





TW3018T-420G-40
TRIPLEX VARIABLE SPEED
BOOSTER PUMP SYSTEM



TW3018T-420G-40 TRIPLEX

The *TW3018T-420G-40 Triplex 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.

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



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

Lead-Free (Wetted) components:

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

Performance curve for each pump

Technical Specifications: Pumps: Goulds 3BF Horse Power: 5 HP per pump

VF Drives: Yaskawa

Flow Rate: 420 GPM (140 GPM per pump)

Boost: 40 PSI

Set Pressure: 65 PSI (unless otherwise specified)

Manifolds: 4 Inch

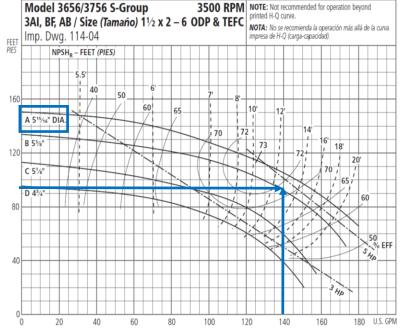
Tank: 32 Gallon non-ASME

Frame: 43"W X 43"H X 34"D

Power options: Three Independent circuits required

208-220V/1PH 208-220V/3PH 360-480V/3PH

Specify when ordering

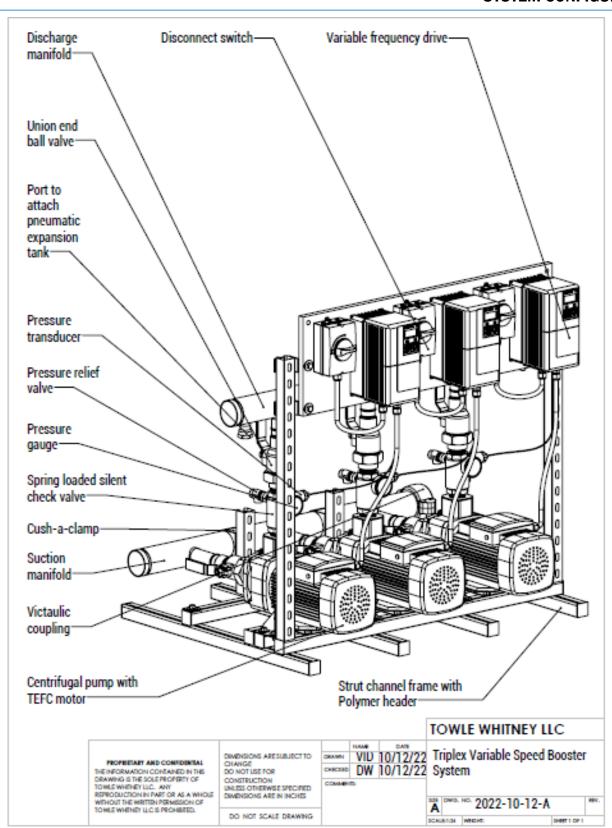


21 Londonderry Turnpike, Hooksett, NH 03106

^{*} All lead-free brass shall contain <.25% Pb

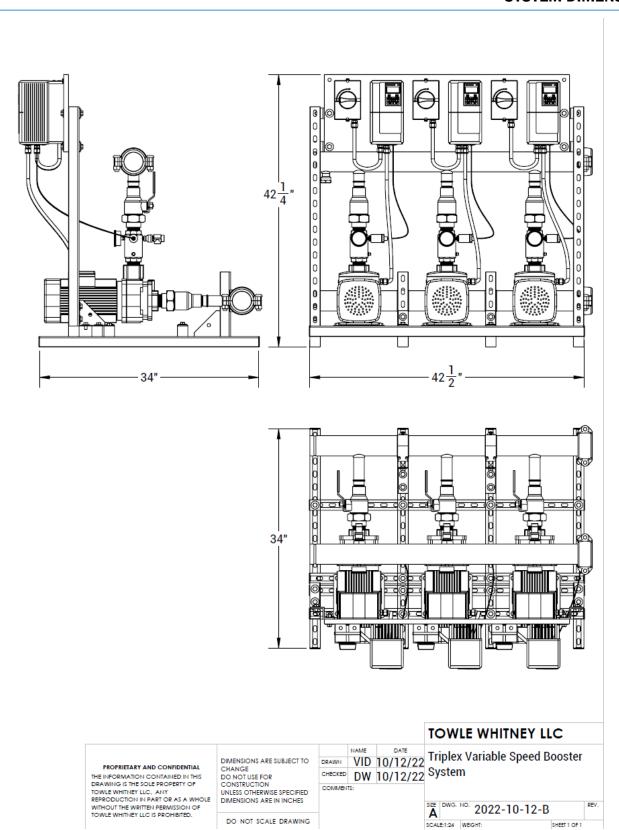


SYSTEM CONFIGURATION





SYSTEM DIMENSIONS





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
- 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:

- Pneumatic expansion tank shall be rated for use with potable water with an operating pressure of a maximum 125 PSI
- 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



COMPONENT COMPLIANCE

Electrical

Yaskawa VFD UL 508C Power Conversion

CSA 22.2 Industrial Controls

COLUMN (€ ROHS

Lovato Shut-off NEMA4 (6 RoHS

Pumps

Grundfos CM(I) SS Series NSF 61

Grundfos CR(I) SS Series NSF 61

Goulds 125MS Series NSF 61

Goulds BF Series NSF 61

Goulds BF Series NSF 61

Walrus TPH Series NSF 372 C€ RoHS

Plumbing

Bluefin BVT200 Ball Valves NSF 61
Webstone BVT200 Ball Valves NSF 61

Bonomi Check 1000012 NSF 61 **€**

Flomatic VFD Check NSF 61
Victaulic 607 "E" Coupling NSF 61
Victaulic 660 Cap NSF 61
Amtrol PL Tank NSF 61

Watts PLT Tank NSF 61
Manifolds / piping Type L Copper
Fittings Copper

Discharge Riser Copper C€

- 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 Gasoila Thread Sealant NSF 61



VFD 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:
 - \pm 0.5 to 1% with slip compensation⁽¹⁾ \pm 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:
- 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 \$avings 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 lossOver torque

Pump Alarms and Messages

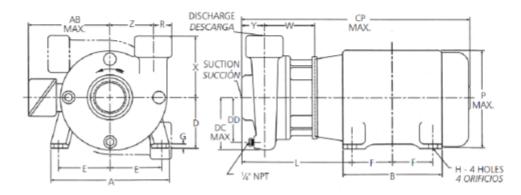
- · Low feedback
- · High feedback
- Low level
- Low water
- Pump over cycling
- No flow detection
- Loss of prime
- Pump fault
- Motor thermostat
- · Pre-charge mode
- · Thrust bearing active
- Start mode active
- · Sleep mode active



PUMP SPECIFICATIONS

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		Discharge Descarga	CP Max.	DC Max.	DD	R	w	х	Y	z	Wt. (lbs.) Pesos (libras)	Mot 140	or Frame 180	Size, Basti 210 L	dor 250																			
Γ	1 x 2 - 7	,	2 11/2				1	1	1	1	1	1	1	1	1	1	1	1	1	,	1	,	27		31/2	1½s	41/8	51/2	3	4	52	10	10%	_	_
Ι	1 x 2 - 8	,		21	41/4	4	1716	315/16	51/4	31/16	41/4	52	10	1074	_	_																			
	1½x2-6	-		23¾	4	31/2	11/4		41/2	25/4 31/2	31/2	34	9%	101/2	_	_																			
T	1½ x Z - 8		172	271/4	51/8	41/8	174	41/4	5	278	41/4	54	974		113/8	11%																			
	2½ x 3 - 7	3	21/2	251/4	51/8	41/2	113/16		6	3	4	49	101/8	10¾	1134	_																			
Γ	3 x 4 - 7	4*	3*	251/4	51/4	51/4	31/4	41/4	0	21/2	41/2	82	93/4	10%	111%	_																			

^{*}For use with ANSI class 150 mating flange. All others are NPT connections.

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.)	В	D	E	F	G	н	P (Max.)	Weight (lbs.) Pesos (libras)	
143						2				41	
145	61/2	51/4	6	31/2	23/4	21/2	1/4	11/32	61/4	57	
182			F7.		414	71/	21/4	74	124	774	77
184	81/2	51/4	61/2	41/2	31/4	23/4	3/16	13/52	71/4	97	
213	211	77.				2¾	1/32	124	9%	122	
215	91/2	73/8	8	51/4	41/4	31/2		13/32		155	
254 TCZ	****		91/2		_	41/8	.,	174		265	
256 TCZ	111/4	9	11¾	61/4	5	5	1/4	17/32	111/2	320	

Motor Frames and Horsepower Bastidores del motor y potencia en HP

Motor Frame		3500	RPM			1750	RPM	
Bastidor	1 Ph	nase	3 Ph	iase	1 Ph	ase	3 Ph	ase
del motor	ODP	TEFC	ODP	TEFC	ODP	TEFC	ODP	TEFC
143	_	34, 1, 11/2	34, 1, 11/2	1/4, 1, 11/2	_	1/2, 3/4	1/2, 3/4, 1	1/2, 3/4, 1
145	_	2	2, 3	2, 3	_	1, 11/2	11/2, 2	11/2, 2
182	3	3	5	3	3	2, 3	3	3
184	5	3, 5	71/2	5	_	_	5	5
213	71/2	_	10	71/2	5	_	71/2	71/2
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.

NOTE:

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

NOTA:

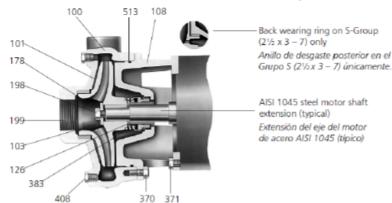
Todas las bombas se embarcan con la descarga en posición vertical. Esta posición puede rotarse en incrementos de 90°. Ajustar los pernos de la carcasa a una torsión de 25 pies/libras.

^{*} Para uso con brida de contacto ANSI clase 150. Todas las demás son conexiones NTP.



PUMP SPECIFICATIONS

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



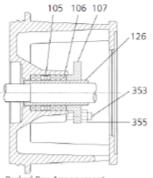
Item No.	Description	Materials, Materiales							
No. İtem	Description Descripción	All Iron Todo hierro	Bronze Fitted Accesorios de bronce	All Bronze Todo bronce					
100	Casing, Carcasa		1001	****					
101	Impeller, Impulsor		1101	1101					
103	Casing wear ring, Anillo de desgaste de la carcasa	AISI Acei	1618	1618					
108	Adapter, Adaptador		1001	1001					
184	Seal housing, Cubierta del sello ① One	piece with adap	ter, Una pieza con adaptado	r 1101					
126	Shaft sleeve, Camisa del eje	AIC	Tuno 200 codes stainless s	tool					
198	Impeller bolt, Pemo del impulsor	AISI Type 300 series stainless steel Acero inoxidable serie AISI tipo 300							
199	Impeller washer, Arandela del impulsor	Acero inoxidable serie Albi tipo 300							
178	Impeller key, Chaveta del impulsor	C	arbon Steel, Acero al carbon	bono					
370	Hex head cap screw (adapter to case), Tornillo de cabeza hexagonal (del adaptador a la cubierta)		Steel SAE 1200 Grade 5						
371	Hex head cap screw (adapter to motor), Tomillo o cabeza hexagonal (del adaptador al motor)	de	Acero SAE 1200 grado 5						
383	Mechanical seal, Sello mecánico	Se	e seal chart, Ver tabla del se	llo					
408	Pipe plug ¼" or ¾", Tapón de tubos de ¼ de pulgada ó ¾ de pulgada	ulgada Steel, Acero Bro							
513	O-ring, Anillo en O		BUNA-N, BUNA-N						
Material	Code, Código de material Eng	jineering Sta	ndard, Norma de Ing	geniería					
	1101 Ca	st iron ASTM A48 (CL20, Hierro fundido ASTM A	48 CL20					

Packed Box Arrangement, Caja prensaestopas							
ltem No., No. Ítem	Description, Descripción	Materials, Materiales					
105	Lantem 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	AIGUT 200 Series Serieless Seriel					
353	Gland stud, Perno del casquillo	AISI Type 300 Series Stainless Steel Acero inoxidable serie AISI tipo 300					
355	Gland nut, Tuerca del casquillo	Aceto monuable selle Alsi (Ipo 300					

	Type 2	21 Mechanica	l Seal, Tipo 21 se	ello mecánico	
Seal Code, Código del Sello	Rotativo Estaciona		Elastomers, Elastómeros	Metal Parts, Partes Metálicas	Part No., Pieza Número
0	Carbon	Ceramic, Cerámica	BUNA-N		10K13
1	- Carbon, - Carbón	Sil-Carbide,	EPR	316 SS,	10K19
3		Carburo de	Viton	316 Acero inoxidable	10K27
5	Sil-Carbide	silicona	VILUIT		10K64
9	Packed Box Design	n with BUNA O-Fling, Dis	eño de prensaestopas empa	cado con anillo en O de BUNA	15K16

1101

1618



Packed Box Arrangement Caja prensaestopas

 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.

Silicon bronze ASTM B584, C87500, Siliciuro de bronce ASTM B584, C87500

Bizmuth brass, Latón al bismuto



PNEUMATIC EXPANSION TANK SPECIFICATIONS



PRO-LINE . Diaphragm Well Tanks: PL Series

125 PSIG Working Pressure

Construction

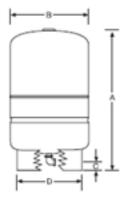
Shell	Deep Drawn Steel
Diaphragm	Butyl
Liner	Polypropylene
System Connection	304L Stainless Steel
Finish	Tan
Water Circulator	Turbulator**
Air Valve	Projection Welded
Factory Precharge	38 PSIG (2.6 bar)

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

Application

 Controls pump cycling in residential well water systems.



Stand Models

Model		nk ume	Max. Accept. Factor		A Height	Tank 0	B lameter	Dys.	Conn. erine	Ottand O) Nameter	Oystem Shipping (NPTF) Weight		
	Oal	Ut	-	in	mm	in	mm	in	mm	in	mm	m	Lbs	Kg
PL-14	14.0	53	0.81	25	635	15	381	1%	40	12	304	1	22	10
PL-20	20.0	76	0.57	32	813	15	381	1%	40	12	304	1	28	13
PL-26	26.0	98	0.44	39	991	15	381	1%	40	12	304	1	34	15
PL-32	32.0	121	0.35	47	1194	15	381	1%	40	12	304	1	40	18
PL-34	34.0	129	1.00	30	702	22	509	17/4	49	2015	021	13%	50	23
PL-44	44.0	167	0.77	38	914	22	559	1%	49	2016	521	134	57	26
PL-62	62.0	235	0.55	47	1194	22	559	1%	49	2015	521	114	75	34
PL-81	81.0	301	0.41	57	1448	22	559	1%	49	2015	521	134	92	42
PL-86	86.0	326	0.54	47	1194	26	660	21/4	52	2015	521	114	99	45
PL-119	119.0	450	0.39	62	1575	26	660	21/4	52	2016	521	134	133	60

All dimensions and weights are approximate.





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.