



Variable Frequency Drives

Variable Speed Product Line

Since 1997, Xylem's Goulds Water Technology brand has been providing variable speed pump control solutions to its customers. One of the first products was the AQUAVAR® variable frequency drive (VFD).

Today, the product line offers a wide range of capabilities for the variable frequency speed pump control market. Our philosophy has not changed: To provide quality, variety and systems solutions for our pump customers.





BENEFITS OF USING A VARIABLE FREQUENCY DRIVE

A Variable Frequency Drive (VFD) controls the speed of the motor by converting the sine wave (60 Hz) signal input to a modifiable pulse waveform to be sent to the motor. The modified wave is sent at different frequencies along the range of 0-60 Hz depending upon the system demand. The result is a change in motor speed based upon the output frequency of the drive. Think of it as cruise control that adjusts speed based upon feedback from the speedometer. In the case of variable speed pumping the speedometer is the system pressure or flow sensor.

Energy Savings

A typical pump and motor are sized for a rating point (flow vs head) at 60 Hz (full speed). Given feedback from system sensors and utilizing the pump affinity laws the VFD varies the speed of the pump and motor to meet demand. At operation below 60 Hz, the HP draw of a centrifugal pump is reduced significantly. The chart below shows that a 16% reduction in speed results in a 42% reduction in horsepower! This reduced power draw equates to reduced operating costs.

Hz	RPM	Multipliers for Flow, Head, Power		
		Flow	Head	Power
60	3450	1	1	1
50	2875	0.83	0.69	0.58
40	2300	0.67	0.44	0.30
30	1725	0.50	0.25	0.125

System and Motor Protections Increase Uptime and Product Life

The VFD is better equipped than across the line starters to help protect your pump, motor, and system components from both electrical and hydraulic extremes. This protection prolongs the life of equipment and increases uptime. By measuring the electrical input to the VFD and controlling the electrical output to the motor a VFD can provide protection from:

- Overcurrent
- Short circuit
- Pump or motor binding
- Ground fault
- Motor overtemp

Pressure or flow feedback is also coming from the system into the drive which extends your protections to the pump and system. This allows extended protection from:

- Low suction pressure
- Dry pump operation
- Overpressure of system
- System shutdown for broken pipes
- Empty supply tank / over filling discharge tank

Integrated Diagnostics Allow Easy Troubleshooting

On-board diagnostics help users understand when there is an issue with the system. Either through flashing LED error codes or through fault text on the keypad the VFD helps protect the system by alarming and controlling your pump during an upset condition such as low water or a broken pipe.

Our variable speed products include the following:



1 hydrovar® X SMART PUMPS

Integrated pump, motor & variable speed drive solutions, powered by hydrovar X

Xylem's hydrovar® X line of products combine ultra-premium efficient motors with integrated variable speed drives and pumps. The result is intelligence, performance, connectivity, and simplicity in one comprehensive package, from one reliable source - Goulds Water Technology.

FEATURES

Intelligent performance: Advanced system controls (up to 8 pumps) are customizable for a wide range of applications. The IE5 "ultra-premium" hydrovar X smart motor provides one of the broadest efficiency ranges in the industry.

Simple: Built-in application software makes hydrovar X one of the easiest drives to commission, program and operate, enabling virtually any configuration of pumps.

Built-in protections: Integrated functions provide protection for the pump and motor while optimizing performance.

Flexible: hydrovar X solutions feature the right combination of motors, variable speed drives and pumps to ensure great performance and a rapid return on investment in nearly any application.

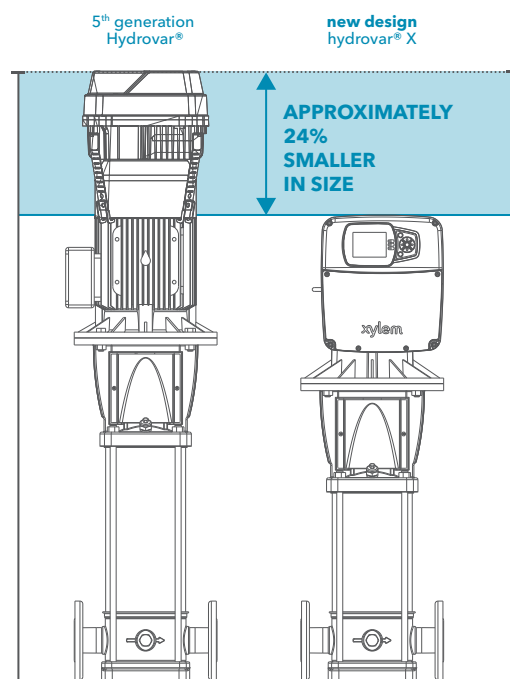
Sustainable: No rare earth materials are used to minimize product availability challenges and address environmental concerns while offering smart technology and superior performance.

Easy service: VFD and/or motor can be easily replaced individually, minimizing downtime and expensive repair. The integrated electrical socket requires no additional wiring, allowing a true plug and play solution versus buying a new motor and drive combination.



Compact motor design: hydrovar X motors offer higher performance with a reduced footprint when compared to the legacy generation Hydrovar solution. Increased performance reduces electricity consumption and lowers life cycle costs.

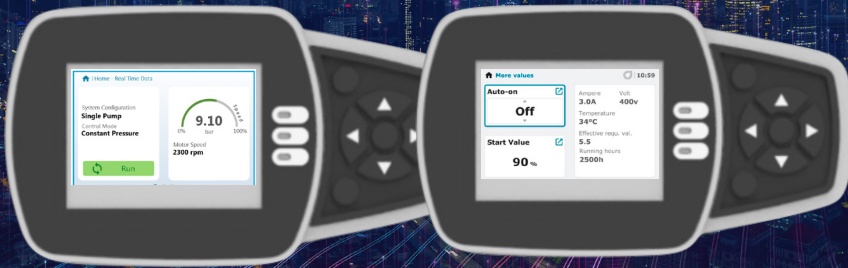
Representative example:



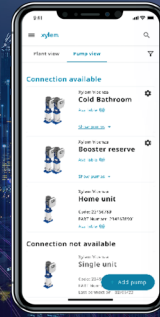
Unleash the power of hydrovar X!

Don't hold back your imagination!

With the graphical color display, you can quickly set-up and navigate the menu of your unit: check all the parameters and choose the perfect unit configuration to fit your installation. No time to do it? Genie will start up and run the unit for you!



Check your systems from wherever

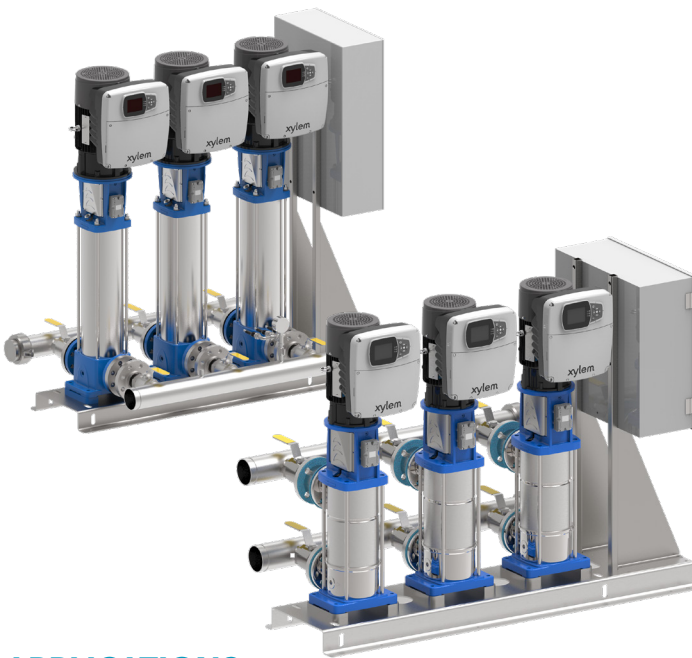


hydrovar X and Avensor, better together!

hydrovar X can communicate with Avensor, Xylem's IoT platform, for a complete overview of all connected assets, anytime, anywhere. Avensor collects historical data to analyze trends and generate alerts preventing failures and equipment downtime.

FEATURES (cont'd.)

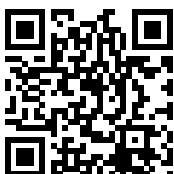
Condition monitoring: e-HVX and e-HVXR Packaged Booster Systems are fitted with Xylem's optimize[®] sensors to monitor the health of the pump and provide early warnings of potential issues that could lead to downtime and service costs.



APPLICATIONS

Industrial, residential, light commercial, commercial building services, and OEM - HVAC, pressure boosting, water supply systems, washing & cleaning, food & beverage and water treatment applications

Download the mobile app



Learn more about the
Goulds Water Technology
hydrovar X product family

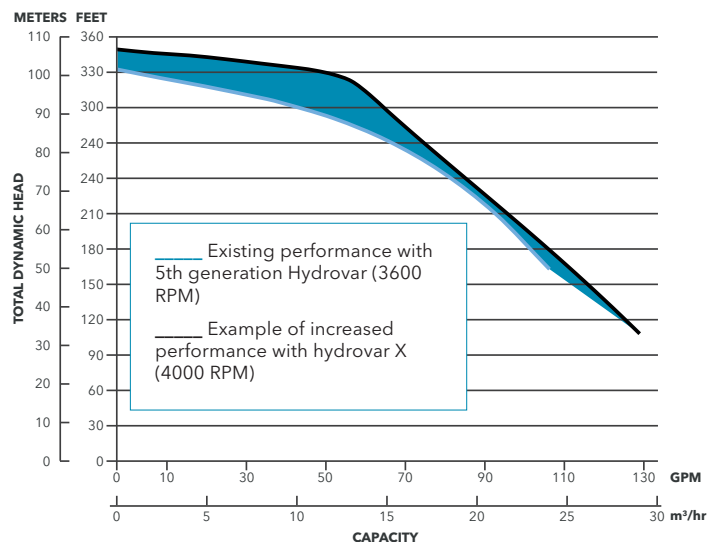


hydrovar X SMART MOTOR SPECIFICATIONS

Display:	Graphic color
Controls modes:	Actuator, Constant Pressure. Proportional Pressure, Proportional Quadratic Pressure, Constant Flow, Constant Temperature, Constant Level
Multi-pump:	up to 8 pumps
Enclosure:	IP55/NEMA4
Working temperature:	-4°/+122°F (-20°/+50°C)
Communication protocols:	MODBUS [®] RTU, BACnet MS/TP
Features:	IE5 synchronous motor
Mobile app:	Bluetooth [®]

PERFORMANCE

(representative example of increased performance with hydrovar X)





2 SMART PUMP RANGE

The Smart Pump Range includes the e-HME, e-SVE and e-AB3 in pre-assembled packages featuring the Xylem Smart Motor, an ultra-premium IE5 permanent magnet motor.

APPLICATIONS

Industrial, residential, light commercial, commercial building services, and OEM - HVAC, pressure boosting, water supply systems, washing & cleaning, food & beverage and water treatment applications

FEATURES

Intelligence: single or multi-pump systems

The Smart Motor can operate single or multi-pump systems of up to three pumps, with no need for an external control panel or PLC. The drive matches performance to demand, reducing energy use. And it allows smart pumps to communicate with building systems in real time (single pump only).

Efficiency: best-in-class IE5 motor

Ultra-premium IE5 efficiency rating is the top efficiency level for motors designed to operate directly on-line. The Xylem Smart Motor meets IE5 specifications, providing efficiency well above a standard IE3 NEMA Premium efficient asynchronous induction motor.

Ease of use: plug-and-play simplicity

The Smart Motor is easy to install and commission in new or retrofit applications. Easy BMS integration and standard BACnet and MODBUS capabilities (single pump) ensure quick connectivity and seamless integration with your building management system.

Performance: extreme environments

The Smart Motor uses the latest technology to manage water delivery in water boosting and transfer applications at the correct pressure and flow. It can easily handle extreme environments from -4°F/122°F (-20°/+50°C), without derating performance.

The Xylem Smart Motor provides built-in pump protection controls and monitoring to help maximize efficiency, optimize pump performance and communicate with other building systems in a simple to use product. Each pre-programmed package (pump plus Smart Motor) provides easy, cost effective installation – and you benefit from a pre-configured system's intelligence and performance – right out of the box.

Please note, the Smart Motor is not sold separately, it is only available in one of the pre-programmed packages.

SPECIFICATIONS

Phase and Voltage	Single phase 208-230V to 2 HP Three phase 208-230/460V to 3 HP
Power	Up to 3 HP (2.2 kW)
Multipump capability	Up to 3 units
Power supply	50/60 Hz
Communication	BACnet and MODBUS standard in single pumps
Motor	IES2 package with IE5 motors
Enclosure rating	IP55 / NEMA 3R
Ambient temperature	-4°F/122°F (-20°/+50°C) full power
Shut down protections	No flow, broken pipe and dry run
Controls	Constant pressure, system curve match and external signal
Other	Standard – automatic test starts, auto smart cycle, change of lead and lag pump units, inverter fault signal memory and operating-hours run counter. Optional – failure and over-temperature sensors



3 AQUAVAR IPC

The AQUAVAR IPC variable frequency drive brings the latest in pump drive technology and programming. It is designed to provide variable frequency pumping control of speed, pressure, flow and level. The drive and interface are designed to give you advanced capabilities that help you effectively and efficiently operate your system.

APPLICATIONS

For submersible and above ground applications.

FEATURES

Optimized for pumps

- Wide range of standard and permanent magnet motors with power up to 90kw/600HP
- Developed by pump experts and optimized for controlling pumps
- Submersible and above ground applications

Quick set up and ease of use

- Easy start-up and programming with Start-Up Genie
- Two wire multi-pump connection for faster installation
- Hand on, Off, and Auto-On buttons available for easy pump operation at the keypad. No toggling between local and remote operation

Helping to improve your performance

- Multi-pump configuration for up to four (4) pumps - no need for PLC
- System redundancy with multi-master control in case of drive failure

Standard for every drive

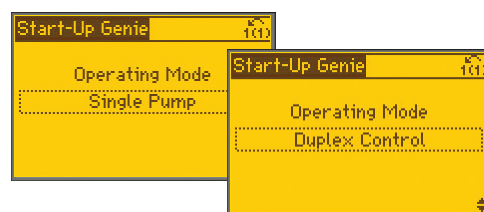
- Wide range of voltage and enclosure options
- True 208V coverage
- Dedicated single phase input
- Remote commissioning and monitoring with USB Connectivity and software
- In-panel or handheld keypad with backlit display
- Alarm Log for last 5 alarms and maintenance events
- EMC/RFI filters and Dual DC-link reactors to reduce drive noise emissions and interference
- I/O expansion cards, factory installed or field configured

SPECIFICATIONS

Input supply	1.5 - 600 HP (frame A - D) wall or base mounted	
Ambient temperature	14° F - 113° F (-10°C - 45°C) Higher temperatures can be achieved by derating the output amperage of the drive 10% for up to 122° F (50°C).	
Communication	MODBUS® RTU, Metasys N2, FLN, and BACnet standard. Others available with option cards	
Altitudes	At altitudes from 0 to 3300 ft (0 to 1000 m) nameplate rated current is available. Derate for altitudes above 3000 ft (1000 m) with a maximum operating altitude of 9900 ft (3000 m). Consult factory for applications above 9900 ft (3000 m)	
Relative humidity	Lower than 95% without condensation	
Electrical - input power	1 phase 200V to 240V ±10% 3 phase 380V to 480V ±10% 3 phase 200V to 240V ±10%	3 phase 525V to 600V ±10% Frequency 50 or 60Hz, ±2Hz
Electrical - output power	3 phase from 0V to Input supply V	

It's an easy start with the AQUAVAR Genie

The AQUAVAR Controller Genie quickly and easily guides you through setup in as little as 15 minutes. Asking for only the required parameters, the Genie will automatically configure your set up to the optimal settings for the specific application - eliminating the guesswork in set up. The AQUAVAR controller can be further customized through the Genie for those applications with pump protections, I/O options, and multi-pump operation to get your pump system working just the way you need.





4 AQUAVAR SOLO²

The AQUAVAR SOLO² variable frequency drive is designed for submersible well pumps to deliver constant water pressure.

APPLICATIONS

For residential, irrigation and greenhouse applications

FEATURES

Easy set up

- Simple menu set-up
- Dual system set points for advanced system application
- Programmable output relay for optional accessories such as a chlorinator or home monitoring system
- Pressure sensor and shielded cable included

Easy to use

- Fade-resistant LED display indicates system pressure, speed and current
- Easy to adjust pressure with control push buttons
- Display gives quick reference for troubleshooting
- Error log - displays last four faults and can be reset
- Auto cooling fan with filter
- Built-in surge protection
- Adjustable current overload protection to match motor Service Factor

Retrofittable

- Turns virtually any conventional system into a constant pressure system

SPECIFICATIONS

Outdoor enclosures	Painted steel, NEMA 3R
Input supply	1Ø Input 208-230 volt Wall mounted with fan cooling
Ambient temperature	up to 122° F
Electrical - output power	Single phase - ½ - 2 HP motors Three phase - ¾ - 5 HP motors

The AQUAVAR SOLO² controllers and GS stainless steel submersible pumps are available in convenient ProPak kits.

AqWiFi - Remote Monitoring System

Provides continuous monitoring of the well system and relays real-time alerts and notifications to the installer or homeowner.



FEATURES

- For indoor and outdoor use
- Easy installation and set-up
- Uses WiFi connection
- App available to monitor single or multiple installations
- Text and/or email notifications in case of faults with date and time stamps included
- Stores up to one year of system history for easy troubleshooting, including pressure, speed, output current, Input voltage and faults



5 AQUAVAR e-AB SERIES (e-AB2/e-AB3)

The AQUAVAR e-AB Series constant pressure booster systems, comprised of the e-AB2 and e-AB3, are designed to deliver increased water pressure when water demand is high. These systems are ideal for both customers of municipal water districts with low water pressure, and those boosting from a storage tank.

RESIDENTIAL APPLICATIONS

e-AB2 Variable Frequency Drive

(1 & 2 HP model configurations)

- Reduces up to 50% of the energy required by a fixed speed pump
- Delivers a boost up to 30 GPM at 70 PSI
- Controller arrives pre-wired for ease of installation
- 2 gallon tank included for options 1-3
- 5 gallon tank for options 4-7

e-AB3 Smart Pump Range, Packaged Pumping System

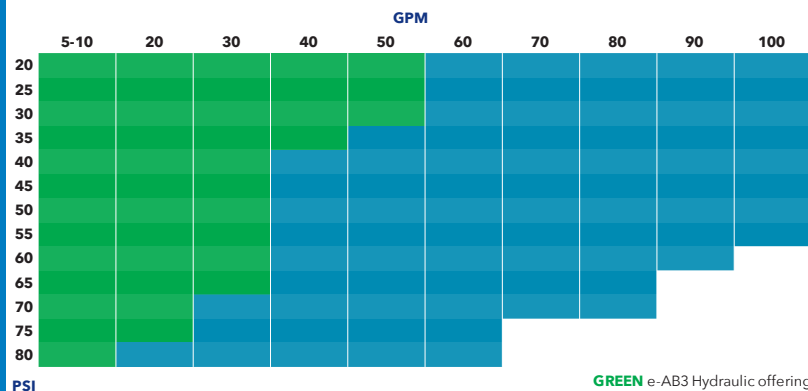
(1/2, 3/4, 1 & 2 HP model configurations)

- Boosting pressures and energy reductions equal to that of the e-AB2
- Ultra-premium efficiency means:
 - Features the Xylem Smart Motor, an ultra-premium IE5 permanent magnet motor and provides:
 - Efficiency well above a standard IE3 NEMA premium efficient asynchronous induction motor
 - Average of 15% in energy savings when compared to similar pumps in the market
- Easy to install:
 - Includes a complete kit for installation: pump, Smart Motor, gauge, tank and tee
 - Programmed to motor electrical characteristics, just select "set pressure"
- Quiet operation:
 - High efficiency hydraulics, motor and thick metal pump body keep the noise level to a minimum

LARGER RESIDENTIAL AND COMMERCIAL APPLICATIONS

e-AB2 (3 & 5 HP model configurations)

- Delivers a boost up to 80 GPM at 70 psi
- Intelligent Pumping with an AQUAVAR IPC variable frequency drive:
 - Easier start-up and programming with the Start-Up Genie
 - Hand On, Off and Auto-On buttons available for easy pump operation at the keypad
 - No toggling between local and remote operation system redundancy with multi-master control in case of drive failure
 - System protection from overvoltage, undervoltage, blocked suction, cavitation, NPSHa, phase loss, short circuit, transducer failure and motor current overload
 - Pump run out and dry running protection
- Expanded capabilities:
 - NEMA 1 and NEMA 3R enclosures expand installation options
 - Duplex operation for lead/lag and alternation



GREEN e-AB3 Hydraulic offering
BLUE e-AB2 Hydraulic offering



6 AWAVFD VARIABLE FREQUENCY DRIVE ALTERNATOR

The AWAVFD Alternator panel provides increased functionality by pairing two drives for alternation. Compatible with AQUAVAR SOLO² and SPD, the AWAVFD also allows for lead/lag operation when one drive does not satisfy the set pressure.

APPLICATIONS

- Water well systems used in residential water supply, irrigation and greenhouse applications
- Water pumps serving commercial buildings
- Pressure boosting for light industry, wash systems, filtration, and municipal systems

FEATURES

Variable time setting:

- Equipped with five time setting options for alternations ranging from 1 to 48 hours to accommodate all application needs

Outdoor rated:

- A NEMA 3 enclosure allows for a range of installation locations

Ease of use:

- Easy terminal strip connections and LED display allow for effortless installation and operation

SPECIFICATIONS

NEMA 3 rating enclosure for outdoor use

LED display for timer and lead/lag

Easy terminal strip connections

Timer function with 5 selections

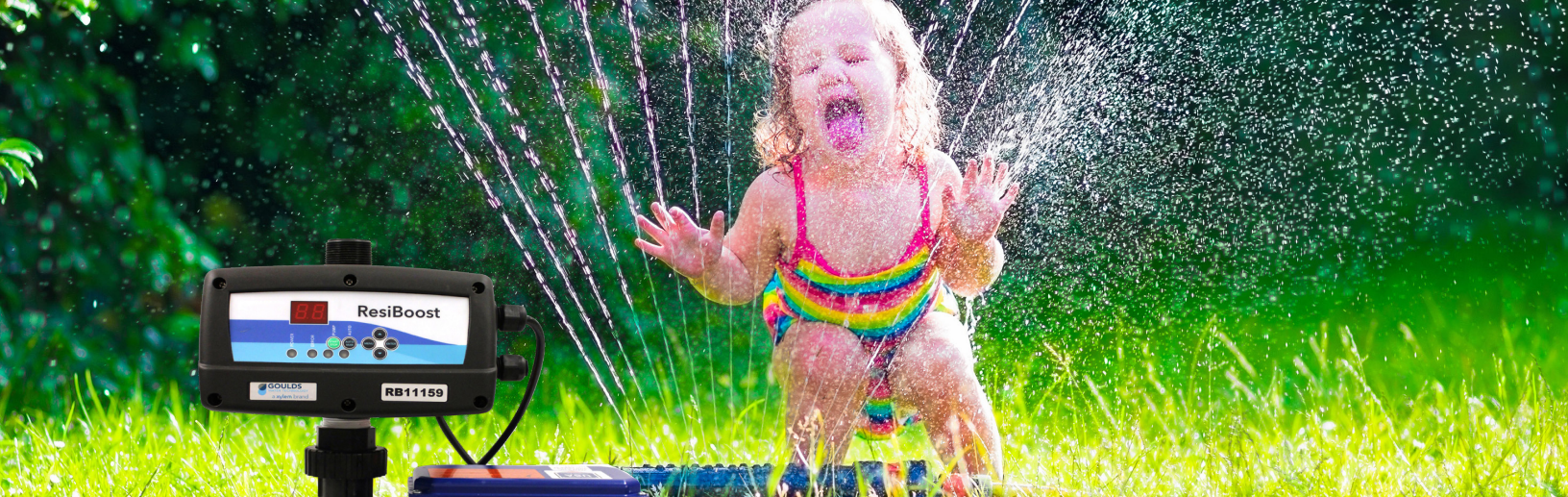
Fully independent operation

Fail-safe design keeps water running even if the alternator is powered off

Wide voltage single phase 115/230V input (120 VAC and 240 VAC)

Power protection is not required

Dimensions: 8.60" L x 6.30" W x 3.94" D



7 RESIBOOST®

APPLICATIONS

For boosting residential and municipal water users with low water pressure as well as low producing well systems with a holding tank

FEATURES

Delivers maximum comfort:

- Customers are able to enjoy improved water pressure consistently regardless of the number of fixtures in use or the location of the fixture in the home.
- Designed to operate quieter than a conventional pump system.

Provides lasting performance:

- The RESIBOOST is proven to last in the most demanding of boosting conditions, customers can rest easy rather than worry about downtime or service needs.

Simplifies installations:

- The plug and play system comes with the pump, motor and controller already assembled and fully programmed (tank included but not installed).
- An integral transducer instantly reduces the number of parts required for installation.
- The small-but-powerful design of the RESIBOOST system allows for a variety of installation locations, including a small utility closet.
- Uniquely designed union with check valve eliminates separate assembly.

The RESIBOOST complete packaged variable frequency system isn't just any constant water pressure system. It's a product of Goulds Water Technology's next-generation engineering and design, making it more reliable, more durable and more efficient at ensuring strong, consistent water pressure and maximum comfort for residential applications.

The RESIBOOST combines a small variable frequency drive, a stainless steel multistage pump and a small bladder tank in a self-contained, easy-to-install package. Backed by top level service and support, rely on the RESIBOOST to deliver constant pressure in the one place it's welcome. Home.

SPECIFICATIONS

Pumps Designation	Max GPM	Stages	Output Phase	Output Voltage	Weight
13 GPM AT 60 PSI	22	5	1	115	30
22 GPM AT 38 PSI	40	3			
13 GPM AT 48 PSI	22	4			
22 GPM AT 50 PSI	40	4			
13 GPM AT 65 PSI	22	5	3	230	30
22 GPM AT 68 PSI	40	5			



Pump Mounted Variable Frequency Drive

FEATURES

Easy set-up and commissioning

- Install directly on any TEFC motor without running new power to a wall-mounted control system
- Quick start-up guide and intuitive menu system
- Advanced programming features to optimize for almost any application
- Large LCD display with easy to read pump language pump on, system pressure, fault codes and system conditions

Control

- Control up to 8 pumps in parallel
- Constant pressure
- Constant flow
- Via 4-20mA or 0-10V external signal

Safety

- Embedded THDi filter to reduce harmonic interference
- Stops the pump at zero flow
- Integrated soft start/stop: no water hammer and lower starting current
- Dry relay contacts available for pump run and fault
- Built-in protection
 - Over / under voltage
 - Overcurrent / output short protection
 - Low water level
 - Sensor failure
 - Motor over temperature
 - Inverter over temperature
 - Minimum threshold / conveyor limit

8 HYDROVAR®

The HYDROVAR variable frequency drive matches performance to system demand. The HYDROVAR is easily mounted directly on the motor of the pump. This makes the HYDROVAR an excellent choice for retrofitting and upgrading fixed speed systems, eliminating the need for an external control panel.

APPLICATIONS

For centrifugal pump systems requiring constant pressure, flow control or differential pressure in commercial and municipal applications

SPECIFICATIONS

Indoor enclosures	NEMA 1. Avoid excessive dust, corrosives, salts and direct sunlight.
Input supply	Power: from 2 HP to 30 HP 1Ø Input 208/230V 2 - 5 HP (208-240V ± 10%) 3Ø Input 208/230V 2 - 15 HP (208-240V ± 10%) 3Ø Input 460V 2 - 30 HP (380-460V ± 10%) Motor mount to fan cover of TEFC motor for a packaged unit with a small footprint
Ambient temperature	Maximum 104° F
Communication	RS485 interface, BACnet, MODBUS
Power	Speed from 15-70 Hz Power supply: single or three phase 50 or 60 Hz
Motor Requirements	3 phase, TEFC, 208 - 230V or 460V, 0 - 60 Hz, Class F insulation, NEMA design A or B
Other	Pressure Transducer included with drive: 304 SS, 17-4 PH stainless steel, ¼" NPT connection, shielded two wire cable, 0 - 300 PSI range

9 ACCESSORIES

FLOAT SWITCHES

- Gold plated contacts for low current applications
- Operates on a 45° differential, above or below horizontal
- Includes a mounting clamp for attaching to pipe (as shown)
- Not sensitive to rotation
- 18 gauge, 2 conductor wire
- Maximum submergence is 30'
- Maximum water temperature 140° F
- Polypropylene float housing is impact and corrosion resistant



9K589 - OVER PRESSURE SWITCH

- Range scale from 60 - 120 PSI
- Factory set at 80 PSI
- Lead-free brass construction
- Gold plated contacts for long life
- Use as over-pressure protection on AQUAVAR SOLO² or S-Drive Controller
- Normally Closed contacts - connect leads to Secondary (dry) Contact Switch
- Wire length - 72 inches
- Use a 5/32" Allen wrench to unlock barrel to change pressure setting
- Snap action, opens and closes on $\pm 1 - 2$ PSI range, not a differential pressure switch



9K585 - MOISTURE SENSOR WITH RELAY

- 5 VDC power supply is provided by VFD
- Will detect any conductive non-flammable liquid
- Ideal anywhere water damage could occur
- Automatic reset



GAUGE GUARD

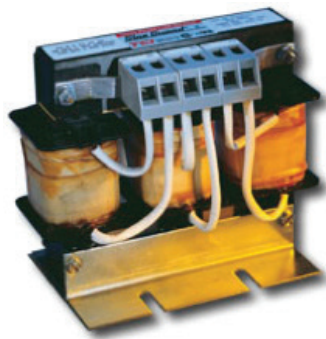
- Low unit cost - makes it feasible to protect even moderate priced instruments
- Compact size makes these isolators ideal for limited-space installations
- Hermetically-sealed, molded uni-body construction - avoids possibility of leaks
- Glass-filled Polypro bodies for chemical compatibility and maximum temperatures to 100° F
- Each gauge guard features a durable and flexible Buna-N diaphragm which serves as a protective barrier between the process fluid and instrument





LINE/LOAD REACTORS

- High Z (application where 5% reactor would be applied)
- 208/240V
- NEMA 3R Enclosure
- Ambient Temperature 40° C
- Fundamental Frequency: 50/60 Hz
- Agency Approvals: UL, cUL; UL Recognized, CE Marked
- Short Term Overload Rating – 200% rated current for minimum of 3 minutes
- Inductance Characteristics
 - Min 95% L at 110% Load
 - Min 80% L at 150% Load



TCI MODEL V1K DV/DT FILTERS

- 2 - 130 amps; 240V - 600V;
2 - 125HP
- NEMA 3R Enclosure
- Carrier Frequency: 1 - 12 kHz
- Fundamental Frequency: 0 - 60 Hz
- Efficiency: > 98%
- Insulation Rating 600V Class



TCI MODEL HG7 HARMONIC FILTER

- 3 Phase 240 - 600V
- NEMA 3R Enclosure
- Ambient Temperature 40° C
- Typical Efficiency: 98 - 99%
- Internal Fusing Protection
- Fundamental Frequency: 60 Hz (50 Hz for 400V)
- Agency Approvals: UL, cUL
- Maximum Altitude: 6,000 feet





Whatever your application, whether it is for above ground booster systems or controlling a submersible pump, Xylem has a wide range of high quality pumps and controls to meet the demands of your application.

For more information on how Xylem can help you, visit www.xylem.com



Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to www.xylem.com

Xylem Product Cybersecurity

Xylem values your system security and the availability of your critical services. For more information on Xylem cybersecurity practices or to contact the cybersecurity team please visit www.xylem.com/security



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Learn more about
Variable Frequency Drives

