



**TOWLE WHITNEY LLC**



**TW2000S-240G-50 DUPLEX  
VARIABLE SPEED BOOSTER PUMP SYSTEM**



The *TW2000S-240G-50 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 a total of 240 GPM with a 50 PSI overboost.

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:

- Pumps: Bronze Fitted Cast Iron
- 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



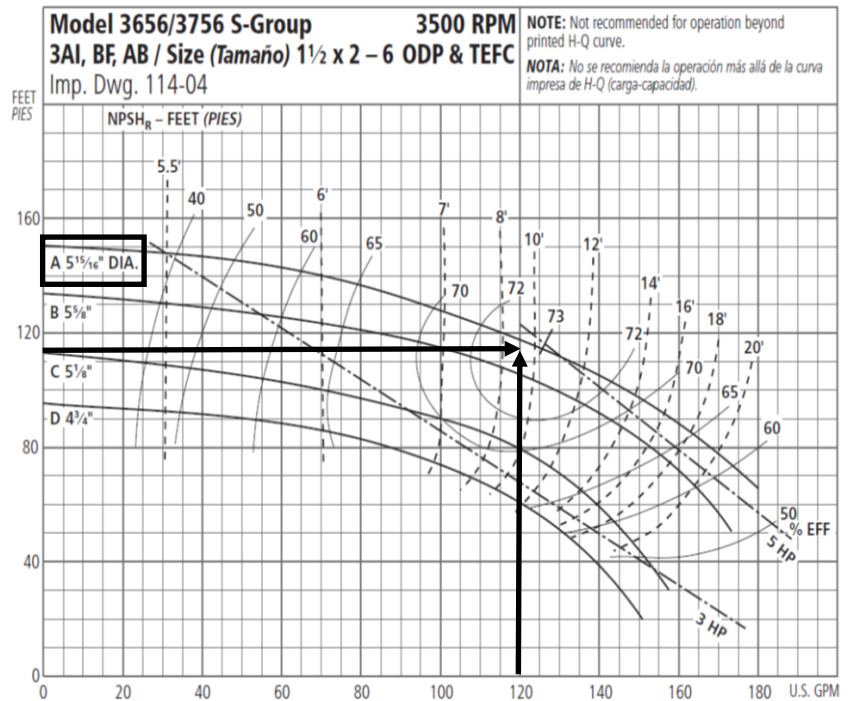
*All parts shown included  
Actual system components may vary*

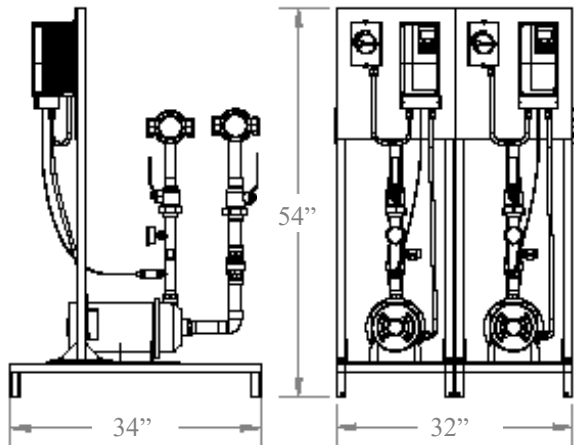
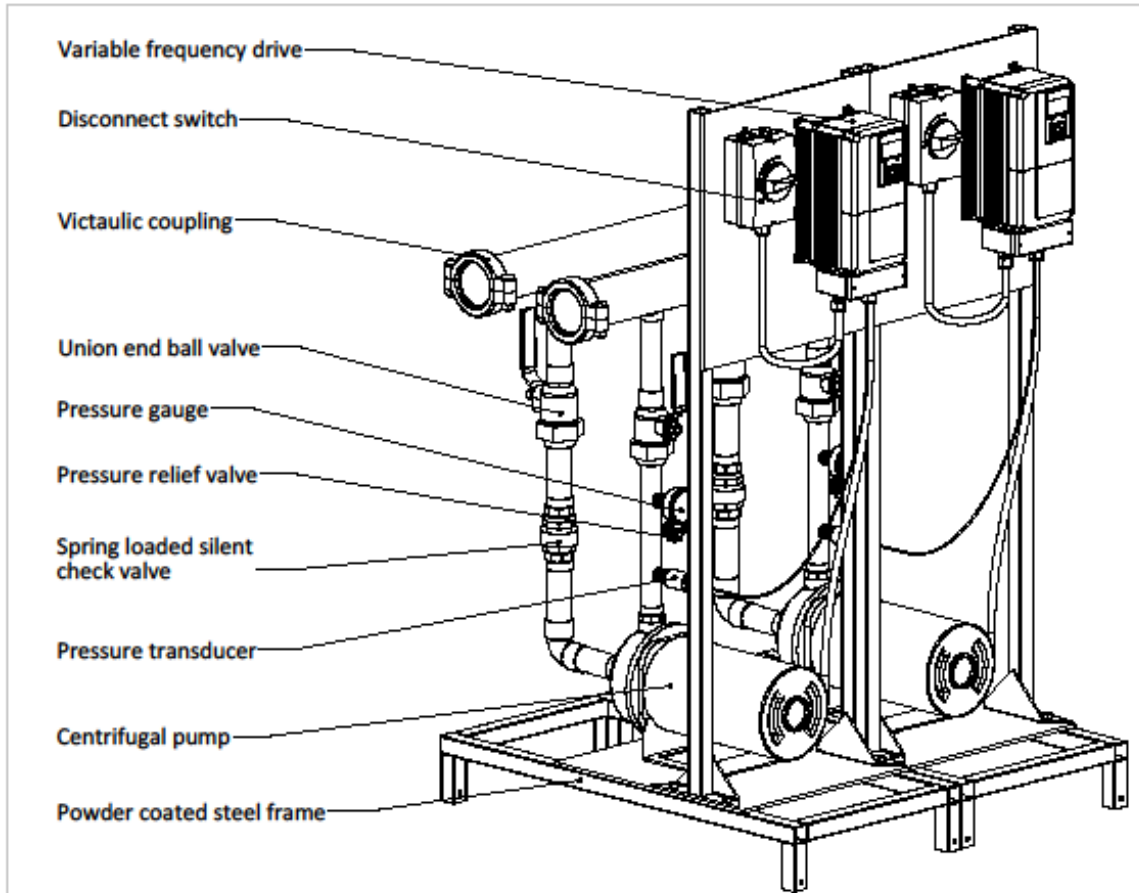
\* All lead-free brass shall contain <.25% Pb

### Performance curve for each pump

### Technical Specifications:

- Pumps:** Gould 3BF
- Horse Power:** 5 HP per pump
- Controllers:** Yaskawa
- Flow Rate:** 240 GPM (120 per pump)
- Boost:** 50 PSI (115' TDH)
- Manifolds:** 4 inch
- Tank:** Flexcon H2P35 (33Gal)
- Frame Size:** 32" W x 54" H x 34" D
- Power:** Two independent circuits required  
208-220V/1PH or  
208-220V/3PH or  
360-480V/3PH  
Specify when ordering





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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	1/23/15
CHECKED:	
COMMENTS:	

### TOWLE WHITNEY LLC

Duplex Variable Speed Booster System

SHEET	DWG. NO.	REV.
A	12315A	

SCALE: 1:20 WBSH: SHEET 1 OF 1



### 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 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
- Supplied on Suction and Discharge

### Centrifugal pump:

- Shall have a cast iron casing with bronze trimmed 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:

- 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

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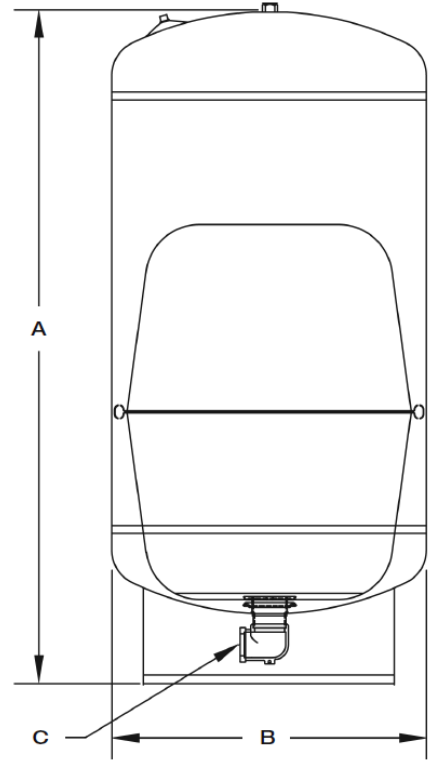


## PNEUMATIC EXPANSION TANK SPECIFICATIONS



### 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.

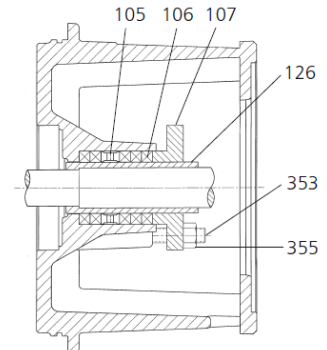
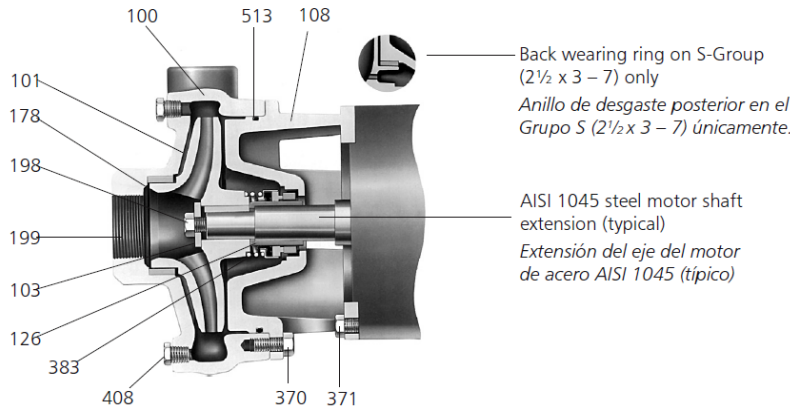
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### 3656 S-GROUP MATERIALS OF CONSTRUCTION MATERIALES DE CONSTRUCCIÓN - GRUPO S, MODELO 3756



Packed Box Arrangement  
Caja prensaestopas

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	
101	Impeller, Impulsor		1101	1101
103	Casing wear ring, Anillo de desgaste de la carcasa	1001	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	Carbon Steel, Acero al carbono		
199	Impeller washer, Arandela del impulsor			
178	Impeller key, Chaveta del impulsor			
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 1/4" or 3/8", Tapón de tubos de 1/4 de pulgada ó 3/8 de pulgada	Steel, Acero		Bronze, Bronce
513	O-ring, Anillo en O	BUNA-N, BUNA-N		

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.

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, Silicio de bronce ASTM B584, C87500
1618	Bismuth 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
353	Gland stud, Perno del casquillo	Acero inoxidable serie AISI tipo 300
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 silicón	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

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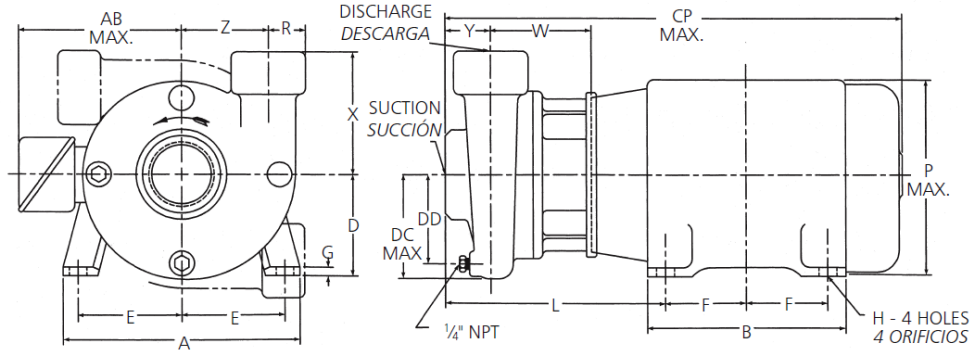
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### 3656 S-GROUP DIMENSIONS AND WEIGHTS GRUPO S, MODELO 3656 - PESO Y DIMENSIONES

### 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			
												140	180	210	250
1 x 2 - 7	2	1	27	4 1/4	3 1/2	1 1/16	4 3/8	5 1/2	3	4	52	10	10 3/4	—	—
4					3 15/16		5 3/4	3 3/16	4 1/4	52	—			—	
1 1/2 x 2 - 6		1 1/2	23 3/4	5 3/8	3 1/2	1 1/4	4 3/8	4 1/2	2 5/8	3 1/2	34	9 3/4	10 1/2	—	—
27 7/8					4 1/4						54			11 3/8	11 1/8
1 1/2 x 2 - 8	3	2 1/2	25 3/8	5 1/8	4 1/2	1 13/16	4 3/8	5	3	4	49	10 1/8	10 3/4	11 3/4	—
2 1/2 x 3 - 7					6						2 1/2			4 1/2	82
3 x 4 - 7	4*	3*	25 1/4	5 3/4	5 1/8	3 3/4	4 3/8	6	2 1/2	4 1/2	82	9 3/4	10 3/8	11 3/8	—

\*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 NPT.

**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	6 1/2	5 1/4	6	3 1/2	2 3/4	2	1/8	1 1/32	6 5/8	41
145						2 1/2				57
182	8 1/2	5 7/8	6 1/2	4 1/2	3 3/4	2 1/4	3/16	1 1/32	7 7/8	77
184						2 3/4				97
213	9 1/2	7 3/8	8	5 1/4	4 1/4	2 3/4	7/32	1 1/32	9 5/8	122
215						3 1/2				155
254 TCZ	11 1/4	9	9 1/2	6 1/4	5	4 3/8	1/4	1 1/32	11 1/2	265
256 TCZ			11 3/4			5				5

**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	—	3/4, 1, 1 1/2	3/4, 1, 1 1/2	3/4, 1, 1 1/2	—	1/2, 3/4	1/2, 3/4, 1	1/2, 3/4, 1
145	—	2	2, 3	2, 3	—	1, 1 1/2	1 1/2, 2	1 1/2, 2
182	3	3	5	3	3	2, 3	3	3
184	5	3, 5	7 1/2	5	—	—	5	5
213	7 1/2	—	10	7 1/2	5	—	7 1/2	7 1/2
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.

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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.
- 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.

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.