



**TW1000V-100G-100 SIMPLEX  
VARIABLE SPEED BOOSTER SYSTEM**



The *TW1000V-100G-100 Simplex Vertical Booster System* is equipped with a centrifugal pump regulated by a variable frequency drive that maintains constant pressure regardless of variation in demand or incoming pressure. This system will supply 100 GPM with a 100 PSI overboost.

### Features and Benefits:

- Commercial application
- Custom design
- Variable Frequency Drive regulated pumps
- Energy efficient operation
- Prewired & Factory Tested

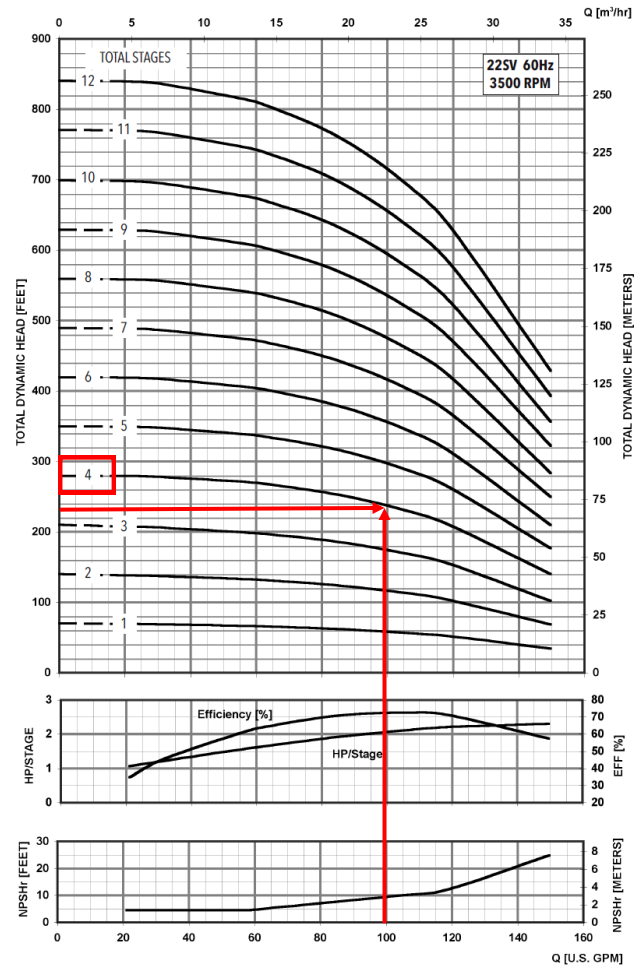


### Lead-Free\* (Wetted) components:

- Centrifugal Pump: Cast Iron & SS
- Relief valve: LF Brass
- Pressure Gauge: Stainless Steel
- Transducer: Stainless Steel
- Check valve: LF Brass
- Fittings: LF Copper or SS
- Flanges: Stainless Steel

\*All lead-free brass shall contain <.25% Pb

*Performance curve for pump*



### Technical Specifications:

- Pumps:** Goulds [22SV4]
- Horsepower:** 10 HP
- Controllers:** Yaskawa or equal
- Performance:** 100 GPM
- Boost:** 100 PSI boost (230' TDH)
- Suction:** 2" inch
- Discharge:** 2" inch
- Tank:** 20 Gallon [Flexcon H2P20]
- Pump:** 16" W x 54" H x 34" D
- Power:** Independent circuit required  
208-220V/3PH  
208-220V/3PH  
360-480V/3PH

21 Londonderry Turnpike, Hooksett, NH 03106

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Variable frequency drive

Disconnect switch

Vertical centrifugal pump with TEFC motor

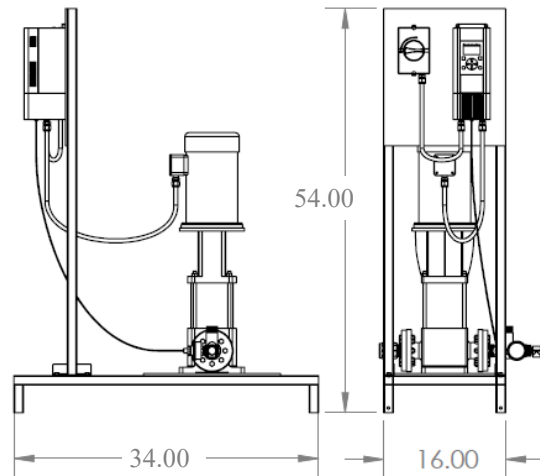
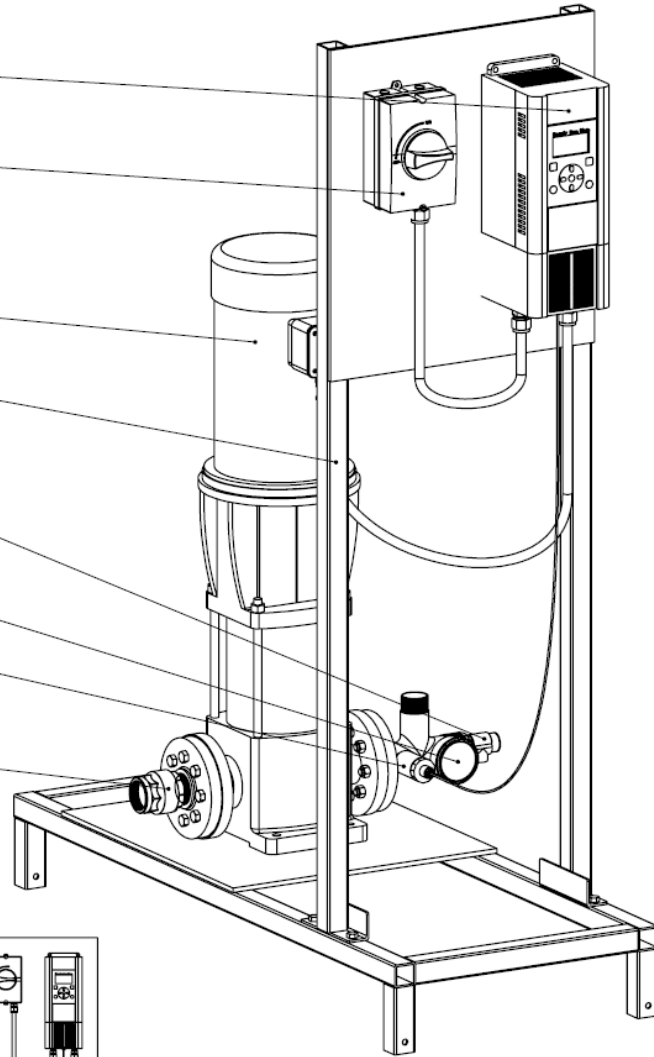
Powder coated steel frame

Pressure relief valve

Pressure gauge

Pressure transducer

Spring loaded silent check valve



**TOWLE WHITNEY LLC**

**3HP Simplex Vertical Variable Speed Booster System**

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DIMENSIONS ARE SUBJECT TO CHANGE  
DO NOT USE FOR CONSTRUCTION  
UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES

DO NOT SCALE DRAWING

NAME	DATE
DRAWN: VID	3/27/15
CHECKED:	
COMMENTS:	

SIZE <b>A</b>	DWG. NO. 32715A	REV.
SCALE: 1:20	WEIGHT:	SHEET 1 OF 1

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### Assembled Units:

- Supplied as shown on the technical specifications. System is built by Towle Whitney or approved equal.
- The pump control system shall include, as a minimum, a separate and independent variable frequency drive (VFD) for pump and a manifold / Tee mounted 4-20 mA pressure transducer, pressure gauge, and relief valve
- The piping and frame shall not interfere with access to the controls
- Pump shall have a separate and independent disconnect box

### Variable frequency drive:

- NEMA 1 rated for indoor use
- Variable frequency drive shall have UL approval with all factory installed options
- All factory preset values and/or last saved data values must remain available to the operator in the event of a complete power outage . The Variable frequency drive program will operate to a program that protects the pumps against damaging hydraulic conditions such as:
  - Motor overload - Pump overflow surges - Loss of prime due to incoming water supply interruption
  - Hunting - Protection from overload through frequency/current optimization
  - Protection from hydraulic damage by restricting the pumps to operate beyond their published end of curve
- The drive shall have the ability to automatically restart after an over-current, over-voltage, under-voltage or loss of input signal protective trip
- The drive shall have an operator control panel [keypad] for customization of parameters
- The drive shall include a feature to upload / download parameters into an external device to be used with another drive or the same drive.
- The drives shall have a removable non-volatile memory device
- The variable frequency drive must be capable of accepting individual analog inputs from transducer. All transducer inputs must be wired to the variable frequency drive for continuous scan and comparison function
- The Variable frequency drive ladder logic program shall utilize a proportional - integral - derivative control function  
The variable frequency drive shall display the following values:
  - Pump running/standby - Pump speed in Hz - User adjustable parameters such as PID set points - Motor frequency
  - Motor current - Threshold set points for PID error, Min operating frequency - Troubleshooting and diagnostics of faults

### Pressure sensor / transducer:

- All “wetted surfaces” shall be lead free (<.25% Pb) in conformance with the 1/4/14 federal law
- Shall have a variable frequency drive (VFD) with a pressure transducer, pressure gauge, and relief valve

### Pneumatic expansion tank:

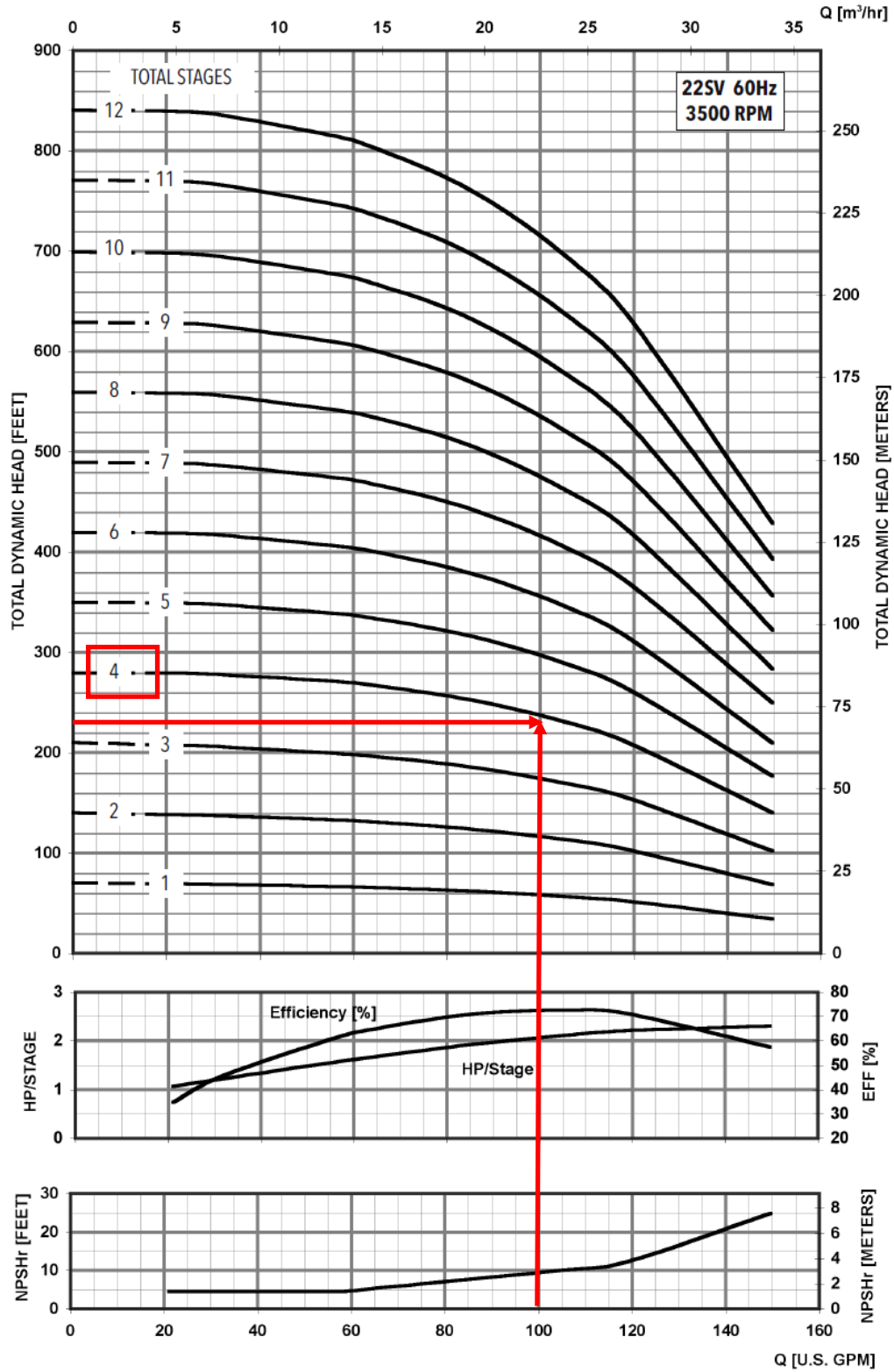
- Pneumatic expansion tank shall be rated for use with potable water with an operating pressure of a minimum 150 PSI
- Tank shall be pre-charged to a pressure of 10 PSI below system operating pressure

### Fittings:

- Shall be sized appropriately to allow water velocity not exceeding 10 ft/sec, to minimize cavitation and turbulence
- Check valve shall be spring-loaded and silent

### Installation:

- Equipment shall be installed in accordance with applicable local building, electrical and plumbing codes





## VARIABLE FREQUENCY DRIVE WARRANTY AND SPECIFICATIONS



**Warranty:** Provide VFD warranty, for one year from startup, not to exceed 18 months from the date of shipment. Warranty shall include parts, and labor allowance for repair hours.



### Performance Features (Drive)

- Ratings:
  - 1 to 5 HP at 200-240 VAC 1-Ph.
  - 1 to 25 HP (ND) at 200-240 VAC 3-Ph.
  - 1 to 25 HP (ND) at 380-480 VAC 3-Ph.
- Overload Capacity:
  - 120% for 60 sec. (Normal Duty)
- Control Methods: V/f Control, Open Loop Current Vector Control
- DC injection braking, ramp to stop
- Electronic reversing
- Adjustable accel/decel: 0.01 to 6000 seconds
- Controlled speed range:
  - 40:1<sup>(1)</sup> 100:1<sup>(2)</sup>
- Speed Regulation:
  - ± 0.5 to 1% with slip compensation<sup>(1)</sup>
  - ± 0.2%<sup>(2)</sup>
- Displacement power factor: 0.98
- Output frequency: 0 to 400 Hz
- Frequency resolution:
  - 0.01 Hz with digital reference
  - 0.06 / 60 Hz with analog reference
- Frequency accuracy:
  - 0.01% with digital command
  - 0.5% with analog command
- Volts / hertz ratio: infinitely adjustable pattern
- DC Injection braking: adjustable amplitude, duration, current limited
- Torque boost: full range, auto
- Power loss ride-thru: 0.5 sec.
- Speed search
- Auto restart
- 3 Critical frequency rejection settings
- Slip Compensation
- Energy Savings Function
- Enhanced PID with loss of feedback function

<sup>(1)</sup> V/f Mode

<sup>(2)</sup> Open Loop Current Vector Mode

### Design Features (Drive)

- Dual microprocessor logic
- Digital keypad operator, 5 digits
- LED status display
- Remote Mount Keypad Capability
- RJ-45 Style Digital Operator Connector
- 7 multifunction digital inputs
- 3 multifunction digital outputs
- Hardwire baseblock (EN954-1 Cat. 3)
- Programmable form C output contact for customer use: 1A at 250 VAC or 30 VDC
- 24 VDC control logic compatible with sourcing or sinking outputs (PNP or NPN)
- Carrier frequency: 15 kHz max; swing PWM
- 2 Remote speed references:
  - 0-10 VDC (20 kohms) or isolated 4-20 mA (250 ohms)
- Signal follower: bias and gain
- 2 programmable open collector outputs
- Analog monitor output:
  - 0-10 VDC proportional to output frequency or output current
- Approx. 400 parameters and monitors
- Digital pulse train input (33 kHz max.)
- Cooling fan controlled by drive run/stop
- RS-422/485 Modbus 115 kbps
- UL recognized electronic overload
- MTBF: 28 years
- NEMA 1 enclosure
- Side-by-Side mounting
- Maintenance monitors

### Protective Features (Drive)

- Current limit, stall prevention during accel, decel, and run
- Motor and drive overload
- Over voltage prevention function
- Instantaneous over current
- Short circuit
- Under voltage
- Heatsink overheat
- Ground fault protection
- Over/under torque
- Short circuit current rating: 30kA rms sym.

### Pump Control Features

- Operator keypad with intuitive pump language
- Hand-Off-Auto
- Programmable pump process set point
- Pump start level and start time
- Sleep protection
- Simplex, duplex and triplex control
- Automatic system restart
- No flow detection
- Low and high feedback set points
- Pre-charge low level control
- Thrust bearing control
- Automatic system stabilization
- Motor condensation pre-heat function

### Pump Protective Features

- Dry well
- Air in system
- Blocked impeller
- Pump over cycling
- No flow protection
- Loss of prime
- Transducer loss
- Over torque

### Pump Alarms and Messages

- Low feedback
- High feedback
- Low level
- Low water
- Pump over cycling
- No flow detection
- Loss of prime
- Pump fault
- Motor thermostat
- Pre-charge mode
- Thrust bearing active
- Start mode active
- Sleep mode active

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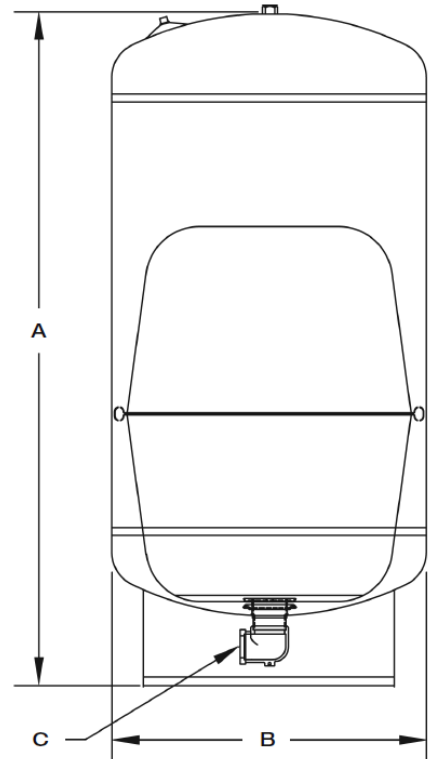


## PNEUMATIC EXPANSION TANK SPECIFICATIONS



### MATERIALS OF CONSTRUCTION

- **Tank:** 16 gauge cold rolled steel
- **Finish:** Appliance quality paint for indoor or outdoor installation
- **Water chambers:** Top chamber is 100% butyl rubber, lower water chamber is copolymer polypropylene
- **Connection:** Stainless Steel
- **Testing:** High pressure, seam weld, helium, final precharge check
- **Air valve:** Brass valve with o-ring seal
- **Warranty:** Five year



### DIMENSIONS & CAPACITIES

Model	Total Tank Volume		A Height		B Diameter		C Connection	Total Weight	
	gal	liters	in	cm	in	cm		lbs	kilos
H2P 14	14	60	22	55.88	16	40.64	1" NPT	28.0	12.7
H2P 20	20	80	29	73.66	16	40.64	1" NPT	36.0	16.3
H2P 25	26	100	34.5	87.63	16	40.64	1" NPT	41.0	18.6
H2P 30	32	120	27.75	70.48	21	53.34	1 1/4" NPT	54.0	24.5
H2P 35	33.4	130	42.75	108.58	16	40.64	1 NPT	49.0	22.2
H2P 45	44	170	36.25	92.07	21	53.34	1 1/4" NPT	67.0	30.4
H2P 65	62	240	48	121.92	21	53.34	1 1/4" NPT	82.0	37.2
H2P 80	81	310	62	157.48	21	53.34	1 1/4" NPT	99.0	44.9
H2P 85	85	325	44.5	113.03	26	66.04	1 1/4" NPT	121.0	54.9
H2P 120	119	450	59.75	150.49	26	66.04	1 1/4" NPT	153.0	69.5

Maximum working pressure 125 psig. Maximum working temperature, internal & external 140° F. Tank pre-charge 38 psig.

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## Booster Pump Systems

### Three Year Limited Warranty

This warranty applies to booster pump systems built by Towle Whitney LLC, and shall:

- Exist 36 months from the date of shipment.
- Be in effect only after installation photographs are received by Towle-Whitney LLC.

Towle-Whitney LLC liability under this warranty shall be limited to the repair or replacement of any part or parts found to be defective (material or workmanship) within the warranty period. Towle-Whitney LLC shall determine whether the part needs to be returned, or field scrapped. The warranty excludes:

- Any water damage or consequential damage.
- Systems not installed in accordance with Installation and Maintenance Instructions.
- Labor, transportation, and related costs incurred by the customer.
- Misuse, negligence, inappropriate chemicals or additives in water.
- Inadequate protection from freezing.
- Lightning, high voltage spikes, accidents, floods, or acts of God.
- Re-Installation costs of repaired or replacement equipment.
- Re-Imbursement for the loss caused by interruption of service.

This warranty applies to all states and territories of the United States and Canada only. There are no express or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages and some jurisdictions do not allow limit actions on how long implied warranties may last. Therefore, the above limitations or exclusions may not apply. This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.