

TOSHIBA

TOSHIBA INTERNATIONAL CORPORATION

ADJUSTABLE SPEED DRIVES

GX9



**LOW
VOLTAGE**

THE ULTIMATE DRIVE SOLUTION

The GX9 is a severe duty adjustable speed drive (ASD) that incorporates Toshiba's proprietary VLP Technology®* into an ASD with a 600 V class rating. By incorporating VLP Technology, the GX9 ASD directly, precisely, and linearly controls pressure, flow, level, and temperature, which allows it to seamlessly control multiple devices while balancing the load between them. This energy-efficient ASD is designed to withstand severe conditions and engineered to provide tight speed control while offering an user-friendly operator interface.

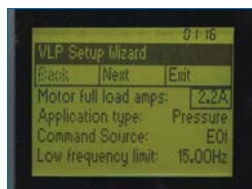
* VLP Technology® as used herein refers to Virtual Linear Pump technology



<p>Powerful Severe Duty Performance</p>	<p>The GX9 is set apart from the competition by offering one of the highest overload capabilities for a 600V drive rated at 110% continuous current and 130% for up to two minutes</p>
<p>Small Footprint</p>	<p>The GX9's small footprint makes it an ideal solution for maximizing real estate and reducing operating costs. The GX9 provides proper cooling of internal electronic components to help ensure optimum performance and durability even within a small footprint enclosure</p>
<p>Rugged & Durable Design</p>	<p>The GX9 can continuously operate in demanding environments. Built to last, this 65,000 AIC-rated ASD offers oversized components with 1,700-PIV-rated transistors to allow for cooler drive operation and longer drive lifespan. In addition, the GX9 offers standard fused inputs in a NEMA 1 enclosure designed for a -10° to 40° C operating environment with elevations of up to 1,000 meters</p>
<p>Toshiba's Proprietary Windows®-Based ASD Pro Software</p>	<p>Available at no additional cost, this easy-to-use software can be used to program and control the GX9, download parameter sets, and monitor real-time conditions</p>
<p>Sealing Water/Vacuum Priming Feature</p>	<p>This feature allows the GX9 to automatically control and help improve system reliability by monitoring water flow and water level and starting the pump once water flows through the seal or the pump is full of water</p>

PRACTICAL STARTUP CONFIGURATION

With its intuitive and user-friendly startup, the GX9 allows for configuration and optimization of the system's performance.



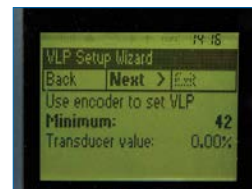
STEP 1:
Input Motor's Electrical
Specifications



STEP 2:
Input Transducer
Specifications



STEP 3:
Input
Maximum



STEP 4:
Input
Minimum



STEP 5:
Complete
VLP Setup

VLP TECHNOLOGY MAKES PID TUNING A THING OF THE PAST

Toshiba's VLP Technology algorithm has taken proportional/integral/derivative gain (PID) and changed how users control pressure and flow. With this new technology, after simply inputting a few values into the GX9, optimum control is obtained. Toshiba's Setup Wizard effortlessly guides the user through the entire process. The setup process defines the operating boundaries by establishing a minimum point and a maximum point. By defining these points, VLP Technology creates an operating domain within the ASD that is directly and proportionately related to the specific pumping system to which it is connected. Once these points have been established, the GX9 will:

- Monitor Multiple Systems for Friction Losses, Impeller Variations & Other System Variables
- Adjust Systems Accordingly to Help Ensure Only Necessary Fans or Pumps are Operating
- Balance Flow Rates for Each Operating Fan or Pump Under Different Conditions
- Maintain the Same Load for All Operating Fans or Pumps

INDUSTRIES SERVED

- Chemical
- Oil & Gas
- Water/Wastewater
- Pulp & Paper
- Mining & Mineral
- Food & Beverage

APPLICATIONS

- Centrifugal Pumps
- Crushers
- Extruders
- Grinders
- Looms
- Mixers
- Shakers
- Rolling Mills

INCLUDED SOFTWARE FEATURES

Start & Stop Points determine when to start and stop the pump based on user-set values and system feedback on pump water levels. These points work with a delay time to help ensure that frequent fluctuations in the system feedback do not unnecessarily start and stop the pump.

A Sleep Timer shuts off the pump in order to help reduce energy consumption and prolong the lifespan of pumping equipment after it has run at the minimum for a user-specified amount of time.

A Run External Devices Feature turns on external booster pumps to support the primary pump when necessary to help increase energy savings and minimize pump and system failures.

A No-Flow/Low NPSH Cut Off Feature stops the pump once loss of feed water or a closed output valve has been detected in order to protect against cavitation.

A Sealing Water/Vacuum Priming Feature automatically controls and helps to improve system reliability by monitoring water flow and water level and starting the pump once water flows through the seal or the pump is full of water.

COMMUNICATION OPTIONS

Toshiba's GX9 supports many common industrial communication protocols. Options Include:

- RS232/485 (Standard)
- TTL (Standard)
- Ethernet® IP & TCP/IP
- DeviceNet®
- Modbus® RTU
- Modbus® Plus
- Profibus® DP
- Metasys® N2



MODEL RANGE	500 to 1200 HP
Voltage Rating	575 to 690 V
POWER REQUIREMENTS	
Input Tolerance	Voltage: 575 to 690 V $\pm 10\%$; Frequency 50/60 Hz ± 2 Hz
Output Frequency	0 to 299 Hz
CONTROL SPECIFICATIONS	
Control Method	Sinusoidal Pulse Width Modulation (PWM) with VLP Technology
Voltage Regulation	Main Circuit Voltage Feedback Control: Automatic, Fixed, & Off
V/Hz Control	Constant Torque, Variable Torque, Automatic Torque Boost, Sensorless Vector Control, Five-Point V/Hz Custom Curve & PG Feedback Vector Control
PWM Carrier Frequency	2.2 kHz Default; Maximum is ASD Dependent
Frequency Setting	Rotary Encoder Integrated into EOI, 0 to 10 VDC, ± 10 VDC, 0 to 20 mA, Digital Input, Binary Input & Motorized Potentiometer Input
Frequency Precision	Analog Terminal Input 0.2 Hz; EOI, Discrete Terminal, Digital Input, Communications Input + 0.01% of Maximum Output Frequency
Speed Regulation	Open Loop: Up to 0.1%; Closed Loop: Up to 0.01%
Main Protective Functions	Overcurrent, Overvoltage, Inverter Overheat, Ground Fault, ASD Overload, Communications Error, Auto-Tuning Error, Emergency Stop, Undervoltage, Overtorque, Input Phase Failure, Open-Output Phase, Motor Overload, Low Operating Current, Option PCB Error & Gate Array Error
Retry	User-Set Number of Retries for Automatic System Restart After Trip
Restart	Able to Smoothly Catch Freewheeling Motor (Bidirectional)
Overload Current Rating	110% Continuous Overload Rating, 130% for 120 Seconds
CONTROL INTERFACE	
Digital Input	Eight Discrete Input Terminals Programmable to 73 Functions (May Be Increased Using Optional Hardware)
Digital Output	Three Discrete Output Terminals Programmable to 78 Functions; Two Form-A Contacts, One Form-C Contact
Analog Input	Three Programmable: One 0 to 20 mA or 0 to 10 VDC Isolated Input, One 0 to 10 VDC Input & One ± 10 VDC Input
Analog Outputs	Two Programmable: One Programmable 4 to 20 mA or 0 to 10 VDC & One 4 to 20 mA Output
Communication Ports	Half/Full Duplex RS485-Modbus RTU or Toshiba TSB Built-In Communications
SAFETY FEATURES	
Start & Stop Points	Determine Start/Stop Based On User-Set Values, Transducer Feedback Signal, & Programmable Discrete Input Terminal; Work with Delay Timer to Help Ensure Pump Does Not Start/Stop Too Frequently Due to Unstable/Fluctuating Input Signal
Sleep Timer	Shuts Off Pump After Pump Has Run for User-Specified Time at Minimum
Run External Devices	Turns on External Booster Pumps to Support Primary Pump Only When Necessary
No-Flow/Low NPSH Cut-Off	Stops Pump Once Loss of Water Feed or Closed Output Valve has been Detected
Sealing Water/Vacuum Priming	Monitors Water Flow/Water Level & Starts Pump Once Water Flows Through Seal or Pump is Full of Water
ELECTRONIC OPERATOR INTERFACE (EOI)	
Display	4x20 Graphical Full-English LCD Back-Lit Display for Programming, Monitoring & Diagnostics
LED Indicators	Run (Red)/Stop (Green), Hand (Green) & DC Bus Charge Indicator (Red)
Keys	Hand/Auto, ESC, Run, Mode & Stop/Reset
Monitoring	Frequency Command Screen; Multiple Parameters Displayed: Output Current, DC Voltage, Output Voltage, Run Time, VLP Technology, Motor Load, Motor Overload, ASD Load, Output Power, RR Input, V/I Input, RX Input, RX2 Input, AM/FM Output
CONSTRUCTION	
Enclosure	NEMA 1
Power Cables	Cabling Locations are ASD Dependent
Cooling	Forced-Air Cooled
Standards & Compliances	IEEE®, UL-Listed in US & Canada, NEMA®, NEC, & American Recovery & Reinvestment Act Compliant (ARRA)
AMBIENT CONDITIONS	
Ambient Temperature	-10° to 40°C
Altitude	3300 ft. Above Sea Level
Humidity	95% Maximum (Non-Condensing)
Installation	Indoor; No Direct Sunlight; Protect from Corrosive Gases

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