



**TW2000U-150G-40
COMPACT DUPLEX VARIABLE SPEED
BOOSTER PUMP SYSTEM**



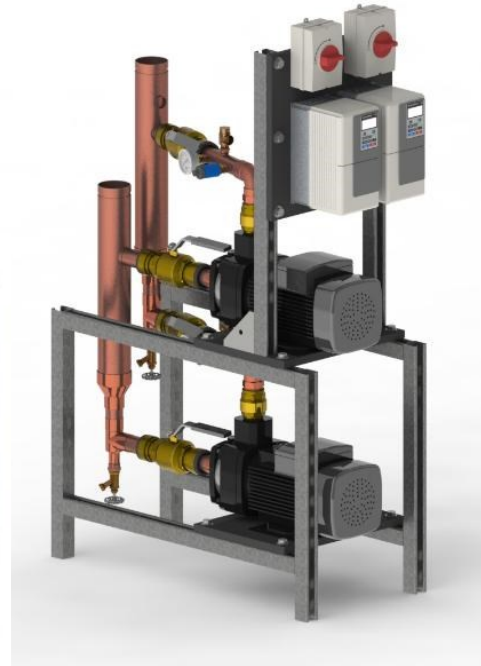
The *TW2000U-150G-40 Duplex Booster Pump System* is equipped with centrifugal pumps regulated by variable frequency drives that control the pump to maintain constant pressure regardless of varying demand or fluctuating incoming pressure.

System is built on a MODULAR frame for ease of transport and installation.

VFD drives will ALTERNATE lead pump every 24 hours of run time. Second pump will remain on standby.

Lead-Free (Wetted) components:

- Centrifugal Pumps: Stainless Steel
- Relief valves: LF Brass or SS
- Pressure Gauges: Stainless Steel
- Transducer: Stainless Steel
- Check valves: LF Brass
- Ball Valves: LF Brass
- Manifolds: Type L Copper
- Fittings: LF Copper or SS



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

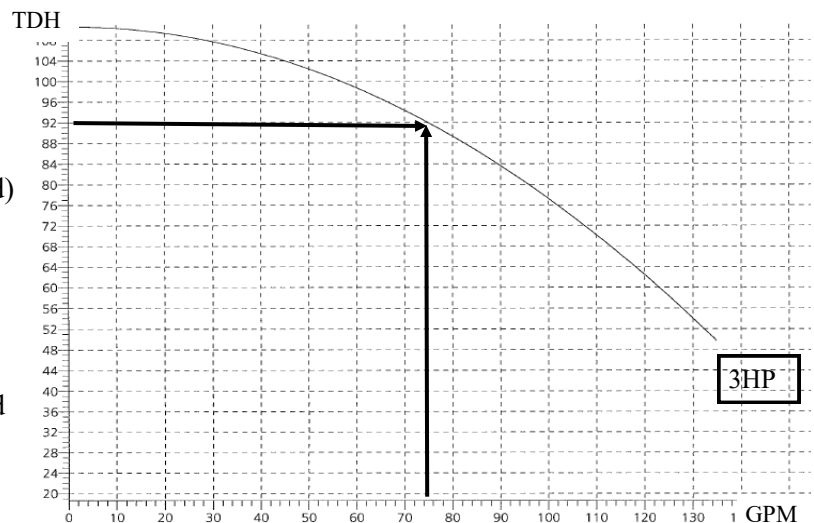
* All lead-free brass shall be less than .25% Pb

Technical Specifications:

- Pumps:** Goulds [125MS]
- Horse Power:** 3 HP per pump
- Controllers:** Yaskawa
- Flow Rate:** 150 GPM (75 GPM per pump)
- Boost:** 40 PSI
- Set Pressure:** 65 PSI (unless otherwise specified)
- Manifolds:** 3 inch Type L Copper
- Tank:** 26 Gallon
- Frame Size:** 16" W x 59" H x 34" D
- Power:** Two Independent circuits required
208-220V/1PH
208-220V/3PH
360-480V/3PH

Specify when ordering

Performance curve for EACH pump





TOWLE WHITNEY LLC Component Compliance

Electrical

Yaskawa VFD UL 508C Power Conversion
CSA 22.2 Industrial Controls



CE

RoHS

Lovato Shut-off NEMA4



CE

RoHS

Pumps

Grundfos CM(I) SS Series NSF 61



CE

Grundfos CR(I) SS Series NSF 61



CE

Goulds 125MS Series NSF 61



CE

Walrus TPH Series NSF 372



CE

RoHS

Plumbing

Bluefin BVT200 Ball Valves NSF 61

Wilkins 375XL RPZ: NSF 61

Watts LF777SM3 Strainer NSF 61

Bonomi Check 1000012 NSF 61

CE

ThermOmega Thermal Valve NSF 61

Victaulic 607 "E" Coupling NSF 61

Victaulic 660 Cap NSF 61

Flexcon H2P25 Tank NSF 61

Amtrol Tank NSF61

Manifolds / piping Type L Copper

Fittings Copper

Discharge Riser Copper

- Pressure Relief valve:

- SS 4-20mA Transducer:

- Pressure Gauges: CA AB1953

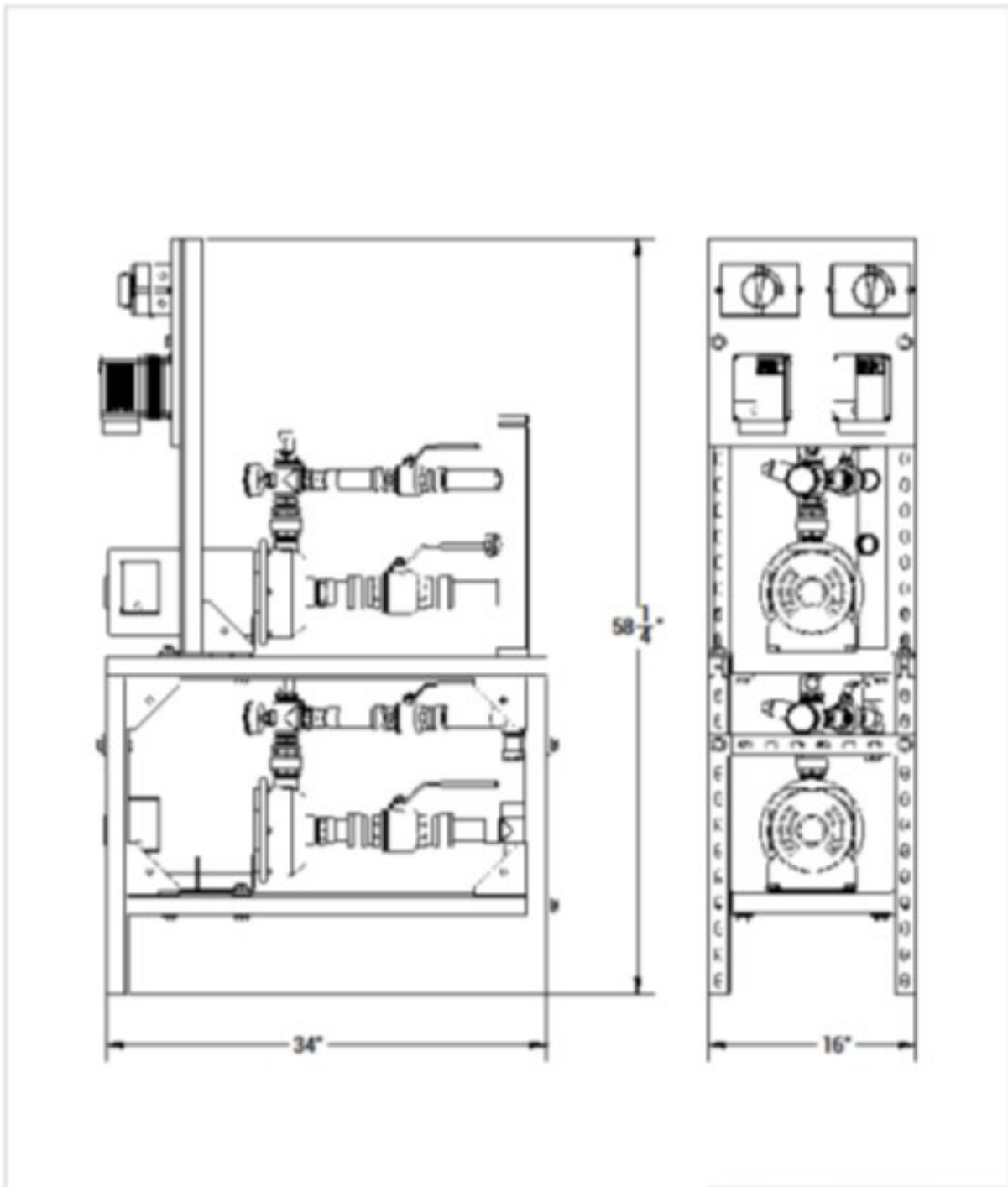
Sealants

Rectorseal Nokorode Flux NSF 61

Worthington SILVER Solder NSF 61

LocTite 567 Thread Sealant NSF 61

Gasoil Thread Sealant NSF 61

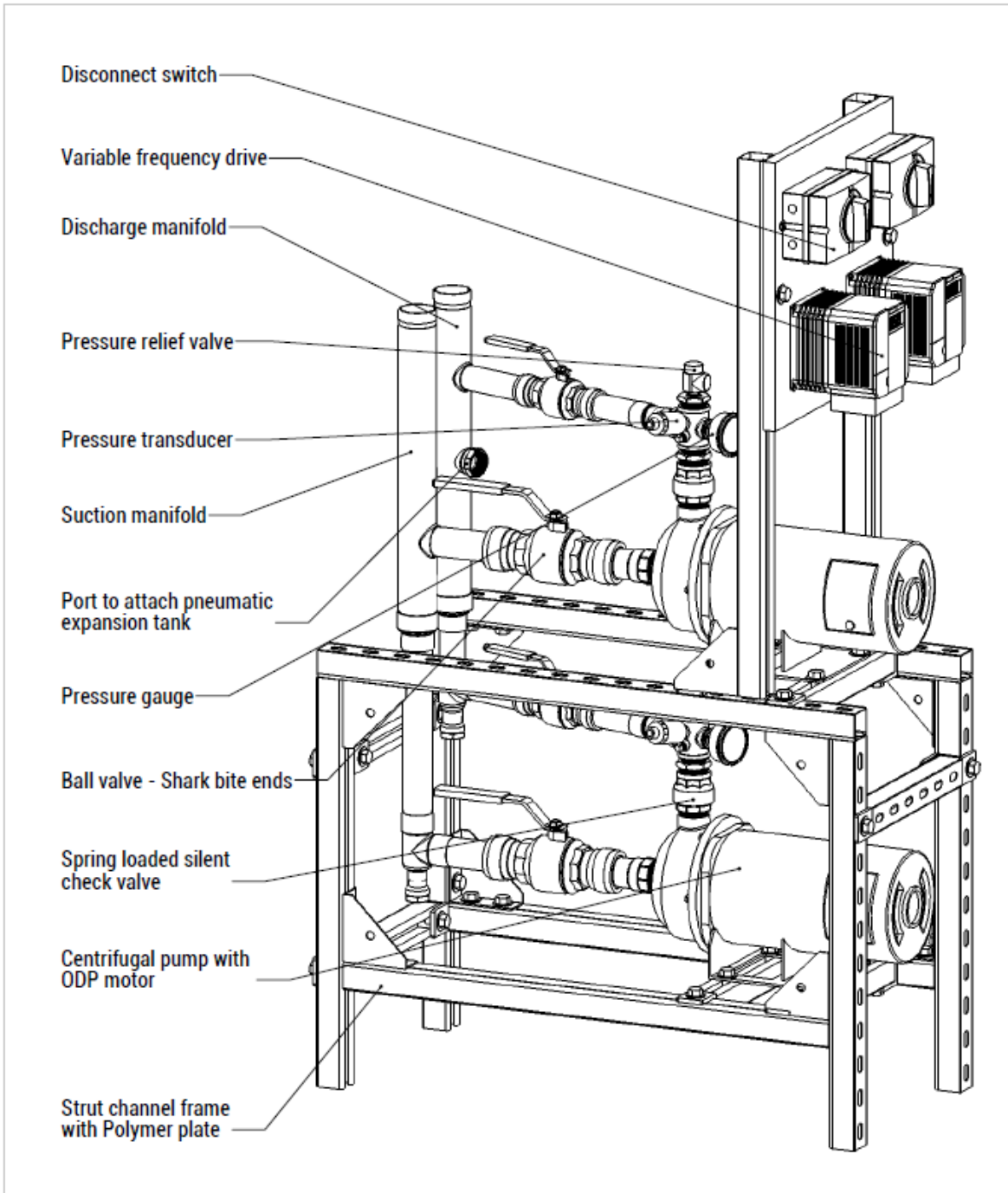


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Drawn	DATE
VID	9/13/19
Checked	
Comments	

TOWLE WHITNEY LLC	
Duplex Overunder Variable Speed Booster System	
REV	DATE
A	2019-09-13-B
SCALE	AS SHOWN



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NAME	DATE
DRAWN VID	9/13/19
CHECKED	
COMMENTS:	

TOWLE WHITNEY LLC	
Duplex Overunder Variable Speed Booster System	
SUE A	DWG. NO. 2019-09-13-A
SCALE: 1:20	WEIGHT:
	SHEET 2 OF 2



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
- Shall be mounted on a modular frame for ease of transport and installation. The pump & drive wiring harness shall remain intact after frame is split apart (with the exception of “network wire”)

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 stainless steel 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



TOWLE WHITNEY LLC Component Compliance

Electrical

Yaskawa VFD

UL 508C Power Conversion
CSA 22.2 Industrial Controls



CE

RoHS

Lovato Shut-off

NEMA4



CE

RoHS

Pumps

Grundfos CM(I) SS Series

NSF 61



CE

Grundfos CR(I) SS Series

NSF 61



CE

Goulds 2MS Series

NSF 61



CE

Walrus TPH Series

NSF 372



CE

RoHS

Plumbing

Bluefin BVT200 Ball Valves

NSF 61

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CE

ThermOmega Thermal Valve

NSF 61

Victaulic 607 "E" Coupling

NSF 61

Victaulic 660 Cap

NSF 61

Flexcon H2P25 Tank

NSF 61

Amtrol Tank

NSF61

Manifolds / piping

Type L Copper

Fittings

Copper

Discharge Riser

Copper

- Pressure Relief valve:

- SS 4-20mA Transducer:

- Pressure Gauges:

CA AB1953

Sealants

Rectorseal Nokorode Flux

NSF 61

Worthington SILVER Solder

NSF 61

LocTite 567 Thread Sealant

NSF 61

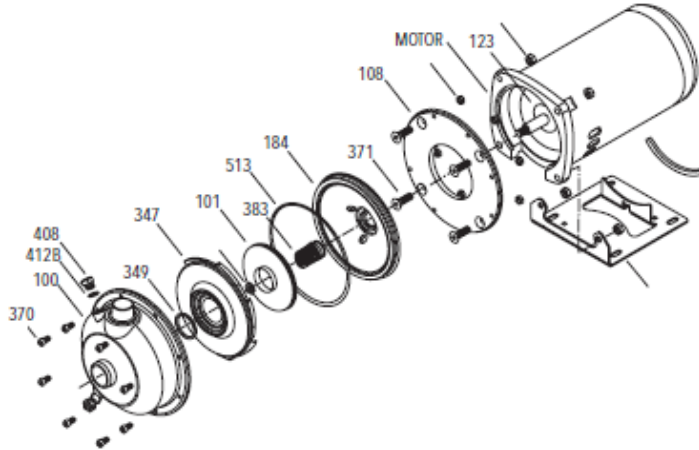
Gasoil Thread Sealant

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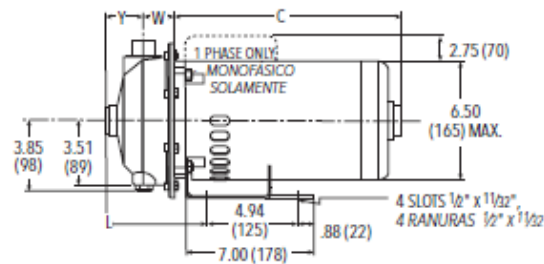
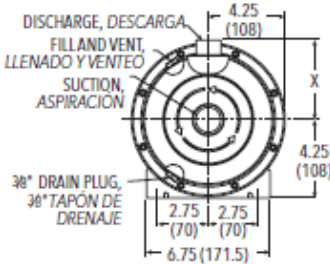
CENTRIFUGAL PUMP DIMENSIONS AND SPECIFICATIONS

MCS CLOSE COUPLED PUMP MAJOR COMPONENTS: MATERIALS OF CONSTRUCTION MATERIALES DE CONSTRUCCIÓN DE LOS PRINCIPALES COMPONENTES DE LA BOMBA MCS DE ACOPLAMIENTO CERRADO



Item No., Parte No.	Description, Descripción	Materials, Materiales
100	Casing, Carcasa	AISI 316L SS,
101	Impeller, Impulsor	AISI 316L Acero inoxidable
108	Motor adapter, Adaptador del motor	Aluminum, Aluminio
123	Deflector, Deflector	BUNA-N
184	Seal housing, Alojamiento del sello	AISI 316L SS, AISI 316L Acero inoxidable
347	Guidevane, Difusor	
349	Seal ring, guidevane; Anillo del sello, difusor	BUNA-N
370	Socket head screws, casing; Encajes de tornillos, carcasa	AISI 410 SS, AISI 410 Acero inoxidable
371	Bolts, motor; Bulones, motor	Steel, Acero
383	Mechanical seal, Sello mecánico	see chart, ver tabla
408	Drain and vent plug, casing; Tapones de drenaje y ventilación, carcasa	AISI 316L SS, AISI 316L Acero inoxidable
412B	O-ring, drain and vent plug; Anillo 'O', tapón de drenaje y ventilación	Viton
513	O-ring, casing; Anillo 'O', carcasa	
Motor	NEMA standard, 56Y flange;	
Motor	NEMA estándar, brida 56Y	

MCS CLOSE COUPLED - DIMENSIONS, WEIGHTS AND SPECIFICATIONS MCS ACOPLADO CERRADO - DIMENSIONES, PESOS Y ESPECIFICACIONES



Clockwise rotation viewed from drive end. Rotación en dirección de las agujas del reloj visto desde el extremo del motor.

NOTES:

- Pumps will be shipped with top vertical discharge as standard. For other orientations, remove casing screws, rotate to desired position, and tighten 6mm screws to 5 - 6 lbs./ft. (6.8-8 N-m).
- Dimensions in inches and millimeters (mm). Weight in pounds and kilograms (kg).
- Motor dimensions may vary with motor manufacturer.
- Not to be used for construction purposes unless certified.

Dimensions and Weights - Determined by Pump, Dimensiones y peso - Determinados por la bomba

Pump, Bomba	Suct., Aspiración	Disch., Descarga	HP	W	X	Y	L	WT. Less Motor, Peso sin motor
100 MS	1.25 (32)	1.00 (25)	1/2-3	1.64 (42)	4.37 (111)	2.00 (51)	5.18 (131)	6 (2.7)
125 MS	1.50 (38)	1.25 (32)	1.50-7.50	2.08 (53)	4.45 (113)	2.13 (54)	5.74 (146)	7 (3.2)
150 MS	2.00 (51)	1.50 (38)	1.50-5	2.08 (53)	4.45 (113)	2.13 (54)	5.74 (146)	7 (3.2)

Dimensions and Weights - Determined by Motor, Dimensiones y peso - Determinados por el motor

HP	Motor Length and Weights, Longitud y peso del motor							
	1 Phase, Monofásicos				3 Phase, Trifásicos			
	ODP*		TEFC*		ODP*		TEFC*	
	C	Weight, Peso	C	Weight, Peso	C	Weight, Peso	C	Weight, Peso
1/2	9.88 (251)	21 (9.5)	11.34 (288)	34 (15.4)	9.79 (249)	19 (8.6)	8.60 (218)	20 (9.1)
3/4	10.63 (270)	26 (11.8)	11.59 (294)	33 (14.9)	9.79 (249)	25 (11.3)	10.34 (263)	21 (9.5)
1	10.88 (276)	28 (12.7)	12.09 (307)	37 (16.8)	9.79 (249)	26 (11.8)	10.84 (275)	30 (13.6)
1 1/2	11.13 (283)	28 (12.7)	12.59 (320)	42 (19)	10.54 (268)	28 (12.7)	11.09 (282)	33.75 (15.3)
2	11.73 (298)	40 (18.1)	12.84 (326)	42 (19)	11.04 (280)	34 (15.4)	11.81 (300)	36 (16.3)
3	12.48 (317)	43 (19.5)	13.34 (339)	48 (21.7)	12.29 (312)	34 (15.4)	12.56 (319)	41 (18.6)
5	13.14 (334)	49 (22.2)	-	-	13.79 (350)	46 (20.8)	-	-

* Premium efficiency where required by Department of Energy regulations.

* Eficacia superior donde se requiera por el Ministerio de regulaciones de la Energía.

NOTAS:

- Las bombas se entregan con la descarga vertical superior estándar; para una orientación diferente, retirar los tornillos de la carcasa, hacer girar hasta la posición deseada y ajustar los bulones de 6 mm a 5-6 libras/pie (6.8-8 N-m).
- Dimensiones en pulgadas y milímetros (mm), peso en libras y kilogramos (kg).
- Las dimensiones del motor pueden variar de acuerdo al fabricante.
- No utilizar para fines de construcción a menos que estén certificadas.



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⁽¹⁾ 100:1⁽²⁾
- Speed Regulation:
 - ± 0.5 to 1% with slip compensation⁽¹⁾
 - ± 0.2%⁽²⁾
- 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

⁽¹⁾ V/f Mode

⁽²⁾ 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

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



PRO-LINE®

Diaphragm Well Tanks: PL Series

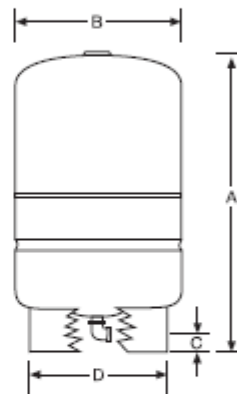
125 PSIG Working Pressure

Construction

Shell	Deep Drawn Steel
Diaphragm	Butyl
Liner	Polypropylene
System Connection	304L Stainless Steel
Finish	Tan
Water Circulator	Turbulator™
Air Valve	Projection Welded
Factory Precharge	38 PSIG (2.6 bar)

Application

- Controls pump cycling in residential well water systems.



Performance

Maximum Operating Temperature	200°F (93°C)
Maximum Working Pressure	125 PSIG (8.6 bar)
Maximum Relief Valve Setting	100 PSIG (6.9 bar)
Warranty	5 Year

Stand Models

Model	Tank Volume		Max. Accept. Factor	A Tank Height		B Tank Diameter		C Sys. Conn. Centerline		D Stand Diameter		System Conn. (NPTF)	Shipping Weight	
	Gal	Lit		in	mm	in	mm	in	mm	in	mm		in	Lbs
PL-14	14.0	53	0.81	25	635	15	381	1 1/8	40	12	304	1	22	10
PL-20	20.0	76	0.57	32	813	15	381	1 1/8	40	12	304	1	28	13
PL-26	26.0	98	0.44	39	991	15	381	1 1/8	40	12	304	1	34	15
PL-32	32.0	121	0.35	47	1194	15	381	1 1/8	40	12	304	1	40	18
PL-34	34.0	129	1.00	30	762	22	559	1 1/8	49	20 1/2	521	1 1/4	50	23
PL-44	44.0	167	0.77	38	914	22	559	1 1/8	49	20 1/2	521	1 1/4	57	26
PL-62	62.0	235	0.55	47	1194	22	559	1 1/8	49	20 1/2	521	1 1/4	75	34
PL-81	81.0	301	0.41	57	1448	22	559	1 1/8	49	20 1/2	521	1 1/4	92	42
PL-86	86.0	326	0.54	47	1194	26	660	2 1/8	52	20 1/2	521	1 1/4	99	45
PL-119	119.0	450	0.39	62	1575	26	660	2 1/8	52	20 1/2	521	1 1/4	133	60

All dimensions and weights are approximate.

21 Londonderry Turnpike, Hooksett, NH 03106

Tel: 603-626-7371/1-800-807-9827 Fax: 603-626-7372 www.towle-whitney.com info@towle-whitney.com



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.
- 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 dive 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.