



Toshiba G7 Series Applications Workbook

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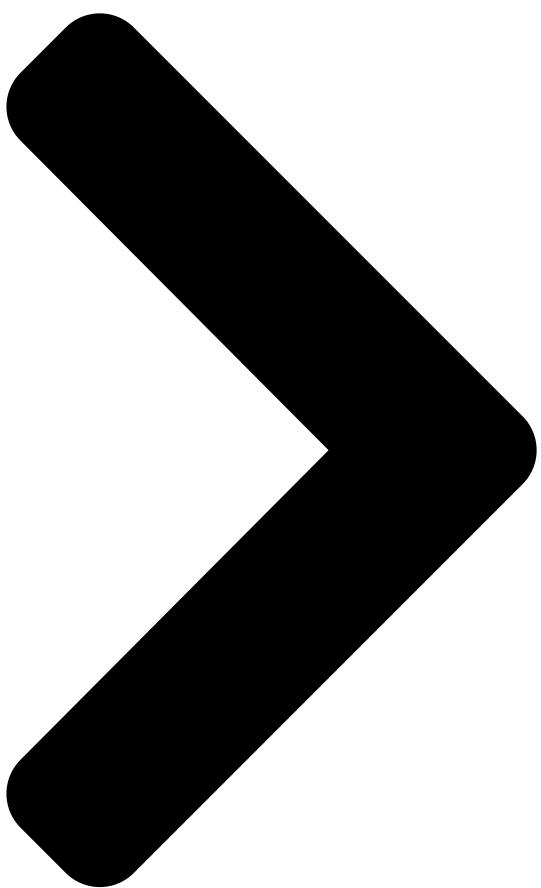
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G7/H7 Applications

Workbook

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Summary of Contents for Toshiba G7 Series

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[Page 3](#) -Toshiba inverter,drive,servo,plc TABLE OF CONTENTS Application Page Configuring
Local / Remote PID Control Three Wire Control Motor Operated Pot (MOP) Configuring Analog
Inputs Configuring Analog Outputs Acc/Dec Time Switching Frequency Frequency Priority

[Page 4](#) Factory Default – Use Control Terminal Strip Changeable During Run – No The Command Mode selection establishes the source of the command inputs. Command inputs include Run, Stop, Forward, etc. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 5](#) Frequency Mode #2 Program Fundamental Parameters Standard Mode Set Direct Access Number – F207 Parameter Type – Selection List Factory Default – VI/II Changeable During Run – Yes For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 6](#) Use MOP Function Simulation • Use Pulse Input Option Lockout of Local/Remote ⇒ ⇒ Lockout of the Local/Remote can be done by Program EOI Setup Lockout Lockout Local/Remote. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 7](#) Lockout Reset Selected EOI Setup Options/Lockout Lockout Monitor Selected EOI Setup Options/Lockout Lockout Parameter Selected Access Setup Enable Password Select Enable Options/Lockout/Password Password set password to For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 8](#) This is often desirable when an EOI is mounted at the drive to facilitate programming, troubleshooting, and monitoring while an additional EOI may be mounted remotely for use by an operator. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 9](#) Separately powered isolated transducers feed into the 'II' and "CC" terminals. If your transducer is not isolated, order an isolated input board. The inputs to the standard G7 are not isolated; do not connect the 'CC' terminal to ground. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 10](#) Press LOCAL/REMOTE button to turn green LED off. Make F-CC OR R-CC. Adjust RR pot to whatever setting it takes to generate the desired process variable value. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 11](#) – pressureat pressureat inches × 60 = 18 – inches inches So for this example you would enter 18 as your set point in the drive. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 12](#) Differential Gain (seconds/repeat) (seconds) Flow Levels: fast Levels: slow 0.25 16.0 Pressure: fast Pressure: slow Temperature: fast Temperature: slow 16.0 0.25 Temperature: furnace 0.125 Compressor speed For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 13](#) If you have a system that never quite gets to the setpoint (there is steady-state error), decrease the integral time. Input to Integral Circuit error Time Output from Integral Circuit Proportional Gain times Time Integral Time DIFFERENTIAL GAIN For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 14](#) The longer the differential time, the stronger the differential action. Input to Differential Circuit Output from Differential Circuit Derivative Time For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 15](#) (in response to pressure drop) Desired Response Time Improve by decreasing Integral Time Time Improve by decreasing Proportional Gain, decreasing Integral Time Time Improve by increasing Proportional Gain Time For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 16](#) PID ON/OFF to work (a frequency reference can come from keypad if desired). PID can be turned ON/OFF in this way while the motor is turning. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 17](#) When S3 is closed, it is in reverse direction, when opened, forward direction. The

following programming example will demonstrate how to set up a G7 to function as a three-wire control operator. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 18](#) (6) The drive will ramp down speed and pass zero hertz and speed up to set speed from the pot in reverse direction (7) Push Stop button to close S2 to CC terminal momentarily (8) The drive will ramp down to stop For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 19](#) "reset" contact ramps the drive down to zero hertz. Do not use this control scenario with ACCEL and/or DECEL time greater than 10 seconds. The following programming example will demonstrate how to set up a G7 to function as a MOP operator. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 20](#) (14) The drive will ramp down speed until either the S2 contact is opened or lower limit is reached (15) Close S3 to CC terminal (16) The drive will ramp down to zero and the frequency setting will be zero For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 21](#) Care should be taken to ensure that only the desired parameters are being controlled by the analog inputs, and that these parameters are being controlled in the appropriate manner Connections For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 22](#) Torque Boost Adjustment – The analog input will determine the percentage of Torque Boost that the drive will output at low speeds in a manner similar to that mentioned in the description of upper limit frequency discussed above. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 23](#) VI/II Input % of maximum input RX2 Input % of maximum input FM Output % of maximum output AM Output % of maximum output Meter Adjust Value For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 24](#) Program → Meter Terminal Adjustment Desired output for ANALOG1 Parameters →FM Analog1 Terminal Program → Meter Terminal Adjustment Desired output for ANALOG2 Parameters →FM Analog2 Terminal For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 25](#) 4.) Now, with your meter connected, set the drive in a state that will output the minimum of the output range. Check to see that the meter is at its maximum range. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 26](#) Accel/Decel Switching Set to 20 hertz Parameters Accel/Decel Special Frequency #1 F513 Program Special Control Accel/Decel Switching Set to 40 hertz Parameters Accel/Decel Special Frequency #2 For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 27](#) (24) The drive should decelerate from 60 to 40 hertz in 6 seconds (25) From 40 to 20 hertz in 4 seconds (26) From 20 to stop in 2 seconds For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 28](#) When S1 is left open, the drive takes the input from RR as its speed reference. When S1 is closed, the drive takes the II as its speed reference. The S1 can be opened and closed while the drive is running. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 29](#) (5) When the RR input is below 5 VDC (30 hz) again, the drive follows the II input (6) If the F200 parameter is set to Frequency Source #2 Priority, the reverse will be true for the above example For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 30](#) 4-20mA speed reference while trimming the reference with a (+/-) trim from a pot connected to the RX terminal. Connections TERMINAL STRIP 4-20 mA Source Speed Pot For

additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 31](#) Point #1 Frequency". As soon as this parameter is set to a non-zero value, its reference value is added to the 4-20mA reference value. ⇒ No combination of reference and trim will cause a change in rotation direction. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 32](#) E.G.: The user wants to run a 4 pole motor using the drive and display the output in RPM. Using the formula poles So the Hz per user defined unit should be set to 30. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 33](#) Note 3: Frequency display resolution sets the precision of the user-defined unit. In most cases the factory default of tenths (0.1) is adequate. The number only needs to be changed if the user-defined unit is less than 1/10 of a Hz For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 34](#) 110%. If the DC bus value is less than 110% during regeneration, increase F443. If the DC bus value is greater than 110% during regeneration, decrease F443. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 35](#) RPM (when compared to its performance on a V/Hz drive). If a non-Toshiba motor is being used, the G7 can model the motor by performing an 'auto-tune' or by manual setting of the motor data.

[Page 36](#) Toshiba EPAC ODP Other If one of the above types of Toshiba motors is used, no other tuning should be required. If the motor is not a Toshiba motor, or has been rewound by other than a factory authorized service center, the motor type should be set to 'Other'.

[Page 37](#) Go to monitor and observe excitation current and torque current. Go to the 'Vector Motor Model' Parameter screen and record the values for PRIMARY RESISTANCE _____ SECONDARY RESISTANCE _____ EXCITATION INDUCTANCE _____ For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 38](#) Go to the 'Vector Motor Model' Parameter screen and record the values for PRIMARY _____ RESISTANCE SECONDARY _____ RESISTANCE EXCITATION INDUCTANCE _____ Are these values different from those previously recorded? For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 39](#) RPM (when compared to its performance on a V/Hz drive). If a non-Toshiba motor is being used, the G3 can model the motor by performing an 'auto-tune' or by manual setting of the motor data.

[Page 40](#) S1. Otherwise, you will need to make a dry contact between S1 and CC. This will put the drive into torque control mode. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 41](#) RPM (when compared to its performance on a V/Hz drive). If a non-Toshiba motor is being used, the G3 can model the motor by performing an 'auto-tune' or by manual setting of the motor data.

[Page 42](#) (36) Increase the frequency setpoint to 60.0 Hz. (37) Test system under varying load conditions. (38) If response is slow, or appears to be unstable, contact Toshiba for assistance. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 43](#) RPM (when compared to its performance on a V/Hz drive). If a non-Toshiba motor is being used, the G3 can model the motor by performing an 'auto-tune' or by manual setting of the motor data.

[Page 44](#) (39) Place G7 in local control mode (40) Using the EOI, give the G7 a 1Hz frequency setpoint (41) Press Run For additional assistance, please contact Toshiba Adjustable Speed

Drive Marketing Dept. at (800) 872-2192...

[Page 45](#) (43) Increase the frequency setpoint to 60.0 Hz. (44) Test system under varying load conditions. (45) If response is slow, or appears to be unstable, contact Toshiba for assistance. (8) Close S1 to place the G7 in torque control mode...

[Page 46](#) The number of pulses per revolution (PPR) affects the resolution of feedback & thus the accuracy of the speed regulation. PPR's range from 100 to 2048. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 47](#) Encoders should be selected for specific applications. However, a general recommendation would be a 1024 PPR, bi-directional, differential line driver output with an index pulse. Power should be 12 or 15 VDC. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 48](#) G7 Master/Follower Via Communications Introduction Master/follower setup on the Toshiba G7 can be accomplished using the on board communications ports. There are a number of arrangements that can be used to set up the drive. All make use of the...

[Page 49](#) 5 cable. This setup will make use of the latter arrangement. The splitter mentioned is readily available and a web search for "RJ45 splitter" should produce several vendors. Cabling RS485 Cable 1 RS485 Cable 2 RS485 Cable 2 For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 50](#) TTL Cable 1 Cabling RS485 Cable 1 RS485 Cable 1 For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 51](#) Start with the last follower in the series and work back towards the primary master using the steps below and referencing the programming table above. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 52](#) Check the programming for the drive. Note: If item F806 or F826 are programmed to Output Command Frequency and the drive is stopped, the frequency command will not be passed to other drives in the series. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 53](#) (51) The Mastger drive will ramp up to the set speed entered from the encoder dial (52) The Follower drive will follow the Master drive speed For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 54](#) 100% motor torque is 6 Hz (10% of 60). With the same configuration and a command frequency of 45Hz, droop at 100% motor torque is 3Hz. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 55](#) As shown in the chart to the right, the 0% Torque drooping insensitive band is in effect for both positive torque and negative torque. 100% Torque 50% Torque 150% Torque 100% Torque For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 56](#) If instabilities occur as a result of drooping, refer to the document/application note titled 'Drooping (advanced)' which covers items such as droop filtering, load inertia, and drooping references. For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 57](#) #6 Flat Washer (Qty. 4 each) • 1 of the following cables CAB0011-0 (1 meter option connection cable) CAB0013-0 (3 meter option connection cable) CAB0015-0 (5 meter option connection cable) For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 58](#) The following example will program all 3 preset speeds from 5 Hz for Preset Speed 1, 25Hz (Reverse) for Preset Speed 2, and to 45 Hz for Preset Speed 3. Connections TERMINAL STRIP For additional assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

[Page 59](#) F380 Program Frequency Setting Set to Use speed modes by putting a mark
Parameters Preset Speed Use Speed Mode in the box Mode Use Speed Modes For additional
assistance, please contact Toshiba Adjustable Speed Drive Marketing Dept. at (800) 872-2192...

This manual is also suitable for:

H7 series