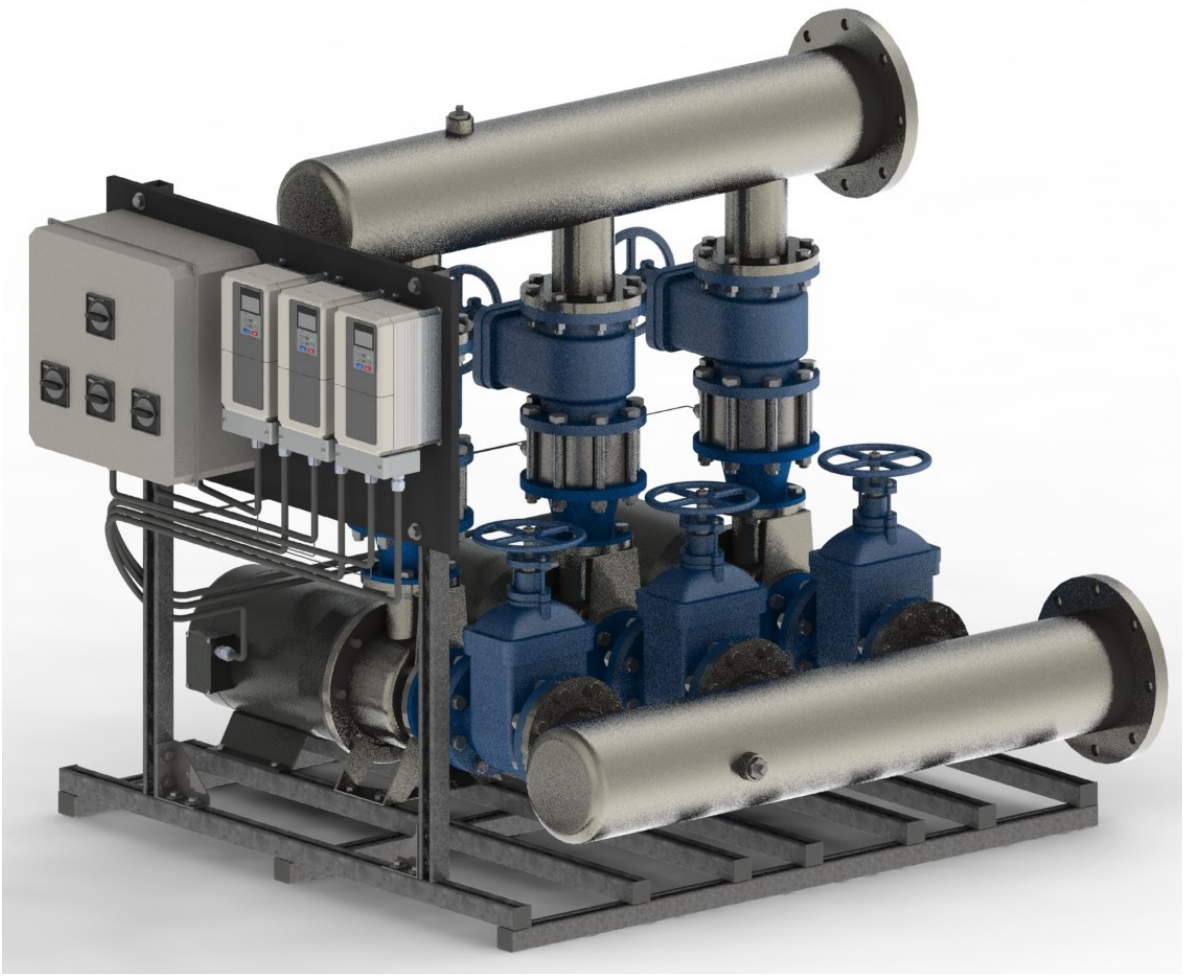
TOWLE WHITNEY
Booster Pump Systems

AHR EXPO INNOVATION AWARDS 2022 FINALIST

Project



TW3018T-6BF-10HP
TRIPLEX VARIABLE SPEED
BOOSTER PUMP SYSTEM

TOWLE WHITNEY
603-626-7371

SYSTEM MODEL: TW3018T-6BF-10HP

The DATA CENTER Booster Pump System features centrifugal pumps with variable frequency drives (VFDs) that maintain constant pressure, despite demand fluctuations. The system alternates the lead pump every 24 hours, keeping the remaining pumps on standby.

Design Specifications:

System Flow Rate:	XXX GPM
Pump Flow Rate:	XX GPM
Incoming Pressure:	XX PSI
Pump Boost:	XX PSI
Set Pressure:	XX PSI
Power:	XXX-XXXV/X Phase
Circuits Required:	**Single Point Connection**
Pump Hp (each):	10 Hp
Total Hp:	30 Hp

See Page 9 for amp requirements (based on system power)

Technical Data:

Frame
Material: Steel Strut Channel
Footprint: 50" W x 54" D

Pumps
Model: Goulds 6BF "D"
Material: Cast Iron
Horsepower: 10 HP per pump
Maximum
Volume: 460 GPM per pump
Boost: 47 PSI (110' TDH)
Curve: Refer to page 3

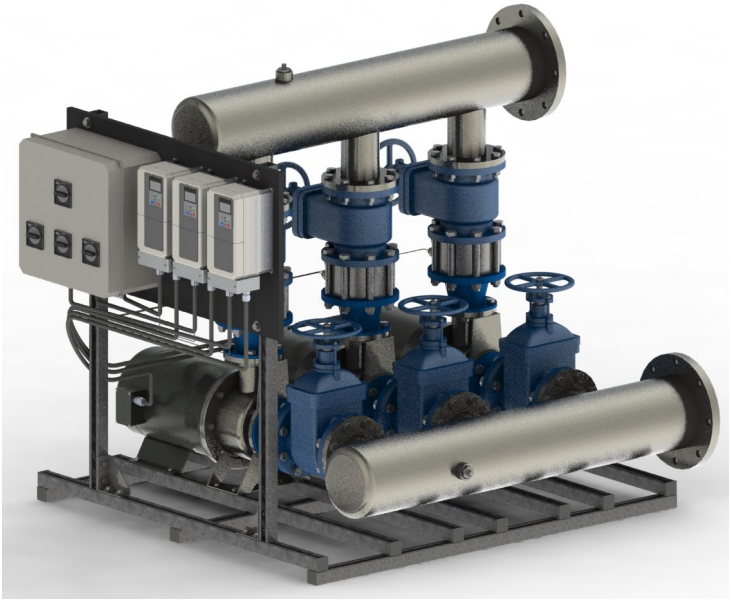
Manifolds
Material: Stainless Steel
Connection: AWWA Flange

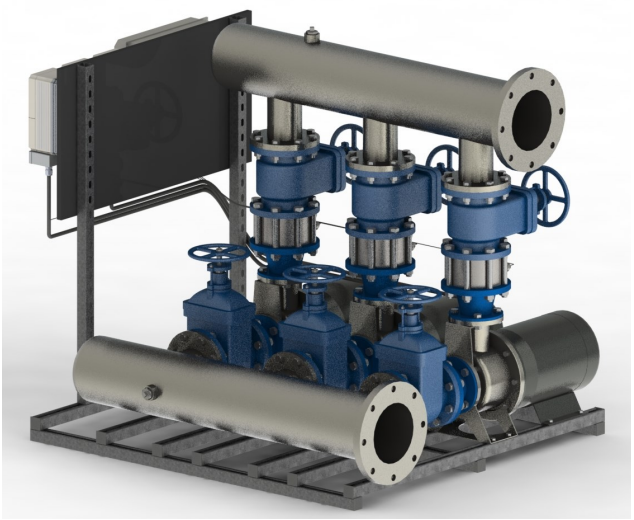
VF Drives
Model: Yaskawa iQPump 1000
Rated: NEMA 1

Power Options
200-240V/3Phase
360-480V/3Phase

Fuse Amp Sizing
Refer to page 9

Electrical Options
Single Point Connection



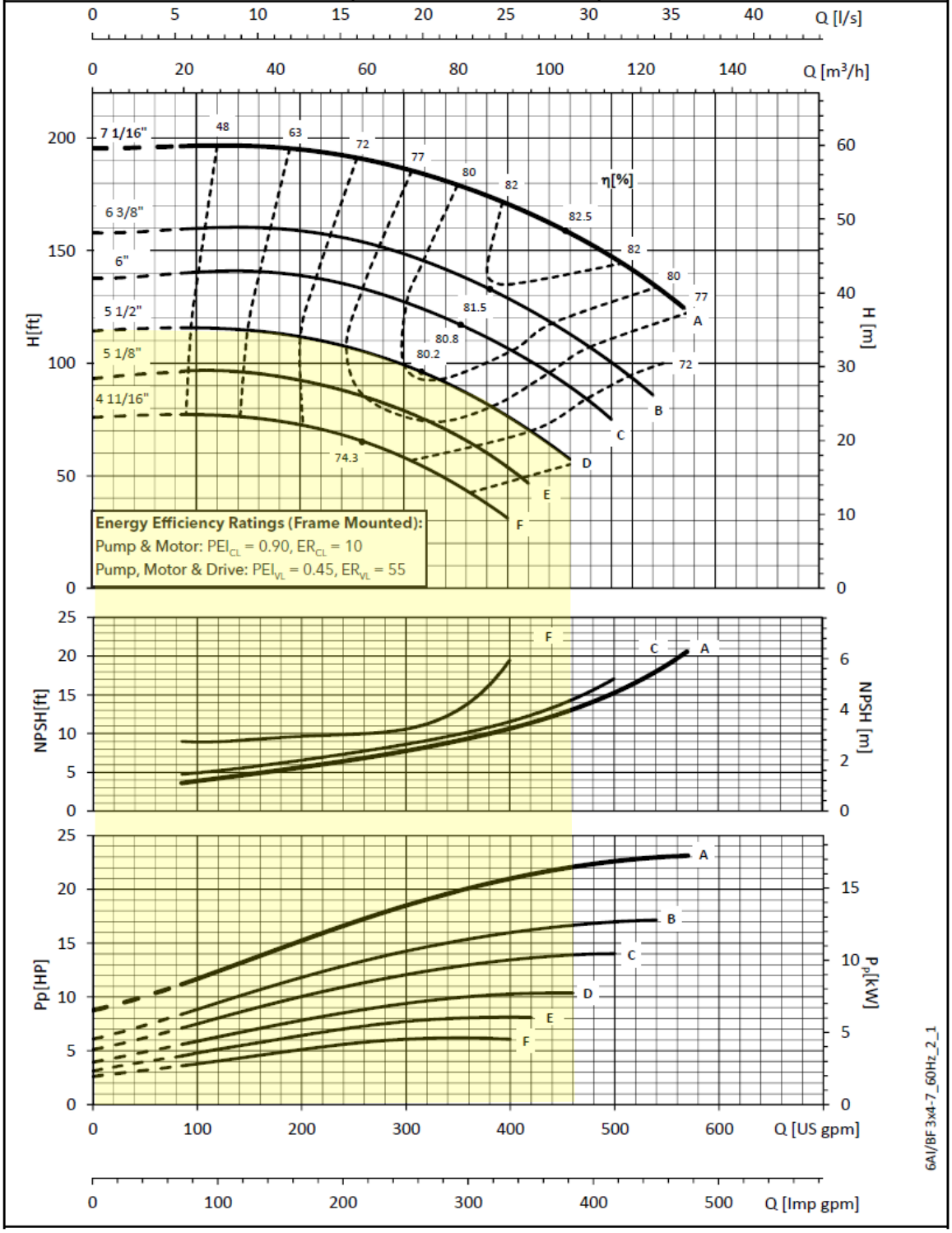


All parts shown included. Actual system components may vary.

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

Performance curve for each pump

6AI/BF 3x4-7	3500 rpm	ANSI/HI 14.6 - Grade 2B



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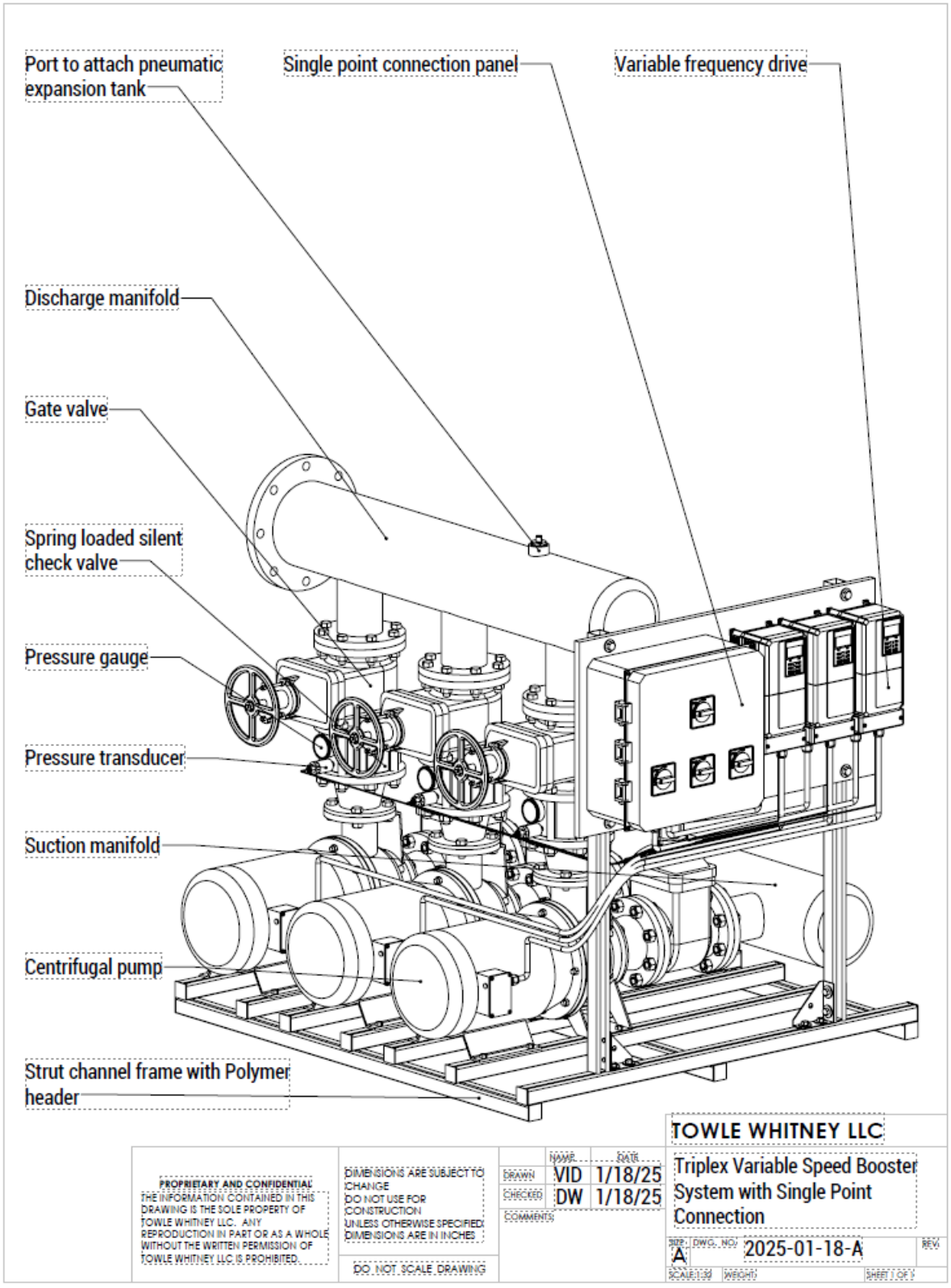
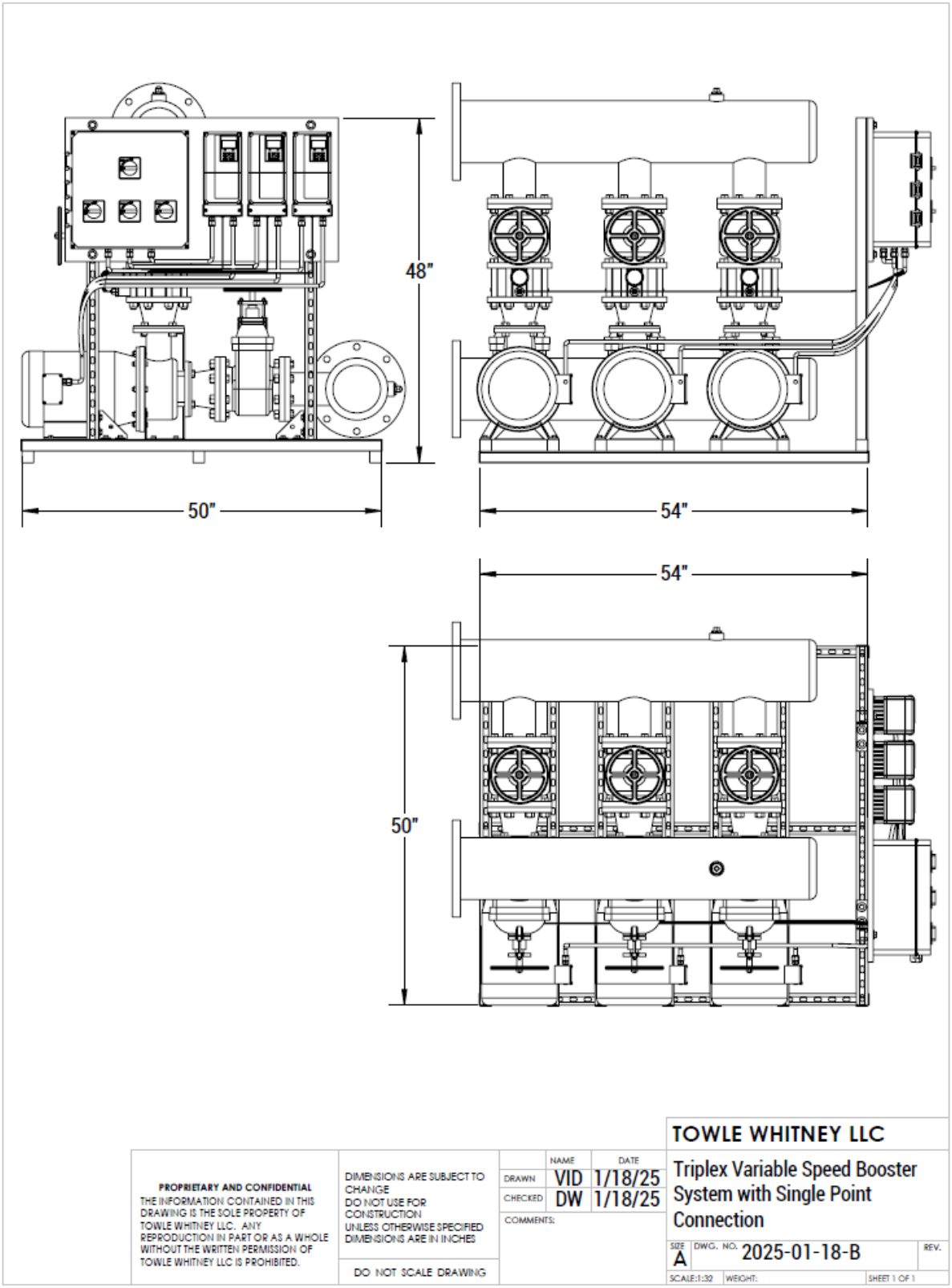
SYSTEM CONFIGURATION



SYSTEM DIMENSIONS



PROPRIETARY AND CONFIDENTIAL
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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	1/18/25
CHECKED	DW	1/18/25

COMMENTS:

TOWLE WHITNEY LLC

Triplex Variable Speed Booster System with Single Point Connection

SIZE A | DWG. NO. 2025-01-18-B | REV.

SCALE:1:32 | WEIGHT: | SHEET 1 OF 1

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603-626-7371

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 and pressure gauge. Piping and frame shall not interfere with access to the controls
- Each pump shall include gate valves on both the suction and discharge piping
- System shall have Single Point Connection
- Shall be mounted on a frame for ease of transport and installation.

Variable frequency drive:

- Will ALTERNATE the lead pump every 24 hours (field adjustable) of run time. The lag pump shall be in standby
- 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 bronze fitted 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 to totally enclosed fan cooled (TEFC). and manufactured in compliance with CE, RoHS and CSA

Pneumatic expansion tank (supplied by others):

- Pre-charged to a pressure of 10 PSI below system operating pressure for system to run properly

Manifolds, valves and fittings:

- Manifolds are designed for either right or left access
- Shall be sized appropriately to allow water velocity not exceeding 10 ft/sec, to minimize cavitation and turbulence
- 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

Lead-Free (Wetted) Components:	
Pumps:	Stainless Steel
Relief Valves:	Stainless Steel
Pressure Gauges:	Lead Free Brass
Transducers:	Stainless Steel
Check Valves:	Stainless Steel
Gate Valves:	Ductile Iron Lead Free Brass
Manifolds:	Stainless Steel

Electrical

Yaskawa VFD	UL 508C Power Conversion CSA 22.2 Industrial Controls
Single Point Connection	UL508A

Pumps

Grundfos CM(I) SS Series	NSF 61
Grundfos CR(I) SS Series	NSF 61
Goulds BF Series	NSF 61

Plumbing

Flomatic 888VFD Check	NSF 61
Gate Valve	AWWA C-509
Manifolds	NSF 61

Sealants

Rectorseal Nokorode Flux	NSF 61
Worthington SILVER Solder	NSF 61
LocTite 567 Thread Sealant	NSF 61
Gasoila Thread Sealant	NSF 61

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VFD SPECIFICATIONS

YASKAWA

Service Conditions:

Ambient Temperature:-10°C to 40°C (14°F to 104°F) NEMA 1,
Humidity: 95% RH, non-condensing
Altitude: 3300 ft; higher by derate
Input voltage: +10%/-15%
Input frequency: 50/60 Hz ± 5%
3-phase, 3-wire, phase sequence insensitive

Design Features:

LCD keypad display, 5 lines x 16 characters, backlit, 6 languages, copy function
Multi-step speed settings: 5 available
Setpoint (PI) control
32-bit microprocessor logic
Nonvolatile memory, program retention
Displacement power factor: 0.98
Output frequency: 0.1 to 120 Hz
Frequency resolution: 0.06 Hz
Frequency regulation: 0.1%
Control Terminal Board: Quick disconnect
Carrier frequency: selectable to 15 kHz
24 VDC control logic, PNP / NPN selectable
Transmitter/Option power supply
Input/output terminal status
Timer function: Elapsed time, Delay on start, Delay on stop
RS-422/485 port: Modbus protocol
Volts/hertz ratio: Preset and programmable V/Hz patterns
Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
NEMA 1 or protected chassis
UL, cUL listed and CE marked; IEC 146;
MTBF: exceeds 28 years

Pump Protective Features:

Dry Well
Air in System
Blocked Impeller
Pump over Cycling
No Flow Protection
Loss of Prime
Transducer Loss
Over Torque

Performance Features:

Overload capacity: nominal 110% for 60sec. (150% peak)
Starting torque: 100% at 3 Hz
Motor preheat function
Adjustable accel/decel: 0.1 to 6000 sec.
Critical frequency rejection: 3 selectable, adjustable bands
Torque-limiting: 30-180%
Energy Saving control
Torque boost: full range, auto
Power loss ride-thru: 2 sec
Auto restart after power loss or resettable fault, selectable, programmable
Feedback signal loss detection
Serial communications loss detection
"Up/Down" floating point control capability (PI)
Stationary motor auto-tuning
Pump Sleep function
Run-permissive input

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Silent Check Valve — Model 888VFD

FLOMATIC®
Flomatic Corporation
LEAD FREE
NSF/ANSI 61
IAPMO R&T

Sizes 2" Thru 10" / 50 mm Thru 250 mm
888S6VFD INCLUDED

Written Specifications:

Wafer style silent check valves shall be of silent operating type that begin to close as flow is reduced and fully close at zero velocity stopping reverse flow which reduces or eliminates water hammer shock.

The unique poppet design insures that the valve operates quietly and efficiently throughout the entire stroke of the poppet due to varying flow rates, especially with VFD controlled pumps, across a wide range of flow velocities.

The valve design shall incorporate a center guided, spring loaded poppet, guided by an oversized, one-piece bushing. The poppet shall have a short linear stoke that generates a flow area equal to that of the pipe size in the full open position.

The valve shall operate equally well in the horizontal or vertical flow up position. For vertical flow down position CONSULT FACTORY.

The valve body shall be constructed of ductile iron (grade 65-45-12) or stainless steel.The poppet and seat ring shall be constructed of 316 stainless steel, with the spring constructed of 302 stainless steel. The oversized bushing shall be constructed of un-leaded bronze and will be located concentrically within the valve body and held in place by a 302 stainless steel snap ring. The valve will be fitted with an EPDM o-ring seal to insure drip tight closure when the poppet closes against the seat ring.

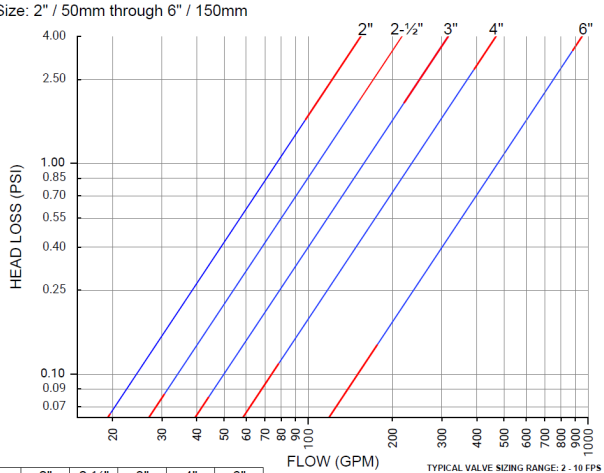
Valves shall be certified to NSF/ANSI 61 Drinking Water System Components - Health Effects, and also certified to be lead free in accordance with NSF/ANSI 372.

All component parts shall be field replaceable and without the need of specialty tools.

The valve shall be equal in all respects to the Model 888VFD as manufactured by the Flomatic® Corporation.

Wafer Check Valve Head Loss Chart Model 888S6VFD FLOMATIC® VALVES

Size: 2" / 50mm through 6" / 150mm



Size	2"	2-½"	3"	4"	6"
Cv	77	108	158	234	475

TYPICAL VALVE SIZING RANGE: 2 - 10 FPS SHOWN IN BLUE
FLOW OUTSIDE RECOMMENDED RANGE IS SHOWN IN RED
Note: Calculated Data
Headloss charts are not to be used for valve sizing

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GATE VALVE SPECIFICATIONS

Sizes: 2-1/2" - 12"
ANSI 125# Flange

FEATURES:

Sizes: □2 ½" □3" □4" □6" □8" □10" □12"

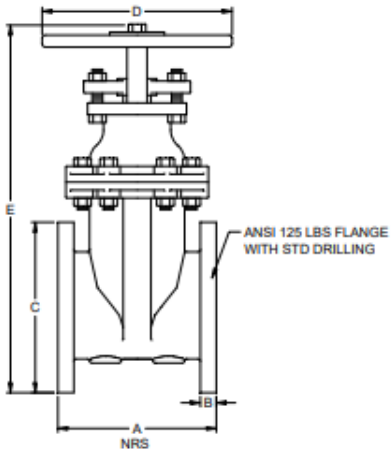
Max. working water pressure	250 PSI (1723 kPa)
Max. working water temperature	140°F (60°C)
Hydrostatic test pressure	400 PSI (2758 kPa)
End connection	ANSI/ASME B16.1
Opens	Left turn

STANDARDS COMPLIANCE:

- AWWA Compliant C-509

MATERIALS:

Valve Body & Handwheel Covers	Ductile Iron ASTM A536 Gr 65-45-12
Coating	AWWA compliant C-550 & FDA Compliant (Inside & Out)
Wedge	Ductile Iron ASTM A536 Gr 65-45-12 With EPDM coating
Elastomers	EPDM FDA approved
Fasteners	304 Stainless Steel
Stem	Bronze ASTM B584 CDA 862



Size		Part #	A		B		C		D		E		WEIGHT	
Inch	mm		Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	lbs	kg
2-1/2	65	8461	7-1/2	191	11/16	18	7	178	7-1/4	184	14-7/8	378	38	17.2
3	80	8462	8	203	3/4	19	7-1/2	191	10	254	16-1/8	410	56	25.4
4	100	8463	9	229	15/16	24	9	229	10	254	19-1/4	489	78	35.4

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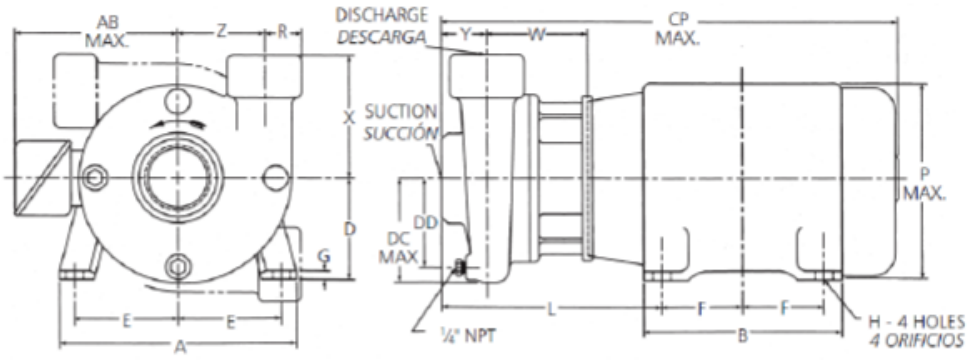
3656 S-GROUP DIMENSIONS AND WEIGHTS
GRUPO S, MODELO 3656 - PESO Y DIMENSIONES

MECHANICAL SEAL
SELLO MECÁNICO



Pump Dimensions and Weights (Dimension "L" determined by Pump and Motor)
Peso y dimensiones de la bomba *(la dimensión "L" está determinada por la bomba y el motor)*

Pump *Bomba*	Suction *Succión*	Discharge *Descarga*	CP Max.	DC Max.	DD	R	W	X	Y	Z	Wt. (lbs.) *Pesos (libras)*	Motor Frame Size, *Bastidor* L			
												140	180	210	250
1 x 2 – 7	2	1	27	4¼	3½	1 1/16	4⅛	5½	3	4	52	10	10¾	—	—
1 x 2 – 8					4		3 15/16	5¾	3 3/16	4¼	52			—	—
1½ x 2 – 6		1½	23¾		3½	1¼	4¼	4½	2⅜	3½	34	9¾	10½	—	—
1½ x 2 – 8			27⅛	5⅜	4⅜			5		4¼	54			11⅜	11⅛
2½ x 3 – 7	3	2½	25½	5½	4½	1 11/16		6	3	4	49	10⅛	10¾	11¼	—
3 x 4 – 7	4*	3*	25¼	5¾	5⅛	3¼	4⅛		2½	4½	82	9¾	10⅜	11⅜	—

*For use with ANSI class 150 mating flange. All others are NPT connections.
* *Para uso con brida de contacto ANSI clase 150. Todas las demás son conexiones NTP.*

Motor Dimensions and Weights (may vary with manufacturer)*
Peso y dimensiones del motor *(pueden variar de acuerdo al fabricante)* *

Frame Size JM *Tamaño del bastidor JM*	A	AB (Max.)	B	D	E	F	G	H	P (Max.)	Weight (lbs.) *Pesos (libras)*
143	6½	5¼	6	3½	2¾	2	1/8	11/32	6⅛	41
145						2½				57
182	8½	5⅞	6½	4½	3¾	2¼	3/16	13/32	7⅛	77
184						2¾				97
213	9½	7⅛	8	5¼	4¼	2¾	7/32	15/32	9⅝	122
215						3½				155
254 TCZ	11¼	9	9½	6¼	5	4⅛	¼	17/32	11½	265
256 TCZ			11¼			5				320

NOTE:
All pumps shipped in vertical discharge position. May be rotated in 90° increments. Tighten casing bolts to 25 ft./lbs. torque.

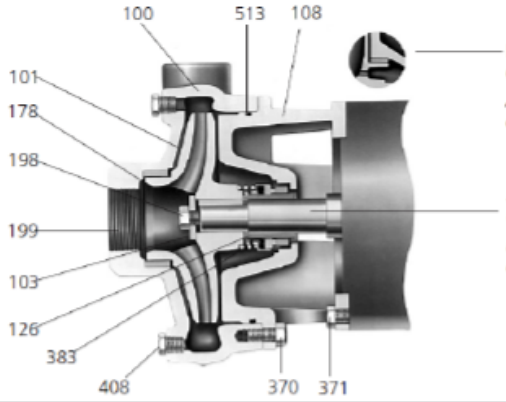
NOTA:
Todas las bombas se embarcan con la descarga en posición vertical. Esta posición puede rotarse en incrementos de 90°. Ajustar los pernos de la carcasa a una torsión de 25 pies/libras.

Motor Frames and Horsepower
Bastidores del motor y potencia en HP

Motor Frame *Bastidor del motor*	3500 RPM				1750 RPM			
	1 Phase		3 Phase		1 Phase		3 Phase	
	ODP	TEFC	ODP	TEFC	ODP	TEFC	ODP	TEFC
143	—	¾, 1, 1½	¾, 1, 1½	¾, 1, 1½	—	½, ¾	½, ¾, 1	½, ¾, 1
145	—	2	2, 3	2, 3	—	1, 1½	1½, 2	1½, 2
182	3	3	5	3	3	2, 3	3	3
184	5	3, 5	7½	5	—	—	5	5
213	7½	—	10	7½	5	—	7½	7½
215	10	—	15	10, 15	—	—	—	—
254TCZ	—	—	20	—	—	—	—	—
256TCZ	—	—	25	20, 25	—	—	—	—

All dimensions in inches and weights in lbs. Do not use for construction purposes.
Todas las dimensiones están en pulgadas, el peso en libras. No utilizar para fines de construcción.

3656 S-GROUP MATERIALS OF CONSTRUCTION
MATERIALES DE CONSTRUCCIÓN - GRUPO S, MODELO 3756



Item No. *No. ítem*	Description *Descripción*	Materials, *Materiales*		
		All Iron *Todo hierro*	Bronze Fitted *Accesorios de bronce*	All Bronze *Todo bronce*
100	Casing, *Carcasa*	1001	1001	1101
101	Impeller, *Impulsor*		1101	
103	Casing wear ring, *Anillo de desgaste de la carcasa*		1618	1618
108	Adapter, *Adaptador*		1001	1001
184	Seal housing, *Cubierta del sello* ①	One piece with adapter, *Una pieza con adaptador*		1101
126	Shaft sleeve, *Camisa del eje*	AISI Type 300 series stainless steel *Acero inoxidable serie AISI tipo 300*		
198	Impeller bolt, *Perno del impulsor*			
199	Impeller washer, *Arandela del impulsor*			
178	Impeller key, *Chaveta del impulsor*	Carbon Steel, *Acero al carbono*		
370	Hex head cap screw (adapter to case), *Tornillo de cabeza hexagonal (del adaptador a la cubierta)*	Steel SAE 1200 Grade 5 *Acero SAE 1200 grado 5*		
371	Hex head cap screw (adapter to motor), *Tornillo de cabeza hexagonal (del adaptador al motor)*			
383	Mechanical seal, *Sello mecánico*	See seal chart, *Ver tabla del sello*		
408	Pipe plug ¼" or ⅜", *Tapón de tubos de ¼ de pulgada ó ⅜ de pulgada*	Steel, *Acero*		Bronze, *Bronce*
513	O-ring, *Anillo en O*	BUNA-N, *BUNA-N*		

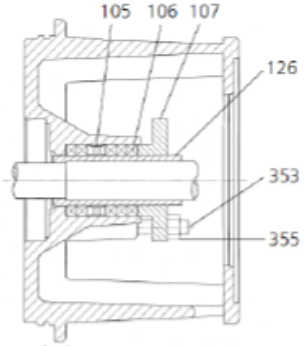
Material Code, *Código de material*	Engineering Standard, *Norma de ingeniería*
1101	Cast iron ASTM A48 CL20, *Hierro fundido ASTM A48 CL20*
1101	Silicon bronze ASTM B584, C87500, *Silicuro de bronce ASTM B584, C87500*
1618	Bizmuth brass, *Latón al bismuto*

Packed Box Arrangement, *Caja prensaestopas*

Item No., *No. ítem*	Description, *Descripción*	Materials, *Materiales*
105	Lantern ring, *Aro de linterna*	Teflon™
106	Packing, 5 rings; *Empaquetadura, 5 aros*	Teflon Impregnated, *Impregnado de Teflon*
107	Gland, *Casquillo*	AISI 316SS
126	Shaft sleeve, *Camisa del eje*	AISI Type 300 Series Stainless Steel *Acero inoxidable serie AISI tipo 300*
353	Gland stud, *Perno del casquillo*	
355	Gland nut, *Tuerca del casquillo*	

Type 21 Mechanical Seal, *Tipo 21 sello mecánico*

Seal Code, *Código del Sello*	Rotary, *Rotativo*	Stationary, *Estacionario*	Elastomers, *Elastómeros*	Metal Parts, *Partes Metálicas*	Part No., *Pieza Número*
0	Carbon, *Carbón*	Ceramic, *Cerámica*	BUNA-N	316 SS, *316 Acero inoxidable*	10K13
1		Sil-Carbide, *Carburo de silicona*	EPR		10K19
3			Viton		10K27
5	Sil-Carbide				10K64
9	Packed Box Design with BUNA O-Ring, *Diseño de prensaestopas empacado con anillo en O de BUNA*				15K16



Packed Box Arrangement
Caja prensaestopas

① For separate seal housing and adapter construction, all bronze material only, see repair parts page.

Para la construcción separada del compartimiento del sello y el adaptador, materiales de bronce únicamente, consulte la página de piezas de repuesto.

NOTE:
Pumps will be shipped with top-vertical discharge position as standard. For other orientations, remove casing bolts – rotate discharge to desired position – replace and tighten bolts to 25 ft./lbs. Note that discharge may extend below motor mounting surface in bottom-horizontal position; adequate clearance must be provided.

NOTA:
Las bombas salen de la fábrica con la descarga orientada en posición vertical superior de manera estándar. Para modificar la orientación, retirar los pernos de la carcasa, hacer girar la descarga hasta la posición deseada y volver a colocar los pernos, ajustándolos a una torsión de 25 pies/libras. Se ha de notar que la descarga se puede extender por debajo de la superficie de montaje del motor en la posición horizontal inferior; por lo tanto, debe proveerse suficiente espacio.

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 damage to pump internal parts.
- 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 Towle Whiney.

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.