

TOSHIBA

Leading Innovation >>>



SEVERE
DUTY

vlp
technology

GX9 ASD
LOW VOLTAGE DRIVE >>>

BUILT TO LAST—THE ULTIMATE DRIVE SOLUTION

The GX9 severe duty adjustable speed drive is revitalizing the industry by combining Toshiba's proprietary, ground-breaking Virtual Linear Pump™ (VLP) Technology into a drive that has a 600 V class rating. By incorporating VLP Technology, the GX9 directly, precisely, and linearly controls pressure, flow, level, and temperature, which seamlessly controls multiple devices while balancing the load between them. This state-of-the-art, energy efficient adjustable speed drive is designed to withstand the most severe conditions and is engineered to provide tight speed control, while offering the industry's most user-friendly operator interface.

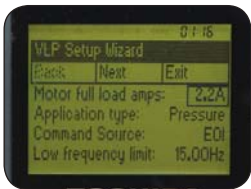


➤ ADVANCED FEATURES FOR MAXIMUM DRIVE PERFORMANCE

- **Powerful Severe Duty Performance** separates the GX9 from the competition by offering one of the highest overload capabilities available for a 600 V drive. For ratings of 5 to 125 HP, the GX9 is rated at 110% continuous current and 150% for up to one minute. For ratings of 150 to 1200 HP, the GX9 is rated at 110% continuous current and 130% for up to two minutes.
- **A Small Footprint** makes the GX9 an ideal solution for maximizing real estate and reducing operating costs. The GX9 provides proper cooling of internal electronic components to ensure optimum performance and durability even in a small footprint enclosure.
- **A Rugged & Durable Design** allows the GX9 to continuously operate in the most demanding manufacturing environments. Built to last, this 65,000 AIC-rated drive offers oversized components with 1,700 PIV-rated transistors to allow for cooler operation and longer 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.
- **Toshiba's Proprietary Windows®-Based ASD Pro Software** is 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.

➤ SIMPLE STARTUP AS IT'S NEVER BEEN SEEN BEFORE

Toshiba stands at the forefront of innovation with our remarkably intuitive and user-friendly startup. In fact, out-the-box, the GX9 is only minutes from complete configuration and optimizing your system's performance.



STEP 1:
Input
Motor's Electrical
Specifications



STEP 2:
Input
Transducer
Specifications



STEP 3:
Input
VLP Maximum



STEP 4:
Input
VLP Minimum



STEP 5:
Complete
VLP Setup

➤ 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 timer to 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 reduce energy consumption and prolong the lifespan of pumping equipment after it has run at the VLP 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 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 to protect against cavitation.
- ▶ **A Sealing Water/Vacuum Priming Feature** automatically controls and improves 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.

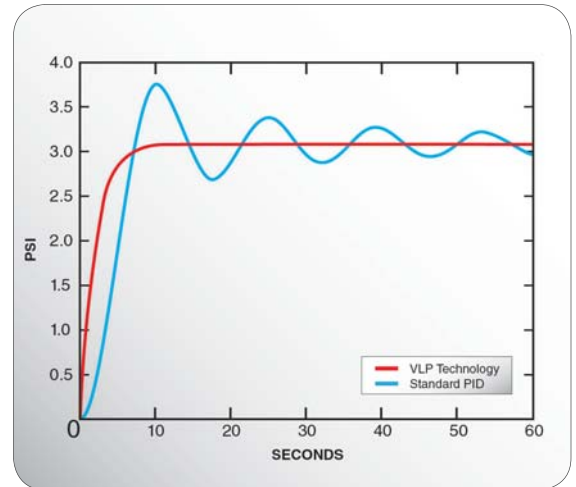
▶ MAKE PID TUNING A THING OF THE PAST WITH VLP™ TECHNOLOGY

Toshiba's breakthrough VLP algorithm has taken PID and made it obsolete, completely reinventing how users control pressure, flow, levels, and temperature. With this new technology, after simply inputting a few values into the GX9, optimum control is attained. Toshiba's VLP Setup Wizard effortlessly guides the user through the entire process!

The setup process defines the operating boundaries by establishing a minimum VLP point and a maximum VLP point. By defining the minimum and maximum points, VLP creates an operating domain within the drive that is directly and proportionately related to the specific system to which it is connected.

Once VLP points have been established, the GX9 performs the following functions:

- **Monitors Multiple Systems** for Friction Losses, Impeller Variations, & Other System Variables
- **Adjusts System** Accordingly to Ensure Only Necessary Pumps/Fans Are Operating
- **Balances Flow Rates** for Each Operating Pump/Fan Under All Conditions
- **Maintains Same Load** for All Operating Pumps/Fans



▶ COMMUNICATION OPTIONS

Toshiba's GX9 supports many common industrial communication protocols. These include:

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

▶ ADDITIONAL OPTIONS

The GX9 can be supplied with additional options to expand control, allow greater flexibility, and provide better protection for a user's application. These options include:

- Dynamic Breaking Transistor (Some Models)
- 18-Pulse Input Rectifier (Some Models)
- Three-Contactor Isolated Bypass
- AC Line Reactor
- Long Lead Filter

APPLICABLE INDUSTRIES

- Chemical
- Food
- Irrigation
- Manufacturing
- Mining & Mineral
- Oil & Gas
- Petroleum
- Pulp & Paper
- Quarry
- Timber
- Water/Wastewater

APPLICABLE APPLICATIONS

- Centrifugal Pumps
- Crushers
- Extruders
- Grinders
- Looms
- Mixers
- Punch Presses
- Rolling Mills
- Shakers
- Winders & Unwinders





MODEL RANGE	5 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; 150% for One Minute Up to 125 HP, 130% for Two Minutes 150 HP & Above

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 Output	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 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 VLP Minimum
Run External Device	Turns on External Booster Pumps to Support Primary Pump Only When Necessary
Sealing Water/Vacuum Priming	Monitors Water Flow/Water Level & Starts Pump Once Water Flows Through Seal or Pump is Full of Water
No-Flow/Low NPSH Cut-Off	Stops Pump Once Loss of Water Feed or Closed Output Valve has been Detected

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, Motor Load, Motor Overload, ASD Load, Output Power, RR Input, V/I Input, RX Input, RX2 Input, AM/FM Output

CONSTRUCTION

Enclosure	NEMA 1; Free-Standing is ASD Dependent
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

TOSHIBA INDUSTRIAL PRODUCTS:

- Adjustable Speed Drives
- Motors
- Motor Controls
- Instrumentation & PLCs
- Uninterruptible Power Systems



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