

Voltage and Frequency Rating of the Motor changed while the motor is running by (F409/F014). using the Rotary Encoder to change 2. The Upper-Limit Frequency (F012). the Frequency Command value. 5. Press the Stop-Reset key to stop the motor. 3. The Lower-Limit Frequency (F013). https://www.toshiba.com/tic/...

Page 41: Default Setting Changes

Direct Access □□ applicable parameter number). A Pressing the Mode key when finished searching or listing of the Direct Access/Parameter Numbers and when halted at a changed parameter returns the a description of the associated parameter may be system to the primary menu loop. https://www.toshiba.com/tic/...

Page 42: Standard Startup Wizard Requirements

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 active Accel/Decel times]. https://www.toshiba.com/tic/...

Page 43 5 — V/f 5-Point Setting (open 5-point setting window) 6 — PM Drive 7 — PG Feedback Vector Control (speed) 9 — Energy Saving This selection establishes the source of the 10 — Advanced Energy Saving Frequency (speed) command. https://www.toshiba.com/tic/...

Page 44 Click Exit to load the Startup Wizard input and to return to the Frequency Command 12 — Optional High-Speed Pulse Input screen. Additional application-specific programming 10. Display Units F701 may be required. This screen sets the display units for current and voltage. https://www.toshiba.com/tic/...

Page 45: Command Mode And Frequency Mode Control

• The F004 setting, the EOI and run at the commanded EOI value. • Via communications, or The source of the Command control signal may be selected by: • Placing the EOI in the Local mode. https://www.toshiba.com/tic/...

Page 46: Command And Frequency Control Selections

• High-Speed Pulse Input Option. Note: Table 9 on page 252 for the available discrete input terminal functions that may override the F003 F004 selections as shown in Figure 28. (i.e., Serial/Local Switch, Fire Speed, etc.). Figure 28. Command- and Frequency-Control Source Relationship. https://www.toshiba.com/tic/...

Page 47: Command Control

11 — Optional RP Pulse Input Use to allow the system to use a pulsed input for frequency control. 12 — Optional High-Speed Pulse Input Use to allow the system to use a high-speed pulsed input for frequency control. https://www.toshiba.com/tic/...

Page 48: System Configuration And Menu Options

With the exception of the Virtual Linear Pump Electronic Thermal Protection. Expanded Control Enable/Disable, the control settings of the descriptions of these parameters may be found in EOI Command menu are effective for EOI control the section titled Direct Access Parameter only. Information on pg. https://www.toshiba.com/tic/...

Page 49 (of a multiple motor configuration). The settings may be accessed at F440, F441, F442, and F443, respectively. VLP Technology Control — This setting enables or disables the Virtual Linear Pump function. https://www.toshiba.com/tic/...

Page 50: Monitor Mode

FM terminal. This terminal may Exciting Current — Displays the current value be configured at for application-specific F005 suitability. required to produce the excitation field. https://www.toshiba.com/tic/...

Page 51 Output Frequency — Displays the running See parameter F201 for more frequency. information on the setup of this input. RX Input — Displays the RX input setting as a percentage of the full range of the RX value (-10 to +10 VDC Input). https://www.toshiba.com/tic/...

Page 52: Program Mode Menu Navigation

Transducer Output Range F393 Transducer Maximum Reading Settings F403 Transducer Minimum Reading F394 Virtual Linear Pump Minimum (Threshold) F395 Virtual Linear Pump Maximum (Threshold) F396 Command Source F397 Command Value F398 Low Frequency Limit F385 Start and Stop Points Start/Stop Mode https://www.toshiba.com/tic/...

Page 53 Total Number of ASDs on Time-Based Alternation F434 Pump Number F438 Process Hold Mode Response Time Time-Based Alternation F439 Direct Mode Response Time F456 Direct Mode Emergency Setpoint F115 Input Terminal 5 (S1) Function Time-Based Alternation Emergency Timer (Min- F404 utes) https://www.toshiba.com/tic/...

Page 54 F009 Accel/Decel 1 Settings Acceleration Time 1 F010 Deceleration Time 1 F011 Maximum Frequency F012 Upper-Limit Frequency F013 Frequency Settings Lower-Limit Frequency F015 V/f Pattern F256 Time Limit for Lower-Limit Frequency Operation F001 Motor Set 1 Automatic Torque Boost https://www.toshiba.com/tic/...

Page 55 MON1 Terminal Meter Selection F673 MON1 Terminal Meter Adjustment F689 MON1 Output Gradient Characteristic F690 MON1 Bias Adjustment F688 MON1 Voltage/Current Output Switching F674 MON2 Terminal Meter Selection F675 MON2 Terminal Meter Adjustment F692 MON2 Output Gradient Characteristic F693 MON2 Bias Adjustment https://www.toshiba.com/tic/...

Page 56 Input Terminal 5 (S1) Function F116 Input Terminal 6 (S2) Function F117 Input Terminal 7 (S3) Function F118 Input Terminal 8 (S4) Function F119 Input Terminal 9 (LI1) Function F120 Input Terminal 10 (LI2) Function F121 Input Terminal 11 (LI3) Function https://www.toshiba.com/tic/...

Page 57 Output Terminal 9 (R2) Function F168 Output Terminal 10 (R3) Function F169 Output Terminal 11 (R4) Function F100 Low-Speed Signal Output Frequency F101 Reach Settings Speed Reach Frequency F102 Speed Reach Detection Band Parameter Number IRECT CCESS Direct Access Unknown Numbers https://www.toshiba.com/tic/...

Page 58 RS485 Communication Main Power Under-Voltage Alarm Stop After Instantaneous Power-Off Alarm Stop After Lower-Limit Continuous Time Light-Load Alarm Heavy-Load Alarm Maintenance Timer Alarm Over-Torque Alarm Soft Stall Alarm Low Suction/No-Flow Cut Off Alarm Time-Based Alternation Alarm Float Active https://www.toshiba.com/tic/...

Page 59 Trip History (read-only) Speed Feedback (Inst) (Real-Time) Speed Feedback (1 Second) Torque Torque Reference Torque Current Excitation Current PID Feedback Motor Overload Ratio ASD Overload Ratio DBR (Dynamic Braking Resistor) Overload Ratio Motor Load ASD Load DBR (Dynamic Braking Resistor) Load https://www.toshiba.com/tic/...

Page 60 Contrast Adjustment Save User F740 Trace Selection Settings F741 Trace Cycle F742 Trace Data 1 Trace F743 Trace Data 2 F744 Trace Data 3 F745 Trace Data 4 View Trace Data Trace Data Display Save/Restore Wizard Save/Restore System Settings https://www.toshiba.com/tic/...

Page 61 Overload Reduction Start Frequency F631 ASD Overload F615 Over-Torque Trip F616 Over-Torque Detection Level During Power Running Over-Torque Detection Level During Regenerative F617 Over-Torque Parameters Braking F618 Over-Torque Detection Time F619 Over-Torque Detection Hysteresis F651 Under-Torque Detection Under-Torque Detection https://www.toshiba.com/tic/...

Page 62 Short Circuit Detection at Start Special Protection F620 Cooling Fan Control Parameters F621 Cumulative Operation Time Alarm Setting F650 Fire-Speed Control Forced Fire-Speed Control F209 Analog Filter Analog Input Filter REQUENCY F311 Forward/Reverse Disable Forward/Reverse Disable F260 Jog Settings Jog Frequency https://www.toshiba.com/tic/...

Page 63 Preset Speed 14 F294 Preset Speed 15 F201 V/I Input Point 1 Setting F202 V/I Input Point 1 Frequency F203 Speed Reference Setpoints V/I Input Point 2 Setting F204 V/I Input Point 2 Frequency F210 RR Input Point 1 Setting https://www.toshiba.com/tic/...

Page 64 V/I Input Bias F471 V/I Input Gain F472 RR Input Bias F473 RR Input Gain F474 RX Input Bias F475 RX Input Gain F476 RX2 Input Bias F477 RX2 Input Gain F478 Option V/I Input Bias F479 Option V/I Input Gain https://www.toshiba.com/tic/...

Page 65 F244 0 Hz Dead Band Signal F255 0 Hz Command Output F415 Exciting Strengthening Coefficient F634 Special Parameters Annual Average Ambient Temperature F635 Rush Current Suppression Relay Activation Time F637 PTC 1 Thermal Selection F638 PTC 2

Thermal Selection https://www.toshiba.com/tic/...

Page 66 Motor Rated Current (Nameplate) F407 Vector Motor Model Motor Rated RPM (Nameplate) F409 Base Frequency Voltage 1 F410 Motor Constant 1 (Torque Boost) F411 Motor Constant 2 (No Load Current) F412 Motor Constant 3 (Leak Inductance) F413 Motor Constant 4 (Rated Slip) https://www.toshiba.com/tic/...

Page 67 PID Deviation Upper Limit F365 Feedback Settings PID Deviation Lower Limit F366 PID Feedback Differential Gain F367 Process Upper Limit F368 Process Lower Limit F369 PID Control Delay Time F370 PID Output Upper Limit F371 PID Output Lower Limit https://www.toshiba.com/tic/...

Page 68 Input Function Command 2 F904 Input Function Target 3 F905 Output Function Assigned F906 Input Function Target 1 F907 Input Function Command 1 F908 My Function Unit 2 Input Function Target 2 F909 Input Function Command 2 F910 Input Function Target 3 https://www.toshiba.com/tic/...

Page 69 My Function Unit 6 F950 Input Function Command 2 F951 Input Function Target 3 F952 Output Function Assigned F953 Input Function Target 1 F954 Input Function Command 1 My Function Unit 7 F955 Input Function Target 2 F956 Input Function Command 2 https://www.toshiba.com/tic/...

Page 70 Monitor Output Function 11 (2000 – 3099 = FD00 – F965 FE99) F966 Monitor Output Function Command 11 My Function Monitor Monitor Output Function 21 (2000 – 3099 = FD00 – F967 FE99) F968 Monitor Output Function Command 21 https://www.toshiba.com/tic/...

Page 71 Communication Protocol (4-wire RS485) F880 Free Notes F899 Network Option Reset Setting F810 Frequency Point Selection F811 Point 1 Setting F812 Point 1 Frequency Communication Adjust- ments F813 Point 2 Setting F814 Point 2 Frequency F829 Communication Protocol (4-Wire RS485) https://www.toshiba.com/tic/...

Page 72 IP Master Data 1 F590 IP Master Data 2 F591 IP Master Data 3 F592 IP Master Data 4 F593 I/O Scan Permission F594 Communication Time-Out (Modbus) F784 MAC Address 1 F785 MAC Address 2 F786 MAC Address 3 https://www.toshiba.com/tic/...

Page 73 Communication Option Setting 3 F833 Communication Option Setting 4 F834 Communication Option Setting 5 Communication Options F835 Communication Option Setting 6 F836 Communication Option Setting 7 F837 Communication Option Setting 8 F838 Communication Option Setting 9 F841 Communication Option Setting 10 https://www.toshiba.com/tic/...

Page 74 Disconnection Detection Extended Time F851 ASD Operation at Disconnection F852 Preset Speed Operation F853 Communication Option Station Address Monitor Communication Option Speed Switch Monitor Devi- F854 ceNet/CC-Link Password and Enter Password ASSWORD Lockout Password and Lockouts Change Password Lock Outs https://www.toshiba.com/tic/...

Page 75: Virtual Linear Pump Setup

Virtual Linear Pump Setup The parameters addressed while using the Virtual Linear Pump Setup Wizard or the Virtual Linear Toshiba’s Virtual Linear Pump algorithm allows for Pump Settings menu selections are also direct and precise control of pressure, flow rate, or accessible via the applicable associated direct level.

Page 76 • The output frequency is greater than the setting of F505, or • The output frequency no longer changes with continued Virtual Linear Pump number changes. The Minimum threshold setting (F394) plus the F398 setting comprises the range of the Minimum threshold setting. 2. Click Next to continue https://www.toshiba.com/tic/...

Page 77 2. Select Direct Mode if using no feedback or select Process Hold if using feedback. 3. Click Save/Exit. 4. While in the Local mode, press Run. While running, adjust parameters F500 F501 to stabilize operation if unstable. Press ESC https://www.toshiba.com/tic/...

Page 78: Bacnet® Setup

3. Set parameter F829 to 2: BACnet. Signal RS485-B 4. Set parameter F899 to Reset Option

Board and Do not connect ASD. Do not connect The Q9 Plus ASD is now configured to ® communicate with the BACnet network. https://www.toshiba.com/tic/...

Page 79: Bacnet® I/O, And Values

Monitors the status of the LI6 LI6* LI6 Status On/Off input terminal (BI15) Binary Input Monitors the status of the LI7 LI7* LI7 Status On/Off input terminal (BI16) * The ETB004Z expansion I/O card is required to use this input. R = Read-only https://www.toshiba.com/tic/...

Page 80 Indicates the fault status of the drive #2 (BV2) None Local/Remote Binary Value Indicates if the drive is being locally Local/ #4 (BV4) controlled Remote Status Binary Value Indicates if the cumulative run timer has Maint Req Yes/No #6 (BV6) expired https://www.toshiba.com/tic/...

Page 81 (%) of full analog input (AI3) scale Analog Percent Input level of the AI2 AI2* Input #4 AI2 Level (%) of full analog input (AI4) scale * The ETB004Z expansion I/O card is required to use this input. R = Read-only https://www.toshiba.com/tic/...

Page 82 Data From Comm) Controls the MON2 analog Analog Percent MON2 output Output #3 MON2* (%) of full terminal Command scale (AO3) (F674 Data From Comm) * The ETB004Z expansion I/O card is required to use this input. W = Writable https://www.toshiba.com/tic/...

Page 83 Value #8 Power the drive (AV8) Analog Total Output Total cumulative power consumed by Value #9 Power the motor (AV9) Analog Value #10 PID Fbck PID feedback value (AV10) Analog Value #11 Run Time Total time of operation Hours (AV11) https://www.toshiba.com/tic/...

Page 84 Changes Acceleration Time 1 (F009) (AV23) Analog Value #24 Decel Time 1 Changes Deceleration Time 1 (F010) (AV24) * Refer to the BACnet ® Option Unit Function Manual for the list of fault codes. R = Read-only; C = Commandable; W = Writable https://www.toshiba.com/tic/...

Page 85 Autotune). Note: If selecting 1 or 2, the motor must be connected or the Autotune results will not be valid. Settings: 0 — Disabled 1 — Automatic Torque Boost + Autotuning 2 — Sensorless Vector Control (Speed) + Autotuning https://www.toshiba.com/tic/...

Page 86 5 — EOI Keypad 6 — RS485/BACnet 7 — Communication Option Board 8 — RX2 (AI1 Option) 9 — Option V/I (AI2 Option) 10 — UP/DOWN Frequency 11 — Optional RP Pulse Input 12 — Optional High-Speed Pulse Input https://www.toshiba.com/tic/...

Page 87 FM (+) and CCA (-). FM Terminal Setup Parameters F005 — Set FM Function F006 — Calibrate FM Terminal F681 — Voltage/Current Output Switching Selection F682 — Output Response Polarity Selection F683 — Set Zero Level https://www.toshiba.com/tic/...

Page 88 Note: User settings that are stored in the memory of the EOI are not saved via the Save User Settings selection. The unsaved functions include the EOI Option Setups, (Utilities □□ Display Parameters, and (Monitor Setup □) Scrolling Monitor Select. https://www.toshiba.com/tic/...

Page 89 Under most operating conditions, as the output frequency of the ASD goes up so does the output voltage (linear acceleration). The ASD has the ability to modify the relationship between fre- quency and voltage automatically to produce smoother operation or increased (starting) torque (see F502). https://www.toshiba.com/tic/...

Page 90 Lower Limit may also be output when operat- (F012) ing in the PID Control mode, Torque Control mode, or the Vector Units — Hz Control modes (sensorless or feedback). Note: This setting may not be higher than the Upper Limit Frequency (F012) setting. https://www.toshiba.com/tic/...

Page 91 6 — PM Drive (Permanent Magnet) 7 — PG Feedback Vector Control (Speed) 9 — Energy Savings 10 — Advanced Energy Savings Note: When operating in the Vector Control mode, the carrier frequency should be set to 2.2 kHz or above. https://www.toshiba.com/tic/...

Page 92 3 — Soft Stall Only 4 — V/f Motor Overload Trip without Soft Stall 5 — V/f Motor

Overload Trip with Soft Stall 6 — V/f Motor without Overload Trip or Soft Stall 7 — V/f Motor Soft Stall Only https://www.toshiba.com/tic/...

Page 93 If bidirectional operation is required, F and R must be connected to CC. With S1 being the least significant bit of a binary count, the S1 – S4 settings will produce the programmed speed settings as indi- cated in the Preset Speed Truth Table to the right. https://www.toshiba.com/tic/...

Page 94 0101 and is identified as Preset Speed 5. The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Minimum — Lower-Limit Freq. Speed. (F013) Maximum — Upper-Limit Freq. F018 for additional information on this parameter. (F012) Units — Hz https://www.toshiba.com/tic/...

Page 95 0111 and is identified as Preset Speed 7. The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Minimum — Lower-Limit Freq. Speed. (F013) Maximum — Upper-Limit Freq. F018 for additional information on this parameter. (F012) Units — Hz https://www.toshiba.com/tic/...

Page 96 Speed 3 F117 Priority Freq Terminal Priority Terminal Board Board F200 V/I Setup 0.0% 20.0% F201 Freq Mode 2 Keypad F207 Always F110 Assigned N/C = No Change — the setting remains as it was before setting parameter F040. https://www.toshiba.com/tic/...

Page 97 F and R terminal settings if the Reverse option is cho- sen. The Suspend setting will decelerate the motor to a stop regard- less of the rotation direction when both the F and R control termi- nals are activated. https://www.toshiba.com/tic/...

Page 98 S1-S4 on the Terminal Board as binary bits 0 – 3 (F115 – F118). The Frequency Mode 1 (F004) parameter must be set to Binary/BCD. For proper scaling of the binary or BCD input, parameters F228 – F231 must be configured. https://www.toshiba.com/tic/...

Page 99 Changeable During Run — No input terminal. In addition, this input terminal must be specified as Normally Open or Normally Closed. This parameter sets the programmable R terminal to one of the user-selectable functions listed in Table 9 on page 252. https://www.toshiba.com/tic/...

Page 100 Changeable During Run — No In addition, this input terminal must be specified as Normally Open or Normally Closed. This parameter sets the programmable S2 terminal to one of the user-selectable functions listed in Table 9 on page 252. https://www.toshiba.com/tic/...

Page 101 252. Note: The Expansion IO Card Option 1 option board (P/N ETB003Z) is required to use this terminal. See the Expansion IO Card Option 1 instruction manual (P/N 58685) for additional information on the function of this terminal. https://www.toshiba.com/tic/...

Page 102 252. Note: The Expansion IO Card Option 1 option board (P/N ETB003Z) is required to use this terminal. See the Expansion IO Card Option 1 instruction manual (P/N 58685) for additional information on the function of this terminal. https://www.toshiba.com/tic/...

Page 103 252. Note: The Expansion IO Card Option 2 option board (P/N ETB004Z) is required to use this terminal. See the Expansion IO Card Option 2 instruction manual (P/N 58686) for additional information on the function of this terminal. https://www.toshiba.com/tic/...

Page 104 It is often practical to assign a function to this terminal that the user desires to be maintained regardless of external conditions or operations. This parameter sets the programmable ON terminal to one of the user-selectable functions listed in Table 9 on page 252. https://www.toshiba.com/tic/...

Page 105 This parameter is used to set the functionality of the FL output Trips) terminals to one of the user-selectable functions listed in Table 12 Changeable During Run — No on page 257. In addition, the output terminals must be specified as Normally Open or Normally Closed. https://www.toshiba.com/tic/...

Page 106 257. Note: The Expansion IO Card Option 1 option board (P/N ETB003Z) is required to use this terminal. See the Expansion IO Card Option 1 instruction manual (P/N 58685) for

additional information on the function of this terminal. https://www.toshiba.com/tic/...

Page 107 257. Note: The Expansion IO Card Option 2 option board (P/N ETB004Z) is required to use this terminal. See the Expansion IO Card Option 2 instruction manual (P/N 58686) for additional information on the function of this terminal. https://www.toshiba.com/tic/...

Page 108 5 – 12 terminal inputs by the programmed value (see wave- forms at F140). Minimum — 2 Maximum — 200 The delay may be increased to provide additional electrical noise immunity or to prevent the ASD from responding to contact Units — mS bounce or chatter. https://www.toshiba.com/tic/...

Page 109 Motor Set 2 may be selected by a properly configured input terminal (see Table 9 on page 252). Units — Hz For proper motor operation, the Base Frequency should be set for the nameplated frequency of the motor. https://www.toshiba.com/tic/...

Page 110 FLA of the motor may be entered directly when Amps is selected as the unit of measurement (see F701 change the display unit). The Motor 2 Overload Protection Level setting will be displayed in Amps if the EOI display units are set to A/V rather than %. https://www.toshiba.com/tic/...

Page 111 ASD. Units — Hz To enable this function, set the V/f Pattern (F015) selection to the V/f 5-Point Curve setting. V/f Curves may be useful in starting high inertia loads such as rotary drum vacuum filters. https://www.toshiba.com/tic/...

Page 112 The V/f 5-Point Setting Frequency 2 sets the frequency to be Changeable During Run — No associated with the voltage setting of parameter F193 (V/f 5-Point Setting Voltage 2). Minimum — 0.00 Maximum — Maximum Freq. F190 F191 for additional information on this parameter. (F011) Units — Hz https://www.toshiba.com/tic/...

Page 113 The V/f 5-Point Setting Frequency 4 sets the frequency to be Changeable During Run — No associated with the voltage setting of parameter F197 (V/f 5-Point Setting Voltage 4). Minimum — 0.00 Maximum — Maximum Freq. F190 F191 for additional information on this parameter. (F011) Units — Hz https://www.toshiba.com/tic/...

Page 114 Voltage (V) or as a Percent- age (%) of the ASD rating. The default setting is %. F190 F191 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 115 If the commanded frequency of the Frequency Mode 1 setting is less than or equal to the setting of F208, the ASD will follow the setting of Frequency Mode 2. Settings: 0 — FMOD changed by Terminal Board (Frequency Mode) 1 — FMOD (F208) (Frequency Mode) https://www.toshiba.com/tic/...

Page 116 Note: When using the isolated V/I input terminal, the IICC terminal must be used as the return (negative) connection. Note: If using P24 to power a transducer that is to be used to supply the V/I input signal, it may be necessary to connect IICC to CCA. https://www.toshiba.com/tic/...

Page 117 Maximum — Maximum Freq. quency that is associated with the setting of V/I Input Point 2 Set- (F011) ting when operating in the Speed Control mode. Units — Hz See V/I Input Point 1 Setting (F201) for additional information on this parameter. https://www.toshiba.com/tic/...

Page 118 Setting when operating in the Torque Control mode. This value is entered as 0% to 250% of the rated torque. Note: When using the isolated V/I input terminal, the IICC terminal must be used as the return (negative) connection. https://www.toshiba.com/tic/...

Page 119 Changeable During Run — Yes frequency control source from the Frequency Mode 1 setting to the Frequency Mode 2 setting. Minimum — (ASD-Dependent) Maximum — Maximum Freq. F200 for additional information on this parameter. (F011) Units — Hz https://www.toshiba.com/tic/...

Page 120 This holds true for the 15, 30, and 60 mS selections providing a larger sample to produce the average for use by the microproces- sor. False responses to electrical noise are eliminated with no loss in bandwidth because the value used by the ASD is the average value of

several samples. https://www.toshiba.com/tic/...

Page 121 Once set, as the RR input voltage changes, the output fre- quency of the ASD will vary in accordance with the above set- tings. This parameter value is entered as 0% to 100% of the RR input signal range. https://www.toshiba.com/tic/...

Page 122 Maximum — Maximum Freq. quency that is associated with the setting of RR Input Point 2 Set- (F011) ting when operating in the Speed Control mode. Units — Hz See RR Input Point 1 Setting (F210) for additional information on this parameter. https://www.toshiba.com/tic/...

Page 123 This parameter sets RR Input Point 1 Rate and is the output torque value that is associated with the setting of RR Input Point 1 Setting when operating in the Torque Control mode. This value is entered as 0% to 250% of the rated torque. https://www.toshiba.com/tic/...

Page 124 RR Input Point 2 Setting when operating in the Torque Control mode. This value is entered as 0% to 250% of the rated torque. See RR Input Point 1 Rate (F214) for additional information on this parameter. https://www.toshiba.com/tic/...

Page 125 Once set, as the RX input voltage changes, the ASD output speed and/or torque will vary in accordance with the above set- tings. This parameter value is entered as -100% to +100% of the RX input signal range. F474 F475 for information on fine-tuning this terminal response. https://www.toshiba.com/tic/...

Page 126 Maximum — Maximum Freq. quency that is associated with the setting of RX Input Point 2 Set- (F011) ting when operating in the Speed Control mode. Units — Hz See RX Input Point 1 Setting (F216) for additional information on this parameter. https://www.toshiba.com/tic/...

Page 127 This parameter sets RX Input Point 1 Rate and is the output torque value that is associated with the setting of RX Input Point 1 Setting when operating in the Torque Control mode. This value is entered as -250% to +250% of the rated torque. https://www.toshiba.com/tic/...

Page 128 RX Input Point 2 Setting when operating in the Torque Control mode. This value is entered as -250% to +250% of the rated torque. See RX Input Point 1 Rate (F220) for additional information on this parameter. https://www.toshiba.com/tic/...

Page 129 This parameter value is entered as -100% to +100% of the RX2 input signal range. See the Expansion IO Card Option 1 instruction manual (P/N 58685) for additional information on the function of this terminal. F476 F477 for information on fine-tuning this terminal response. https://www.toshiba.com/tic/...

Page 130 Maximum — Maximum Freq. quency that is associated with the setting of RX2 Input Point 2 (F011) Setting when operating in the Speed Control mode. Units — Hz See RX2 Input Point 1 Setting (F222) for additional information on this parameter. https://www.toshiba.com/tic/...

Page 131 This parameter sets BIN Input Point 1 Setting and is entered as 0% to 100% of the range represented by the BIN binary input byte 11111111 (255) or the binary bit(s) 0 – MSB. https://www.toshiba.com/tic/...

Page 132 This parameter sets BIN Input Point 2 Frequency and is the fre- Maximum — 0.00 quency that is associated with the setting of BIN Input Point 2 Maximum — Maximum Freq. Setting. (F011) See BIN Input Point 1 Setting (F228) for additional information on Units — Hz this parameter. https://www.toshiba.com/tic/...

Page 133 Reference Setpoint 1 (frequency). The range of values for this parameter is 0% to 100% of the PG input pulse count range. Note: Further application-specific PG settings may be performed from the following path: Program □□ Feedback □□ PG Settings □ https://www.toshiba.com/tic/...

Page 134 This parameter sets PG Point 2 Frequency and is the frequency Maximum — Maximum Freq. that is associated with the setting of PG Point 2 Setting. (F011) See PG Point 1

Setting (F234) for additional information on this Units — Hz parameter. https://www.toshiba.com/tic/...

Page 135 Program □□Special □□Frequency Control Parameter Type — Numerical Factory Default — 0.00 This parameter provides a plus-or-minus value for the Run Fre- Changeable During Run — Yes quency setting (F241). Minimum — 0.00 Maximum — (ASD-Dependent) Units — Hz https://www.toshiba.com/tic/...

Page 136 This parameter sets the percentage of the rated current of the Changeable During Run — Yes ASD that will be used for DC Injection Braking. A larger load will require a higher setting. Minimum — 0 Maximum — 100 Units — % https://www.toshiba.com/tic/...

Page 137 This parameter is used to set the go-to-zero method to be used Injection Braking) by the ASD in the event that the ASD is commanded to go to Changeable During Run — No zero Hz. Settings: 0 — Standard (DC Injection Braking) 1 — 0 Hz Command https://www.toshiba.com/tic/...

Page 138 Factory Default — 0.0 This parameter sets the time that the ASD is allowed to operate Changeable During Run — Yes below the Lower-Limit setting before an alarm and subsequent fault is incurred. Minimum — 0.0 Maximum — 600.0 Units — Seconds https://www.toshiba.com/tic/...

Page 139 Jog Run terminal activation. Providing a Stop com- mand will terminate the commanded frequency and the Jog function. Terminating the Jog Run terminal activation will ter- minate the Jog function only and will resume the commanded frequency of step 14. https://www.toshiba.com/tic/...

Page 140 Priority as to which is allowed to override the other is selected at F106. The priority selection at F106 enables the selected source for Jog control and disables the other. The F106 setting overrides the F262 parameter setting. Settings: 0 — Disabled 1 — Enabled https://www.toshiba.com/tic/...

Page 141 — At power down while running, and when enabled, this parame- ter writes the running frequency into the F268 location and, upon a sys- tem restart, uses this setting as the start up frequency. Provide a Run command (F or R). The motor will run at the F268 setting. https://www.toshiba.com/tic/...

Page 142 At power up or after a reset, this parameter setting is used to pro- Changeable During Run — Yes vide a starting frequency for the UP/DOWN Frequency function. Minimum — Lower-Limit Freq. F269 for additional information on this parameter. (F013) Maximum — Upper-Limit Freq. (F012) Units — Hz https://www.toshiba.com/tic/...

Page 143 Note: This parameter setting may be different at each start up when enabled. Settings: 0 — Disabled 1 — Enabled Figure 37. UP/Down Frequency Operation Control Timing Diagram. https://www.toshiba.com/tic/...

Page 144 Direct Access Number — Program □□Special □□Jump Frequencies Parameter Type — Numerical Factory Default — 0.00 This parameter establishes a plus-or-minus value for Jump Fre- Changeable During Run — Yes quency 2 (F272). Minimum — 0.00 Maximum — (ASD-Dependent) Units — Hz https://www.toshiba.com/tic/...

Page 145 1010 and is identified as Preset Speed 10. The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Minimum — Lower-Limit Freq. Speed. (F013) Maximum — Upper-Limit Freq. F018 for additional information on this parameter. (F012) Units — Hz https://www.toshiba.com/tic/...

Page 146 1110 and is identified as Preset Speed 14. The binary number is applied to S1 – S4 of the Terminal Board to output the Preset Minimum — Lower-Limit Freq. Speed. (F013) Maximum — Upper-Limit Freq. F018 for additional information on this parameter. (F012) Units — Hz https://www.toshiba.com/tic/...

Page 147 (Break/Make ST) or after a power interruption (momentary power failure). Settings: 0 — Off 1 — (Enabled at) Power Failure 2 — (Enabled at) Make-Break ST-CC 3 — (Enabled at) Make-Break ST-CC or Power Failure 4 — All Starts (Enabled at Run)

https://www.toshiba.com/tic/...

Page 148 Note: If used to restart the motors, the Retry setup of F301 required. Settings: 0 — Off 1 — Ridethrough 2 — Deceleration Stop Ridethrough Setup Requirements 1. Select the Ridethrough Mode at F302. 2.Select the Ridethrough Time at F310. https://www.toshiba.com/tic/...

Page 149 • Communication Error • Option Fault • Sink/Source Setting Error • Over-Speed Error • Over-Torque • Key Error • External Thermal Error • Externally-Controlled Interrupt See the section titled System Setup Requirements on pg. 5 additional information on this setting. https://www.toshiba.com/tic/...

Page 150 Dynamic Braking helps to slow the load quickly; it cannot act as a holding brake. The Dynamic Braking function may be set up and enabled by connecting a braking resistor from terminal PA to PB of the ASD and providing the proper information at F304, F308, and F309. https://www.toshiba.com/tic/...

Page 151 Light-duty and heavy-duty resistors vary from a few ohms to sev- Minimum — 0.5 eral hundred ohms. The appropriate resistance size will be type- Maximum — 1000.0 form- and application-specific. Units — □ Note: Using a resistor value that is too low may result in system damage. https://www.toshiba.com/tic/...

Page 152 Program □□Protection □□Retry/Restart Factory Default — Disabled This parameter adjusts the carrier frequency randomly. This fea- Changeable During Run — No ture is effective in minimizing the negative effects of mechanical resonance. Settings: 0 — Disabled 1 — Enabled https://www.toshiba.com/tic/...

Page 153 If this setting is exceeded, an Minimum — 100 Over-Voltage Trip will be incurred. Maximum — 160 Units — % Note: This parameter setting may increase deceleration times. https://www.toshiba.com/tic/...

Page 154 Drooping Control mode. This function determines the speed of the individual motors at the Minimum — 0.00 100% Drooping Gain setting for motors that share the same load. Maximum — (ASD-Dependent) Units — Hz https://www.toshiba.com/tic/...

Page 155 This parameter is used to set the rate of output change allowed Changeable During Run — Yes when operating in the Drooping Control mode. Minimum — 0.1 Jerky operation may be reduced by increasing this setting. Maximum — 200.0 Units — RAD https://www.toshiba.com/tic/...

Page 156 2, respectively. Note: Ensure that the switching directions are the same and that F311 is set to Permit All. Note: The OUT1 and OUT2 outputs assigned to Commercial Power/ASD Switching Output are used to actuate the re- routing contactors. https://www.toshiba.com/tic/...

Page 157 This parameter determines the amount of time that the connec- Changeable During Run — Yes tion to commercial power is maintained once the switch-to-ASD- output criteria has been met. Minimum — 0.10 Maximum — 10.00 F354 for additional information on this parameter. Units — Seconds https://www.toshiba.com/tic/...

Page 158 This parameter determines the degree that the Proportional func- Changeable During Run — Yes tion affects the output signal. The larger the value entered here, the quicker the ASD responds to changes in feedback. Minimum — 0.01 Maximum — 100.00 https://www.toshiba.com/tic/...

Page 159 F359 allows for this parame- dent) ter setting to function as the Upper Limit while operating in the Changeable During Run — Yes PID Control mode. Minimum — Lower-Limit Freq. (F013) Maximum — Upper-Limit Freq. (F012) Units — Hz https://www.toshiba.com/tic/...

Page 160 Freq. (F013) ter setting to function as the Lower Limit while operating in the Changeable During Run — Yes PID Control mode. Minimum — Lower-Limit Freq. (F013) Maximum — Upper-Limit Freq. (F012) Units — Hz https://www.toshiba.com/tic/...

Page 161 Factory Default — Two Phase This parameter determines the type of information that is sup- Changeable During Run — No plied by the phase encoder. Settings: 1 — Single

Phase 2 — Two Phase 3 — Two Phase (Polarity Inversion) https://www.toshiba.com/tic/...

Page 162 While operating in the PID mode, this parameter establishes an Factory Default — 0 ASD output threshold that must be exceeded in order to activate Changeable During Run — Yes the configured PID control. Minimum — 0 Maximum — 100 Units — % https://www.toshiba.com/tic/...

Page 163 Virtual Lin- Minimum — 1 ear Pump Minimum (Threshold) threshold before the ASD output Maximum — 65535 to the motor is terminated. Units — Seconds F382 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 164 Auto Start- Minimum — 0.1 Stop function. Maximum — 6553.5 Units — Seconds This feature is used to minimize system responses to rapid fluctu- ations in the feedback signal. F385 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 165 Pump Setup Wizard. • • • Inches of Water Column • Feet of Water Column • • °C • °F • *Custom Note: *Custom selection allows for three character spaces to be populated from the 26 alphabet and 13 special characters. https://www.toshiba.com/tic/...

Page 166 Note: This parameter is scaled at F201 – F204 for either selection and requires no user intervention. Settings: 0 — 0 – 20 mA 1 — 4 – 20 mA 2 — 0 – 10 V 3 — 0 – 5 V https://www.toshiba.com/tic/...

Page 167 Virtual Linear Pump command source. Settings: 0 — EOI 1 — *V/I 2 — RR 3 — Communication Board Note: *If Process Hold is selected at F390, selecting V/I here will result in an error message. https://www.toshiba.com/tic/...

Page 168 Autotune precision. Settings: 0 — Autotune Disabled 1 — Reset Motor Defaults 2 — Enable Autotune on Run Command 3 — Autotuning by Input Terminal Signal (see Table 9 on page 252) 4 — Motor Constant Auto Calculation https://www.toshiba.com/tic/...

Page 169 Program □□Virtual Linear Pump □□Settings Factory Default — 0.0 During a properly configured Virtual Linear Pump operation, this Changeable During Run — Yes parameter establishes the minimum level of the transducer range for Virtual Linear Pump operation. Minimum — -3276.7 Maximum — 3276.7 https://www.toshiba.com/tic/...

Page 170 Program □□Motor □□Vector Motor Model Factory Default — (ASD-Depen- This parameter is used to set the (nameplated) rated capacity of dent) the motor being used. Changeable During Run — No Minimum — (ASD-Dependent) Maximum — (ASD-Dependent) Units — kW https://www.toshiba.com/tic/...

Page 171 This parameter is used to set the current level required to excite dent) the motor. Specifying a value that is too high for this parameter Changeable During Run — No may result in hunting (erratic motor operation). Minimum — 10 Maximum — 90 Units — % https://www.toshiba.com/tic/...

Page 172 Start with a setting of 85 at these parameters and gradually adjust them from there one at a time until the desired results are produced. Adjustments to this parameter may increase the load current of the motor and subsequently warrant an adjustment at the Motor Overload Protection Level setting. https://www.toshiba.com/tic/...

Page 173 During Time-Based Alternation operation, this parameter sets the Changeable During Run — No time that the Lead ASD and Lag ASD assignments are valid until changed as a function of the Time-Based Alternation settings. Minimum — 1 Minute Maximum — 41 Days 15 Hours https://www.toshiba.com/tic/...

Page 174 Changeable During Run — No Direct mode, this parameter sets the time that the system may operate within the maximum or minimum Virtual Linear Pump Minimum — 0 zones before turning the ASD on or off, respectively. Maximum — 65535 Units — Seconds https://www.toshiba.com/tic/...

Page 175 This parameter provides a value to be used as the Regeneration abled) Torque Limit 1 if F443 is selected at parameter F442. Changeable During Run — Yes Set this parameter to 250% to disable this function. Minimum — 0.0 Maximum — 250.0 Units — %

https://www.toshiba.com/tic/...

Page 176 This parameter sets the sensitivity of the ASD when monitoring Changeable During Run — No the output current to control speed. Minimum — 0 The larger the value entered here, the more sensitive the ASD is Maximum — 1000 to changes in the received feedback. https://www.toshiba.com/tic/...

Page 177 If unstable at light loads, set to 1. Increase to 2 or 3 if more stabil- ity is required. Settings: 0 — Disabled 1 — Enabled (Low Gain) 2 — Enabled (Middle Gain) 3 — Enabled (High Gain) https://www.toshiba.com/tic/...

Page 178 4 mS, an Over-Voltage Trip will be incurred. Select zero (0) for automatic value selection for this parameter. Note: This parameter setting may increase deceleration times. Note: Over-voltage alarms will display OP to convey Over- Potential. https://www.toshiba.com/tic/...

Page 179 (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 adjusting this setting to provide an output of zero from the ASD. https://www.toshiba.com/tic/...

Page 180 (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 adjusting this setting to provide a zero output from the ASD. https://www.toshiba.com/tic/...

Page 181 (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 adjusting this setting to provide an output of 100% from the ASD. https://www.toshiba.com/tic/...

Page 182 Max Zone Counter Time = 0 Continuous Deactivate Lag2 Pump Min Zone Counter Time = 0 OUT2 Deactivate Lag1 Pump Min Zone Counter Time = 0 OUT1 Sleep if Lead Pump Min Zone Counter Time = 0 — enabled https://www.toshiba.com/tic/...

Page 183 Limit run-time for detection — set the run-time limit at F484. Note: The On (Electronic Switch) setting allows for the availability of the Trip (0) and Alarm (1) selections at F450 ONLY. Settings: 0 — Off 1 — On (Physical Switch) 2 — On (Electronic Switch) https://www.toshiba.com/tic/...

Page 184 ASD. Set the discrete input terminal to Sealing Water. Settings: 0 — Disabled 1 — Enabled https://www.toshiba.com/tic/...

Page 185 This setting is also used to determine the acceleration rate of the UP/DOWN Frequency Functions. Note: An acceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. Automatic Accel/Decel, Stall, and Ridethrough settings may lengthen the acceleration times. https://www.toshiba.com/tic/...

Page 186 This setting is also used to determine the deceleration rate of the UP/DOWN Frequency Functions. Note: A deceleration time shorter than the load will allow may cause nuisance tripping and mechanical stress to loads. Automatic Accel/Decel, Stall, and Ridethrough settings may lengthen the deceleration times. https://www.toshiba.com/tic/...

Page 187 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 decreases the rate of change above the base frequency for acceleration and deceleration. https://www.toshiba.com/tic/...

Page 188 Factory Default — Linear This parameter enables a user-selected preprogrammed output Changeable During Run — Yes 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 https://www.toshiba.com/tic/...

Page 189 Switching Frequency settings to control the Acc/Dec response of the ASD output. Note: If operating from the Local mode, press ESC from the Frequency Command screen to access this parameter. https://www.toshiba.com/tic/...

Page 190 This parameter operates in conjunction with parameter F577. Changeable During Run — Yes This parameter is used to configure the IP Data Card 2 section of Minimum — 00 the IP address of the device. Maximum — 255 F577 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 191 This parameter operates in conjunction with parameter F581. Changeable During Run — Yes This parameter is used to configure the Subnet Data Mask 3 sec- Minimum — 00 tion of the subnet mask for the device. Maximum — 255 F581 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 192 IP Gate 1 Data 4 F588 Direct Access Number — Parameter Type — Numerical Program □□Communications □□Ethernet Settings Factory Default — 00 F585 for information on this parameter. Changeable During Run — Yes Minimum — 00 Maximum — 255 https://www.toshiba.com/tic/...

Page 193 Factory Default — Prohibit This parameter Enables/Disables the ability of the system to read Changeable During Run — Yes the terminal settings of the Terminal Board (i.e., F, R, OUT1, FP, etc.). Settings: 0 — Prohibit 1 — Permit https://www.toshiba.com/tic/...

Page 194 The over- current level is entered as a percentage of the maximum rating of Minimum — 10 the ASD. Maximum — 165 Units — % Note: The Motor Overload Protection parameter must be enabled F017 to use this feature. https://www.toshiba.com/tic/...

Page 195 Factory Default — 1.0 When DC Injection is selected at F603 this parameter deter- Changeable During Run — Yes mines the time that the DC Injection Braking is applied to the motor. Minimum — 0.0 Maximum — 20.0 Units — Seconds https://www.toshiba.com/tic/...

Page 196 Factory Default — Enabled This parameter enables the 3-phase input power phase loss Changeable During Run — No detection feature. A loss of either input phase (R, S, or T) results in a trip. Settings: 0 — Disabled 1 — Enabled https://www.toshiba.com/tic/...

Page 197 Factory Default — 0 With the Low-Current Trip (F610) parameter enabled, this func- Changeable During Run — Yes tion sets the time that the low-current condition must exist to cause a trip. Minimum — 0 Maximum — 255 Units — Seconds https://www.toshiba.com/tic/...

Page 198 Changeable During Run — Yes setpoint for over-torque tripping during positive torque. This set- ting is a percentage of the maximum rated torque of the ASD. Minimum — 0.00 Maximum — 250.00 This function is enabled at F615. Units — % https://www.toshiba.com/tic/...

Page 199 Maximum — 999.9 Associate the Total-Operation-Hours Alarm setting of Table 12 on Units — Hours (X 10) page 257 to a discrete output contactor. Note: The time displayed is 1/10th of the actual time (0.1 hr. = 1.0 hr.). https://www.toshiba.com/tic/...

Page 200 This parameter sets the voltage threshold level that is used Factory Default — 60 as a setpoint for under-voltage tripping. Changeable During Run — No This function is enabled at F627 Minimum — (ASD-Dependent) Maximum — (ASD-Dependent) Units — % https://www.toshiba.com/tic/...

Page 201 Factory Default — 0.03 This parameter sets the time that the under-voltage condition Changeable During Run — No must exist to cause an Under-Voltage Trip. Minimum — 0.01 This parameter is enabled at F627. Maximum — 10.00 Units — Seconds https://www.toshiba.com/tic/...

Page 202 Minimum — 0 period in excess of 0.3 seconds a trip will be incurred (E-18). Maximum — 100 Units — % This value is entered as 0% to 100% of the V/I input signal range. https://www.toshiba.com/tic/...

Page 203 1.8 k□ from an over-temperature condition. An Auto- Restart will not be initiated subsequent to an External Thermal Trip (OH2); a manual restart will be required. Settings: 0 — Disabled 1 — Detect Disconnect https://www.toshiba.com/tic/...

Page 204 Program □□Motor □□PM Motor Factory Default — 0.0 This parameter is used with synchronous motor applications only. Changeable During Run — No Contact the TIC Customer

Support Center for information on this Minimum — 0.0 parameter. Maximum — 25.0 Units — Seconds https://www.toshiba.com/tic/...

Page 205 Parameter Type — Numerical Factory Default — 3000 This parameter provides a user-set resistance threshold for the Changeable During Run — Yes thermal sensor that, once exceeded, will activate the selection of F645. Minimum — 100 Maximum — 9999 Units — □ https://www.toshiba.com/tic/...

Page 206 Under-Torque condition were to occur. Changeable During Run — Yes For an Under-Torque event to occur, the minimum criteria of parameters F652 – F655 must be met: Settings: 0 — Alarm Mode 1 — Trip Mode https://www.toshiba.com/tic/...

Page 207 If Trip is selected at parameter F651, the same threshold applica- bles are in effect with the addition that operator intervention will be required to return the system to the normal operating condi- tion. Remove the source of the trip condition and/or perform a system reset. https://www.toshiba.com/tic/...

Page 208 A729 is used as the multiplier of the commanded frequency. Note: Contact the TIC Customer Support Center for more information on using the A729 selection. Settings: 0 — Disabled 1 — V/I 2 — RR 3 — RX 4 — Setting (A729) 5 — RX2 (AI1 Option) Option https://www.toshiba.com/tic/...

Page 209 This parameter is used to select the output of the OUT1 termi- Changeable During Run — No nals. Note: This parameter is not used with the Q9 Plus ASD. Settings: 0 — Logic Output 1 — Pulse Train Output https://www.toshiba.com/tic/...

Page 210 AM (+) and CCA (-). AM Terminal Setup Parameters F670 — Set AM Function F671 — Calibrate AM Terminal F685 — Output Response Polarity Selection F686 — Set Zero Level https://www.toshiba.com/tic/...

Page 211 This parameter is used to set the gain of the MON1 output termi- Changeable During Run — Yes nal and is used in conjunction with the settings of parameter F672. Minimum — 1 Maximum — 1280 F672 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 212 FP output terminal pulse train changes in direct proportion to changes in the assigned function. Note: The duty cycle of the output pulse train remains at 65 ±5.0 µS. This parameter is used in conjunction with F677. https://www.toshiba.com/tic/...

Page 213 The FM output terminal response may be set to respond inversely (-) or directly (+) to the input signal. F005 for additional information on this parameter. Settings: 0 — Minus (Negative Gradient) 1 — Plus (Positive Gradient) https://www.toshiba.com/tic/...

Page 214 FM terminal. Minimum — -10.0 Set the function of F005 to zero and then set this parameter to Maximum — +100.0 zero for proper operation. Units — % F005 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 215 AM terminal. Minimum — -10.0 Set the function selected at F670 to zero and then set this Maximum — +100.0 parameter to zero for proper operation. Units — % F670 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 216 Factory Default — 0 – 10V output terminal. Changeable During Run — No F674 for additional information on this parameter. Settings: 0 — -10 V – +10 V 1 — 0 – 10 V 2 — 0 – 20 mA https://www.toshiba.com/tic/...

Page 217 Note: An output frequency of 100 Hz would be displayed as 50 Hz if using a multiplier of 0.5 for this parameter. Note: PID frequency-limiting parameters are not affected by this setting (i.e., F364, F365, F367, and F368). https://www.toshiba.com/tic/...

Page 218 Changeable During Run — Yes sets the amount that the output speed will increase or decrease for each speed command change entered from the EOI using the Minimum — 0.00 Rotary Encoder. Maximum — Maximum Freq. (F011) Units — Hz https://www.toshiba.com/tic/...

Page 219 PC are required. The Q9 Plus ASD supports the following com- munications protocols: RS485 (MODBUS-RTU) Toshiba Proto- col, USB Toshiba Protocol, CC-Link, ProfiBus, and DeviceNet (refer to the manual of each protocol type for more information). Trace data may be viewed graphically via Program Utilities ...

Page 220 This parameter is used to select the Trace Data 4 item from Factory Default — DC Voltage Table 13 on page 259 to be read and stored in accordance with Changeable During Run — Yes the setup of parameters F740 and F741. F740 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 221 This parameter is used to configure the MAC Address 1 Factory Default — 00 section of the MAC address of the device. Changeable During Run — Yes Minimum — 00 Maximum — 255 Address 1 Address 2 Address 3 Address 4 Address 5 Address 6 https://www.toshiba.com/tic/...

Page 222 This parameter operates in conjunction with parameter F784. Changeable During Run — Yes This parameter is used to configure the MAC Address 6 section Minimum — 00 of the MAC address of the device. Maximum — 255 F784 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 223 Maximum — FFFF Device Name Data 5 F796 Direct Access Number — Program Communications Ethernet Settings Parameter Type — Numerical F792 for information on this parameter. Factory Default — 0000 Changeable During Run — Yes Minimum — 0000 Maximum — FFFF https://www.toshiba.com/tic/...

Page 224 ASD. Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect. Settings: 0 — 9600 1 — 19200 2 — 38400 https://www.toshiba.com/tic/...

Page 225 Control computers that monitor the status of the ASD(s), trans- fers commands, and loads or modifies the parameter settings of the ASD. Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect. https://www.toshiba.com/tic/...

Page 226 This parameter sets the RS485 (2-wire) response delay time. Changeable During Run — Yes Changes made to this parameter require that the power be Minimum — 0.00 cycled (off then on) for the changes to take effect. Maximum — 2.00 Units — Seconds https://www.toshiba.com/tic/...

Page 227 Communication Protocol (2-Wire RS485) F807 Direct Access Number — Program Communications Communication Settings Parameter Type — Selection List This parameter sets the 2-Wire RS485 communications Factory Default — Toshiba protocol. Changeable During Run — No Settings: 0 — Toshiba 1 — Modbus...

Page 228 Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect. Settings: 0 — Disabled 1 — 2-Wire RS485 (EOI) 2 — 4-Wire RS485 (Terminal Board) 3 — Communication Option Board https://www.toshiba.com/tic/...

Page 229 Communications Reference Speed Setpoint 1 (frequency). This value is entered as 0 to 100% of the Communi- cations Reference input value range. Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect. https://www.toshiba.com/tic/...

Page 230 Address Monitor (Modbus+) F815 Direct Access Number — Program Communications Modbus Settings Parameter Type — Numerical This parameter is used to select a node/station to monitor. Factory Default — 1 Changeable During Run — Yes Minimum — 1 Maximum — 64 https://www.toshiba.com/tic/...

Page 231 This parameter sets the RS485 baud rate. Changeable During Run — Yes Changes made to this parameter require that the power be cycled (off then on) for the changes to take effect. Settings: 0 — 9600 bps 1 — 19200 bps 2 — 38400 bps https://www.toshiba.com/tic/...

Page 232 This parameter sets the Ethernet baud rate. Factory Default —Automatic Detection Settings: Changeable During Run — Yes 0 — Automatic Detection 1 — 10 Mbps Full 2 — 10

Mbps Half 3 — 100 Mbps Full 4 — 100 Mbps Half https://www.toshiba.com/tic/...

Page 233 This parameter sets the RS485 response delay time. Changeable During Run — Yes Changes made to this parameter require that the power be Minimum — 0.00 cycled (off then on) for the changes to take effect. Maximum — 2.00 Units — Seconds https://www.toshiba.com/tic/...

Page 234 0 — Follower (Decel Stop if Error Detected) 1 — Follower (Continues Operation if Error Detected) 2 — Follower (Emergency Off if Error Detected) 3 — Master (Frequency Command) 4 — Master (Output Frequency) 5 — Master (Torque Reference) 6 — Master (Output Torque) https://www.toshiba.com/tic/...

Page 235 Communications Protocol (4-Wire RS485) F829 Direct Access Number — Program □□Communications □□Communication Settings Parameter Type — Selection List Factory Default — Toshiba This parameter sets the communications protocol for ASD-to- Changeable During Run — Yes ASD communications. Settings: 0 — Toshiba 1 —...

Page 236 Changeable During Run — Yes Communication Option (DeviceNet/Profibus) Setting 9 F838 Direct Access Number — Program □□Communications □□Communication Options Parameter Type — Selection List Factory Default — 0000h F831 for information on this parameter. Changeable During Run — Yes https://www.toshiba.com/tic/...

Page 237 Changeable During Run — Yes Communication Option (DeviceNet/Profibus) Setting 17 F848 Direct Access Number — Program □□Communications □□Communication Options Parameter Type — Selection List Factory Default — 0000h F841 for information on this parameter. Changeable During Run — Yes https://www.toshiba.com/tic/...

Page 238 Factory Default — 0 (Disabled) This parameter setting is used to set the Preset Speed selection Changeable During Run — Yes to be used if Preset Speed is selected at parameter F851. Settings: 0 — Disabled 1–15 — Preset Speed Number https://www.toshiba.com/tic/...

Page 239 This parameter plays a role in the setup of the communications Changeable During Run — No network by establishing the targets of a Reset command received via the communications link. Settings: 0 — --- 1 — Reset Option Board and ASD https://www.toshiba.com/tic/...

Page 240 Input Function Target variables, enable a Changeable During Run — No counter/timer function, or perform a hold/reset function. Table 15 on pg. 262 lists the available selections. Their use and selection requirements are described in an example at F977. https://www.toshiba.com/tic/...

Page 241 Changeable During Run — No to two user-selected Input Function Target variables, enable a counter/timer function, or perform a hold/reset function. Table 15 on pg. 262 lists the available selections. Their use and selection requirements are described in an example at F977. https://www.toshiba.com/tic/...

Page 242 Function Assigned data location to one of the functions listed in the Input Setting field of Table 12 on pg. 257. Settings: 0 – 3099 See the My Function Instruction Manual (P/N E6581335) and F977 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 243 Changeable During Run — No to two user-selected Input Function Target variables, enable a counter/timer function, or perform a hold/reset function. Table 15 on pg. 262 lists the available selections. Their use and selection requirements are described in an example at F977. https://www.toshiba.com/tic/...

Page 244 Changeable During Run — Yes analog signal of the My Function Percent Data 2. Minimum — 0.00 The analog signal is selected using the Input Setting number Maximum — 200.00 from Table 12 on page 257. Units — % https://www.toshiba.com/tic/...

Page 245 Changeable During Run — Yes analog signal of the My Function Frequency Data 2. Minimum — 0.00 The analog signal is selected using the Input Setting number Maximum —

Maximum Freq. from Table 12 on page 257. (F011) Units — % https://www.toshiba.com/tic/...

Page 246 The applied discrete input signal must be present at the input ter- Maximum — 600.00 minal of the Q9 Plus ASD for the time setting here for a system Units — Seconds response. Discrete terminal input activation that does not equal or exceed this setting will be ignored. https://www.toshiba.com/tic/...

Page 247 The applied discrete input signal must be present at the input ter- Maximum — 600.00 minal of the Q9 Plus ASD for the time setting here for a system Units — Seconds response. Discrete terminal input activation that does not equal or exceed this setting will be ignored. https://www.toshiba.com/tic/...

Page 248 Input Function Target variables, enable a Changeable During Run — Yes counter/timer function, or perform a hold/reset function. Table 15 on pg. 262 lists the available selections. Their use and selection requirements are described in an example at F977. https://www.toshiba.com/tic/...

Page 249 Function Assigned data location to one of the functions listed in the Input Setting field of Table 12 on pg. 257. Settings: 0 – 3099 See the My Function Instruction Manual (P/N E6581335) and F977 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 250 Changeable During Run — Yes to two user-selected Input Function Target variables, enable a counter/timer function, or perform a hold/reset function. Table 15 on pg. 262 lists the available selections. Their use and selection requirements are described in an example at F977. https://www.toshiba.com/tic/...

Page 251 Input Function Target variables, enable a Changeable During Run — Yes counter/timer function, or perform a hold/reset function. Table 15 on pg. 262 lists the available selections. Their use and selection requirements are described in an example at F977. https://www.toshiba.com/tic/...

Page 252 Function Assigned data location to one of the functions listed in the Input Setting field of Table 12 on pg. 257. Settings: 0 – 3099 See the My Function Instruction Manual (P/N E6581335) and F977 for additional information on this parameter. https://www.toshiba.com/tic/...

Page 253 Changeable During Run — Yes to two user-selected Input Function Target variables, enable a counter/timer function, or perform a hold/reset function. Table 15 on pg. 262 lists the available selections. Their use and selection requirements are described in an example at F977. https://www.toshiba.com/tic/...

Page 254 The function selected at F961 may be adjusted using the input analog control signal selected here. Settings: 0 — Disabled (None) 1 — V/I 2 — RR 3 — RX 4 — RX2+, RX2- 5 — Optional V/I 6 — Internal Memory https://www.toshiba.com/tic/...

Page 255 F964 may be adjusted using the input analog control signal selected here. Settings: 0 — None (Disabled) 1 — V/I 2 — RR 3 — RX 4 — Optional RX2+, RX2- 5 — Optional V/I 6 — Internal Memory https://www.toshiba.com/tic/...

Page 256 Use the Communication Number if operating using communica- tions. See the My Function Instruction Manual (P/N E6581335) for a complete description of the setup requirements and operational information of the Monitor Output Function parameter. https://www.toshiba.com/tic/...

Page 257 Settings: 0 — Normal 1 — Maximum 2 — Minimum See the My Function Instruction Manual (P/N E6581335) for a complete description of the setup requirements and operational information of the Monitor Output Function parameter. https://www.toshiba.com/tic/...

Page 258 Use the Communication Number if operating using communica- tions. See the My Function Instruction Manual (P/N E6581335) for a complete description of the setup requirements and operational information of the Monitor Output Function parameter. https://www.toshiba.com/tic/...

Page 259 This parameter sets the programmable Virtual Input Terminal 2 terminal to one of the functions that are listed in Table 9 on page 252. In addition, the input terminal must be specified as Normally Open or Normally Closed. https://www.toshiba.com/tic/...

Page 260 This parameter sets the programmable Virtual Input Terminal 4 terminal to one of the functions that are listed in Table 9 on page 252. In addition, the input terminal must be specified as Normally Open or Normally Closed. https://www.toshiba.com/tic/...

Page 261 Function Always On or selecting My Function With TB Signal. If set to My Function Always On, the combination of ST and F are always On (both are connected to CC only during the S1 activa- tion). — Continued on next page — https://www.toshiba.com/tic/...

Page 262 Input Function Target 1 and the Input Function Target 2 settings. F905 Set Output Function Assigned ( ) to 1222. This setting will trans- fer the results of the logical AND to My Function Output 1 (OUT1). — Continued on next page — https://www.toshiba.com/tic/...

Page 263 If enabled for normal operation using settings 1 or 2, the motor may start and engage the driven equipment unexpectedly upon receiving a Run signal during the My Function setup. https://www.toshiba.com/tic/...

Page 264 V/f Selection performed at parameters F014, F409, F016, Terminal F600 (for selection 1) and F170-F173 (for selection 2). V/f profiles are comprised of Base Frequency, 1 = Terminal Activated Base Frequency Voltage, Manual Torque Boost, and Motor Overload Protection. https://www.toshiba.com/tic/...

Page 265 (100/101) function. When configured to Run (Run/Stop to CC), the activation/deactivation of this terminal changes the direction of the motor. Run/Stop Command — This terminal enables the motor to run when activated and disables 100 101 the motor when deactivated. https://www.toshiba.com/tic/...

Page 266 V/Hz Rate Switching — This function is not used with the Q9 Plus ASD. 154 155 Manual Boost Switching — Activation applies the torque boost setting of F016 F172 156 157 motor profiles 1 and 2, respectively, for the duration of the activation. https://www.toshiba.com/tic/...

Page 267 RX Input Signed 185% Meter Adjust Value RX2 (AI1 Option) Input Signed 250% Meter Adjust Value FM Output Analog Output MON1 (Extended I/O) AM Output Analog Output MON2 (Extended I/O) 100% Meter Adjust Value Pulse Input RP (Extended I/O) https://www.toshiba.com/tic/...

Page 268 Virtual Input Terminal 1 Virtual Input Terminal 2 Virtual Input Terminal 3 Virtual Input Terminal 4 Internal Terminal 1 Internal Terminal 2 Internal Terminal 3 Internal Terminal 4 Internal Terminal 5 Internal Terminal 6 Internal Terminal 7 Internal Terminal 8 https://www.toshiba.com/tic/...

Page 269 Forward/Reverse Switching Local/Remote Switching 1060 1158 Ready for Operation 1 Forced Operation (RUN) 1062 1160 Ready for Operation 2 Forced Operation (Fire Speed) 1064 1162 Under-Torque Detection 1066 POFF Alarm 1164 Frequency Command From (RR/S4) 1070 Alarm Status Active 1166 https://www.toshiba.com/tic/...

Page 270 My Function Output 8 1248 My Function Output 14 1238 My Function Output 9 1250 My Function Output 15 1240 My Function Output 10 1252 My Function Output 16 1242 My Function Output 11 1254 Always Off 1244 My Function Output 12 https://www.toshiba.com/tic/...

Page 271 0.01 kWhr FE77 Output Watt-Hour 0.01 kWhr 0006/0671 FM/AM Gain Display FE60 My Function Monitor 1 (Unsigned Value) FE61 My Function Monitor 2 (Unsigned Value) FE62 My Function Monitor 3 (Signed Value) FE63 My Function Monitor 4 (Signed Value) https://www.toshiba.com/tic/...

Page 272 3038 FE38 (see Note 2) Note 1: If no PG feedback is used, an estimated speed value is displayed. Note 2: My Function cannot process negative values. A negative value is processed by My Function as an absolute value. https://www.toshiba.com/tic/...

Page 273 FE84 16-Bit BIN/BCD Input Value Note 1: If no PG feedback is used, an estimated speed value is displayed. Note 2: My Function cannot process negative values. A negative value is processed by My Function as an absolute value. https://www.toshiba.com/tic/...

Page 274 Outputs a 1 upon reaching the pulse count setting of F933. (Timer) FB_COUNTER2 Outputs a 1 upon reaching the pulse count setting of F934. (Timer) Outputs the peak output value since powering up or since the last FB_PEEK_HOLD reset. Sets data. RESET Resets data. Clears data. CLRN Retains data. https://www.toshiba.com/tic/...

Page 275 Autotune function is active. Virtual Linear Pump Virtual Linear Pump function is operating at the Low-Frequency LOFr Low Frequency Limit setting. No Error No active errors. nErr Virtual Linear Pump On Virtual Linear Pump function is enabled and active. Pump https://www.toshiba.com/tic/...

Page 276 • Acceleration time is too short. Heavy Load Motor/ASD Over Loaded. • ASD is improperly matched to the application. • Excessive load. Light Load Light Load. • ASD is improperly matched to the application. * Reset ignored if active. https://www.toshiba.com/tic/...

Page 277 • ASD is too close to heat-generating equipment. *Over-Heat Over-Heating. • Cooling fan vent is obstructed. • Cooling fan is inoperative. • Internal thermistor is disconnected. User-set run-time counter Run-Time Counter • Type Reset is required; select Clear run timer. exceeded. * Reset ignored if active. https://www.toshiba.com/tic/...

Page 278 • User-set thermal threshold setting of F646 Thermal Err threshold exceeded. exceeded. • Disable detection at F610. Output current of the ASD Under-Current • Parameter F611 adjustment is required. is below the level defined at F611. • Motor not connected. https://www.toshiba.com/tic/...

Page 279 E-21 Stack overflow error. • Contact TIC Customer Support Center. • Discrete input terminal configured for operation Improper input voltage level Discrete In Volts and the input activation voltage level is out of E-22 at discrete input terminal. specification. https://www.toshiba.com/tic/...

Page 280 Etn1, Etn2, or Etn3. • 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. • Motor not connected. https://www.toshiba.com/tic/...

Page 281 • Mechanical brake is engaged while the ASD is Over-current during Over-Current Dec OC2, OC2P running. deceleration. • ASD current exceeds 320% or 340% of the rated FLA on ASDs that are greater than 100 HP or that are 100 HP or less, respectively, during acceleration. https://www.toshiba.com/tic/...

Page 282 • ASD current exceeds 320% or 340% of the rated FLA on ASDs that are greater than 100 HP or that are 100 HP or less, respectively, during acceleration. • Motor winding short. • Phase-to-phase short or phase-to-ground short external to the ASD. https://www.toshiba.com/tic/...

Page 283 Trip Record at Monitor Screen (Program Utilities Type Reset Reset to Factory Settings). An active trip is displayed at the Monitor screen. Once cleared, NERR is displayed to indicate that there are No Errors. https://www.toshiba.com/tic/...

Page 284 • Pressing the Stop-Reset key twice, • Remotely via the communications channel, • Momentarily connecting terminal RES to CC of the Terminal Board, or • Via Program Utilities Type Reset: Clear Past Trip (clears Monitor screen records only). https://www.toshiba.com/tic/...

Page 285 The Type 1 enclosed versions of these drives meet or exceed the specification UL 50- 1995, the Standard for Heating and Cooling Equipment, and complies with the applicable requirements for installation in a compartment handling conditioned air. Note: All Toshiba ASD enclosures carry an IP20 rating. https://www.toshiba.com/tic/...

Page 286 0.394/10 2600 2750 12.2/310 26.7/680 25.6/650 9.8/250 210K 212K 13.8/350 30.8/782 29.8/758 11.7/298 0.224/ Figure 42. 14.6/370 0.472/12 2750RD 3.0/ 12.2/310 36.2/920 25.6/650 9.8/250 75 9.5/ 210KRD 5.9/ 2.8/ 212KRD 13.8/350 40.2/1022 29.8/758

11.7/298 RD Suffix = DCL Included. https://www.toshiba.com/tic/...

Page 287 25.6/650 9.8/250 3.0/75 420KRD 13.0/350 30.8/782 29.8/758 11.7/298 2.8/72 425KRD 13.8/334 11.2/285 5.9/150 9.5/240 430KRD 16.9/430 37.4/950 36.2/920 13.8/350 3.0/75 435KRD 440KRD 23.0/585 21.3/540 * = Reactance NOT included; but, required (ACL or DCL). RD suffix = DCL included. https://www.toshiba.com/tic/...

Page 288 Enclosure Dimensions Q9 Plus ASD Install/Op Manual Figure 39. See Table 20 for Actual Dimensions. https://www.toshiba.com/tic/...

Page 289 Enclosure Dimensions Q9 Plus ASD Install/Op Manual Figure 40. See Table 20 for Actual Dimensions. https://www.toshiba.com/tic/...

Page 290 Enclosure Dimensions Q9 Plus ASD Install/Op Manual Figure 41. See Table 20 for Actual Dimensions. https://www.toshiba.com/tic/...

Page 291 Enclosure Dimensions Q9 Plus ASD Install/Op Manual Figure 42. See Table 20 for Actual Dimensions. https://www.toshiba.com/tic/...

Page 292 177 A 194.7 A 2750 221 A 243.1 A 210K 285 A 313.5 A 212K 359 A 394.9 A 2750RD 221 A 243.1 A 210KRD 285 A 313.5 A 212KRD 359 A 394.9 A Rd Suffix = DCL Included. https://www.toshiba.com/tic/...

Page 293 124 A 136 A 412K 156 A 172 A 415K 180 A 198 A 420K 240 A 264 A 425K 302 A 332 A 430K 361 A 397 A 435K 414 A 455 A 440K 477 A 525 A https://www.toshiba.com/tic/...

Page 294 *4/0 212K *3/0 *4/0 6 to 250 275/31 2750RD *3/0 *4/0 210KRD *3/0 *4/0 212KRD *3/0 *4/0 Note: (*) Indicates that the item is one of a set of two (listed type) parallel cables. RD Suffix = DCL Included. https://www.toshiba.com/tic/...

Page 295 4 to 350 360/41 440K **250 **350 Note: (*) Indicates that the item is one of a set of two (listed type) parallel cables. Note: (**) Indicates that the item is one of a set of three (listed type) parallel cables. https://www.toshiba.com/tic/...

Page 296 HLL36025 4080 HLL36040 4110 HLL36050 4160 HLL36070 4220 HLL36090 4270 HLL36100 4330 HLL36100 4400 HLL36125 4500 HLL36150 4600 JLL36200 4750 JLL36225 410K JLL36250 412K LIL36300 415K LIL36300 420K LIL36400 425K LIL36400 430K Contact TIC Customer Support Center. 435K 440K https://www.toshiba.com/tic/...

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