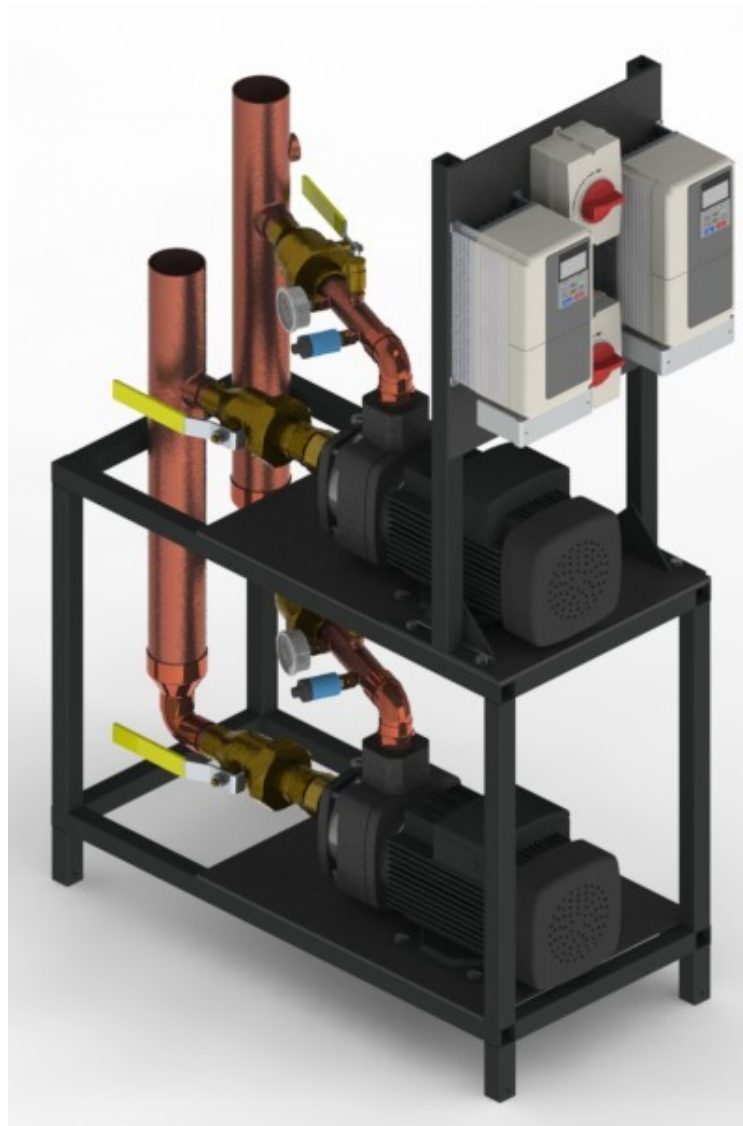




**TOWLE WHITNEY LLC**



**TW2000U-40W-40  
COMPACT DUPLEX VARIABLE SPEED  
BOOSTER PUMP SYSTEM**



The **TW2000U-40W-40 Compact Duplex Booster Pump System** is equipped with centrifugal pumps regulated by variable frequency drives that control the pump to maintain constant pressure regardless of varying demand or fluctuating incoming pressure. This system will supply **40 GPM with a 40 PSI overboost.**

System is custom built on a compact over/under frame.

VFD drives will **ALTERNATE** lead pump every 24 hours of run time and 2nd pump remains in standby until needed.

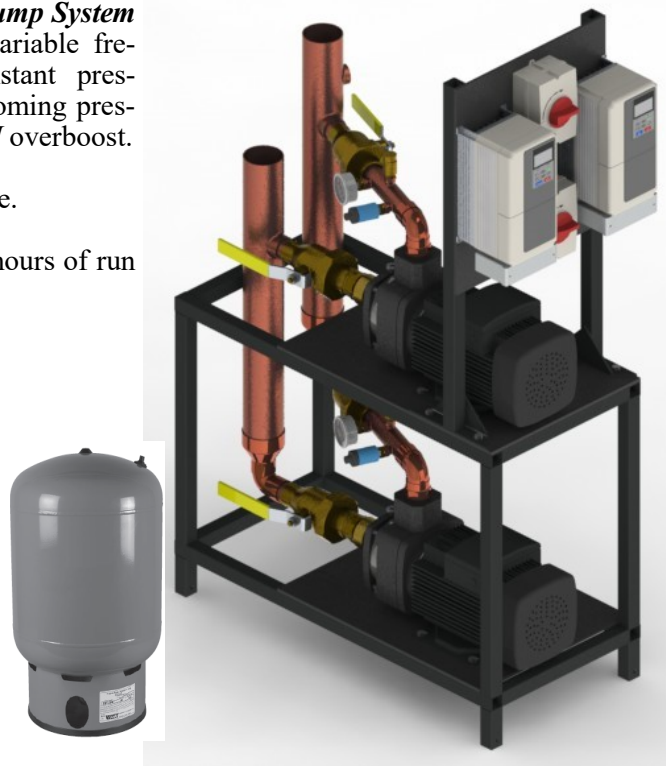
### Lead-Free (Wetted) components:

- Pumps: Cast Iron or SS Option
- Relief valves: LF Brass
- Pressure Gauges: Stainless Steel
- Transducers: Stainless Steel
- Check valves: LF Brass
- Ball Valves: LF Brass
- Manifolds: Type L Copper
- Fittings: LF Brass or SS

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

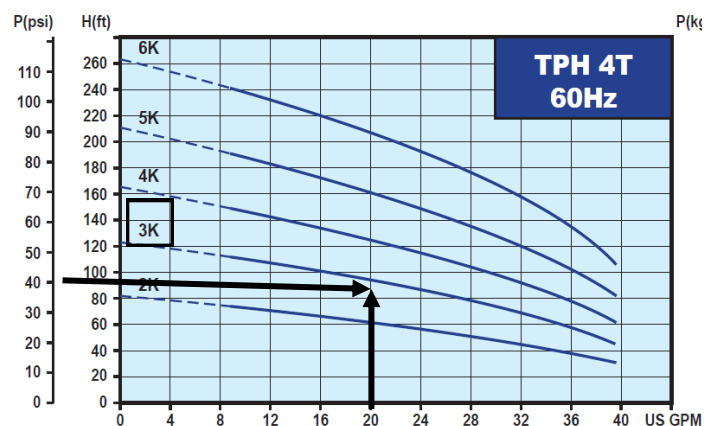
### Technical Specifications:

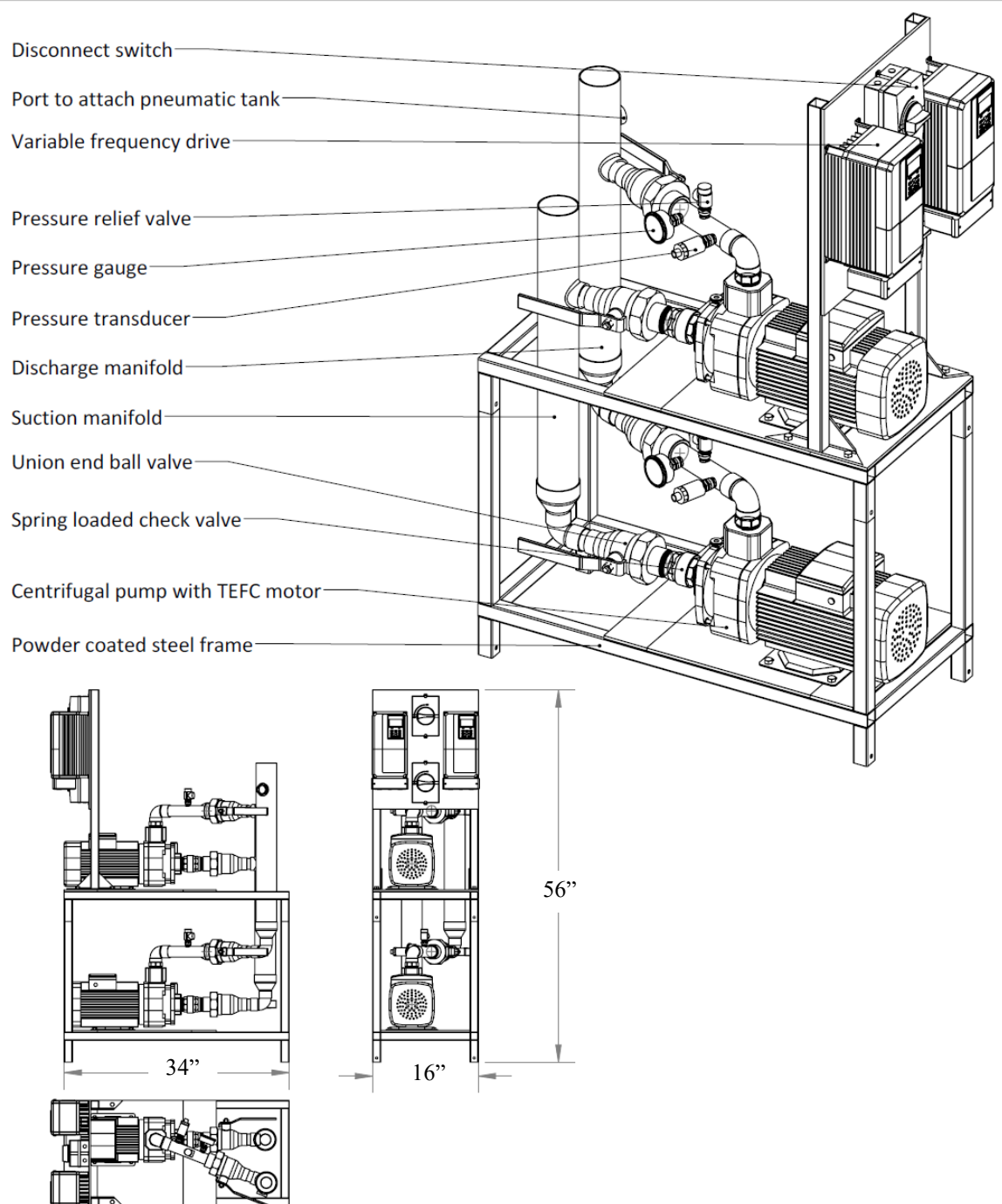
**Pumps:** Walrus [4T-3K]  
**Horse Power:** 3/4 HP per pump  
**Controllers:** Yaskawa or Equal  
**Flow Rate:** 40 GPM (20 GPM per pump)  
**Boost:** 40 Overboost  
**Set Pressure:** 65 PSI unless specified  
**Manifolds:** 2 inch  
**Tank:** Watts PLT-35 (14Gal)  
**Footprint:** 34" D x 16" W x 56" H  
**Power:** Two Independent circuits required  
208-220V/1PH or  
208-220V/3PH or  
360-480V/3PH  
Specify when ordering



*All parts shown included  
Actual system components may vary  
Some assembly required*

*Performance curve for each pump*





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

DO NOT SCALE DRAWING

|           | NAME | DATE    |
|-----------|------|---------|
| DRAWN     | VID  | 3/27/14 |
| CHECKED   |      |         |
| COMMENTS: |      |         |

### TOWLE WHITNEY LLC

Compact Overunder Variable  
Speed Booster System

SIZE DWG. NO. 32714B

SCALE: 1:20 WEIGHT:

SHEET 1 OF 1

21 Londonderry Turnpike, Hooksett, NH 03106

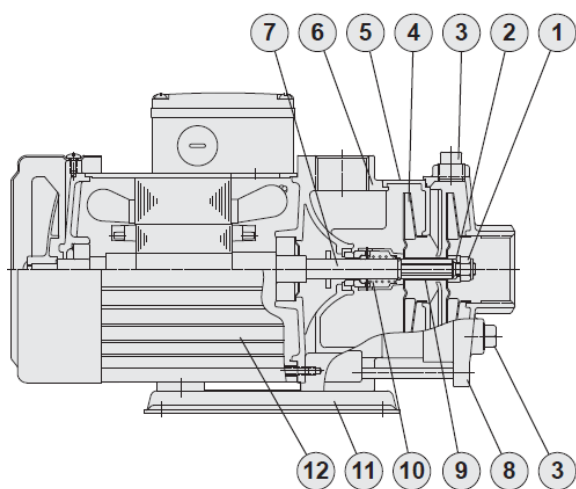
Tel: 603-626-7371/1-800-807-9827 Fax: 603-626-7372

www.towle-whitney.com ned@towle-whitney.com



# MULTISTAGE CENTRIFUGAL PUMP

## TPH2T/4T/8T/12T



### ***Motors:***

- The pump is coupled with (TEFC) Totally Enclosed Fan Cooled, squirrel-cage motor.
- Nominal speed: 3500 rpm at 60Hz
- Protection class: IP54
- Insulation class: F

### ***Pumps:***

- Horizontal multi-stage centrifugal pump
- Non self-priming
- close coupled design
- Impellers mounted on extended motor shaft.

### ***Materials***

| No. | Part name            | Material                |          |          |
|-----|----------------------|-------------------------|----------|----------|
|     |                      | Standard                | S series | N series |
| 1   | Lock Nut             | SUS 316                 | SUS 316  | SUS 316  |
| 2   | Sleeve(Shaft End)    | SUS 304                 | SUS 304  | SUS 316  |
| 3   | Water Plug           | FC 20                   | SUS 304  | SUS 316  |
| 4   | Impeller             | SUS 304                 | SUS 304  | SUS 316  |
| 5   | Intermediate Chamber | SUS 304                 | SUS 304  | SUS 316  |
| 6   | Pump Casing          | FC 20                   | SUS 304  | SUS 316  |
| 7   | Shaft                | SUS 304                 | SUS 304  | SUS 316  |
| 8   | Suction Chamber      | FC 20                   | SUS 304  | SUS 316  |
| 9   | Sleeve               | SUS 304                 | SUS 304  | SUS 316  |
| 10  | Mechanical Seal      | Tungsten carbide + HNBR |          |          |
| 11  | Mounted Base         | Coating Steel           |          | SUS 316  |
| 12  | Motor Shell          | Aluminum alloy          |          |          |

SUS 304 may be replaced by SUS316 depended on stock availability.

### ***Operating Limits:***

- Ambient temperature: Max. 104°F (40°C )
- Liquid temperature range: 32°F (0°C) to 194°F (90°C)
- Operating pressure: Max. 142 psi
- Inlet pressure: Max 85 psi

### ***Suitable Liquids:***

- Clean or other non-corrosive liquids





## GENERAL SPECIFICATIONS

### Assembled Units:

- All “wetted surfaces” shall be lead free (<.25% Pb) in conformance with the 1/4/14 federal law
- Shall include a separate and independent variable frequency drive (VFD) for each pump with a pressure transducer, pressure gauge, and relief valve. Piping and frame shall not interfere with access to the controls
- Each pump shall include isolation valves on both the suction and discharge piping
- Each pump shall have a separate and independent disconnect box

### Variable frequency drive:

- Will ALTERNATE the lead pump every 24 hours (field adjustable) of run time. The remaining pump(s) shall be in standby
- Shall have lead/lag & alternation feature without an external control panel or PLC
- Shall have hands-off automatic (HOA) capability
- Rated to operate using specified power requirement. The drive efficiency shall be 98% or better
- Have UL approval with all factory installed options and preset values and/or last saved data values will remain available to the operator after power outage
- Shall have at least NEMA 1 rated conduit enclosure
- The program will protect 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
- Shall have the ability to automatically restart after an over-current, over-voltage, under-voltage or loss of input signal
- Shall have an operator control panel [keypad] for customization of parameters
- Shall include a feature to upload/download parameters into an external device to be used with another drive or the same drive
- Shall have a removable non-volatile memory device
- Shall 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
- Ladder logic program shall utilize a proportional - integral - derivative control function
- 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

### Transducer:

- The transducer shall be rated for required system pressure and shall be 4-20 mA analog
- Separate transducers shall be supplied for each variable frequency drive to ensure redundancy

### Centrifugal pump:

- Shall have a cast iron casing with 304 stainless steel impellers.
- Shall have a 316 stainless steel shaft sleeve. Mechanical seal shall be rated to withstand pressure of up to 142 PSI
- Motor shall be totally enclosed fan cooled (TEFC). and manufactured in compliance with CE, RoHS and CSA

### Pneumatic expansion tank:

- Pneumatic expansion tank shall be rated for use with potable water with an operating pressure of a maximum 125 PSI
- Shall be pre-charged to a pressure of 10 PSI below system operating pressure for system to run properly

### Manifolds, valves and fittings:

- Shall be sized appropriately to allow water velocity not exceeding 10 ft/sec, to minimize cavitation and turbulence
- All shut off valves shall be standard port ball valves and check valves shall be silent and spring-loaded

### Installation:

- Equipment shall be installed in accordance with applicable local building, electrical and plumbing codes
- Shall be installed indoors (unless otherwise specified) and protected from water spray





## 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



PLT-35



Certified to  
ANSI/NSF 61  
(73°F/23°C)

### Pressure — Temperature PLT-35 Order No. 0067373

Max. Pressure: 150 psi  
Max. Temp: 200 °F (93°C)  
Tank Volume: 14.0 gal. (53 liters)  
Tank Acceptance: 5.6 gal. (21.2 liters)  
Air Pre-charge: 20psi (138 kPa)  
Connections Size: 1" (25mm)  
Diameter: 16.0" (406mm)  
Length: 21.7" (551mm)  
Weight: 32 lbs. (15 kgs.)

### Acceptance Volume

| AIR SIDE<br>PRE-PRESSURE |         | WATER SIDE VOLUME<br>AT 150 psi (gallons) |
|--------------------------|---------|---|
| psi                      | kPa/bar | PLT -35                                   |
| 20                       | 138 kPa | 10.7                                      |
| 40                       | 276 kPa | 9.2                                       |
| 60                       | 413 kPa | 7.6                                       |
| 80                       | 551 kPa | 6.1                                       |

### ⚠ WARNING!

Improper installation, adjustment, alteration, service or maintenance may cause property damage, serious bodily injury or death. Read instructions completely before proceeding with installation. Only qualified personnel should install or service this equipment in accordance with local codes and ordinances.

This Expansion Tank is designed and intended for water storage at a maximum pressure of 150psi (10.3 bar) and a maximum temperature of 200°F. (93°C) Any use other than for potable water or at a sustained or instantaneous pressure in excess of 150psi or 200°F is **UNSAFE** and may cause property damage, serious bodily injury or result in death.

Do not exceed 80psi (5.5 bar) air charge. Air charge pressures exceeding 80psi (5.5 bar) could become hazardous and will void any and all warranties, either written or implied. Failure to follow these instructions may cause property damage, serious bodily injury or death.

**Disclaimer:** The manufacturer of this tank does not accept any liability or other responsibility for personal injury or property damage resulting from improper use, installation or operation of this tank or the system of which it is a part.

**Notice:** This Expansion Tank, like all Expansion Tanks, may eventually leak. Do not install without adequate drainage provisions where water flow will cause damage.





### 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.
- Transducers and pump seals.
- Debris in water causing internal pump 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.
- Adjusting drive parameters without consulting factory.

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.