

**TW2018V-240R-100
DUPLEX VERTICAL
VARIABLE SPEED BOOSTER PUMP SYSTEM**

TW2018V-240R-100 Duplex

The *TW2018V-240R-100 Duplex Vertical Booster System* is equipped with centrifugal pumps regulated by a variable frequency drive that controls the pump operation to maintain constant pressure regardless of varying demand and fluctuation in incoming pressure.

The VFD drives will ALTERNATE the lead pump every 24 hours of run time. The 2nd pump will remain in standby until needed.

System is built on a MODULAR painted steel frame for ease of transportation and installation.



*All parts shown included
Actual system components may vary*

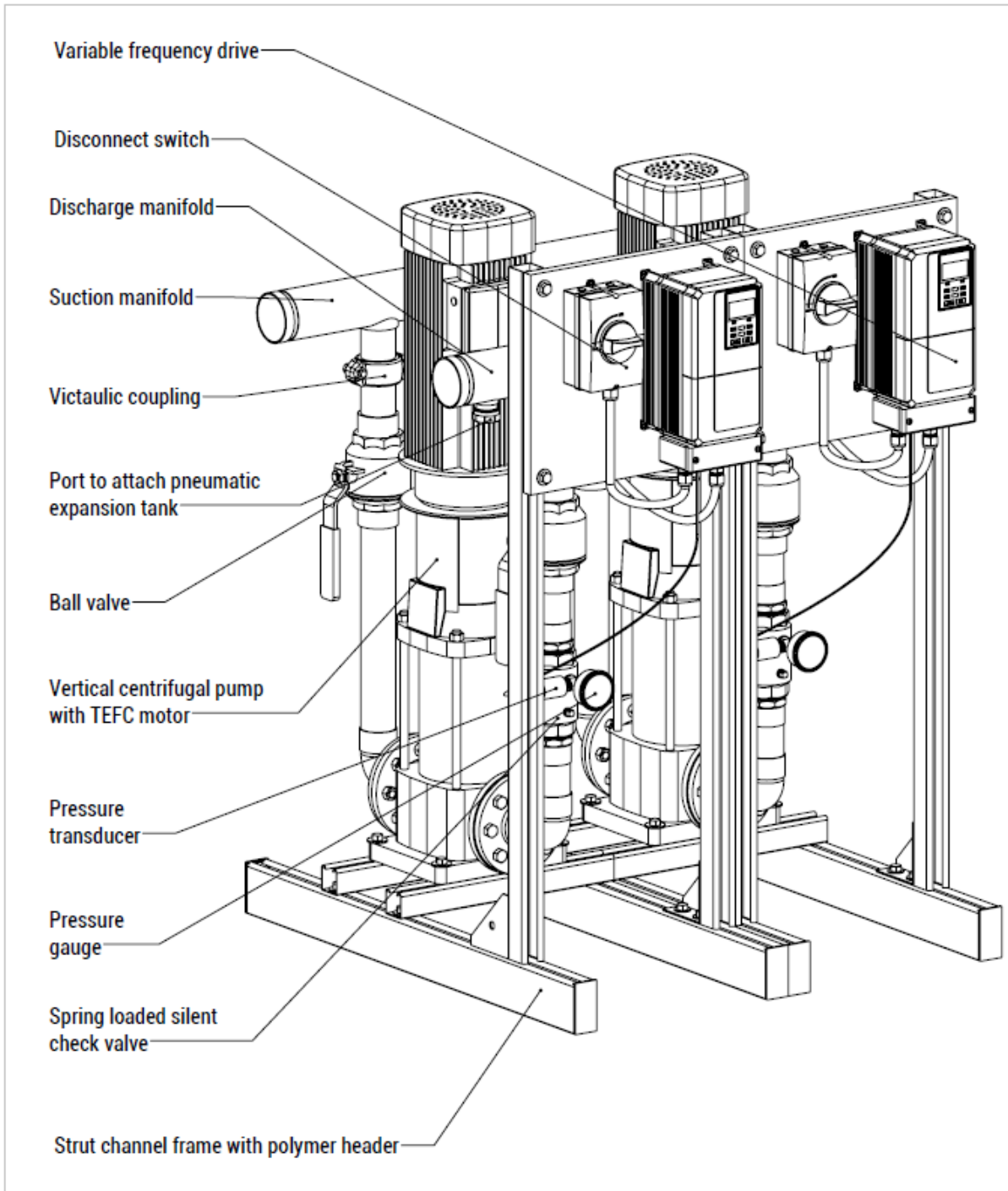
Lead-Free (Wetted) components:

- Grundfos CR Cast Iron and SS
- Relief valves: LF Brass or SS
- Pressure Gauges: Stainless Steel
- Transducer: Stainless Steel
- Check valves Lead Free Brass
- Ball Valves: Lead Free Brass
- Manifolds: Type L Copper
- Fittings: LF Copper or SS
- Thermal Valves: Stainless Steel

Technical Specifications:

- Pumps:** Grundfos [CR32-3]
- Horse Power:** 15 HP per pump
- Controllers:** Yaskawa IQPump1000
- Flow Rate:** 240 GPM (120 GPM per pump)
- Boost:** 100 PSI (230' TDH)
- Manifolds:** 4 inch
- Tank:** 32 Gallon
- Frame Size:** 32" W x 48" H x 35" D
- Power:** Two independent circuits required
200-240V/1 Phase
200-240V/3 Phase
360-480V/3 Phase
Specify when ordering

SYSTEM CONFIGURATION



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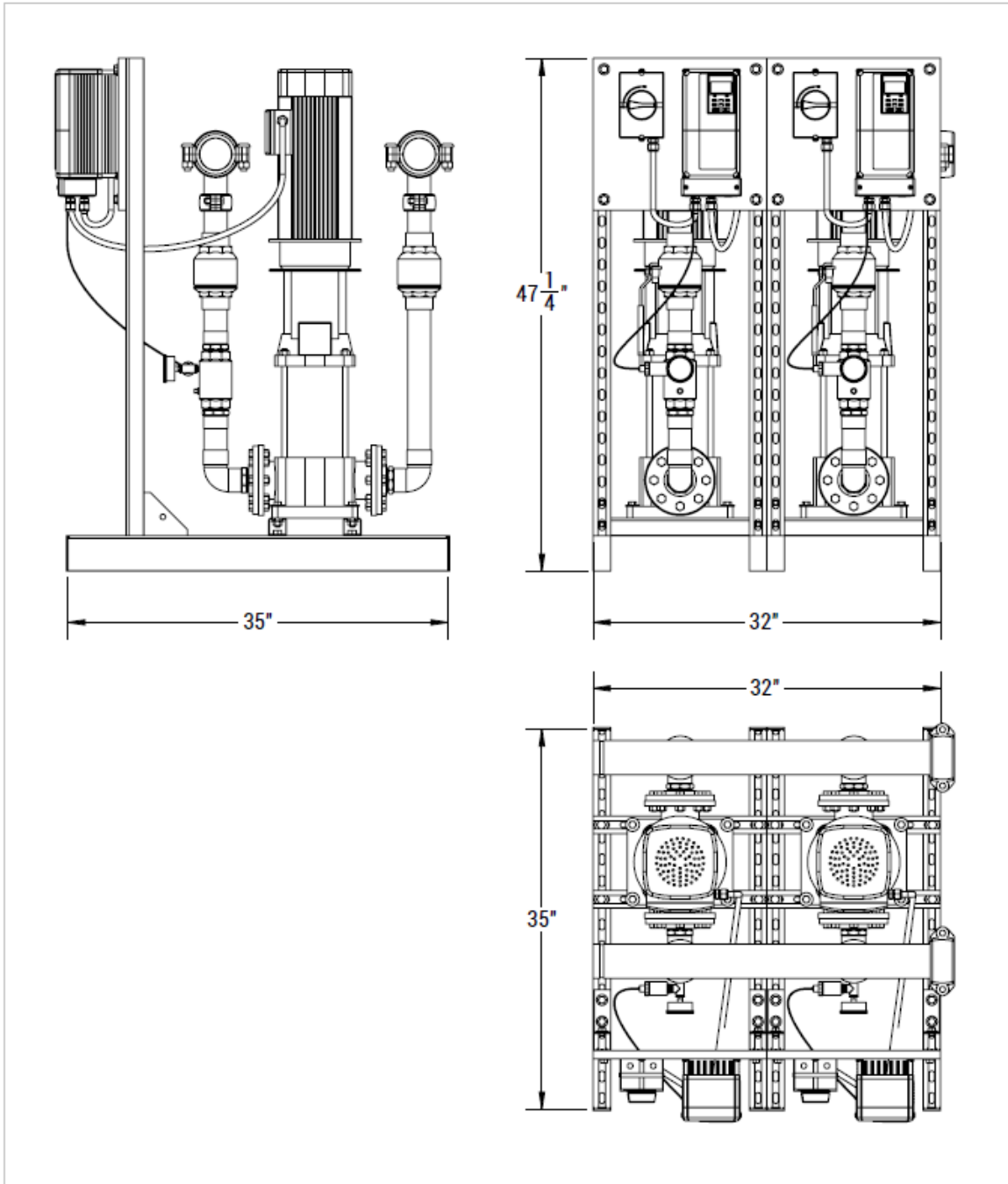
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	NAME	DATE
DRAWN	VID	3/29/22
CHECKED	DW	3/29/22
COMMENTS:		

TOWLE WHITNEY LLC		
Vertical Duplex Variable Speed Booster System		
SIZ A	DWG. NO. 2022-03-29-A	REV.
SCALE: 1:24	WEIGHT:	SHEET 1 OF 1

SYSTEM DIMENSIONS



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TOWLE WHITNEY LLC

**Vertical Duplex Variable Speed
Booster System**

SIZE	DWG. NO.	REV.
A	2022-03-29-B	

SCALE: 1:24 WEIGHT: 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 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 304 stainless steel impellers.
- Shall have a 316 stainless steel shaft sleeve. Mechanical seal shall be rated to withstand pressure of up to 232 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 150 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

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

Goulds BF Series NSF 61

 CE

Walrus TPH Series NSF 372

CE **RoHS**

Plumbing

Bluefin BVT200 Ball Valves NSF 61

Webstone BVT200 Ball Valves NSF 61

Bonomi Check 1000012 NSF 61

CE

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

CE

- Pressure Relief valve:

- SS 4-20mA Transducer:

- Pressure Gauges: CA AB1953

Sealants

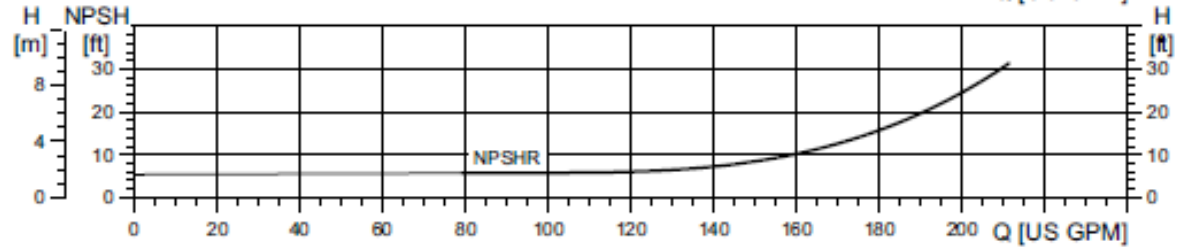
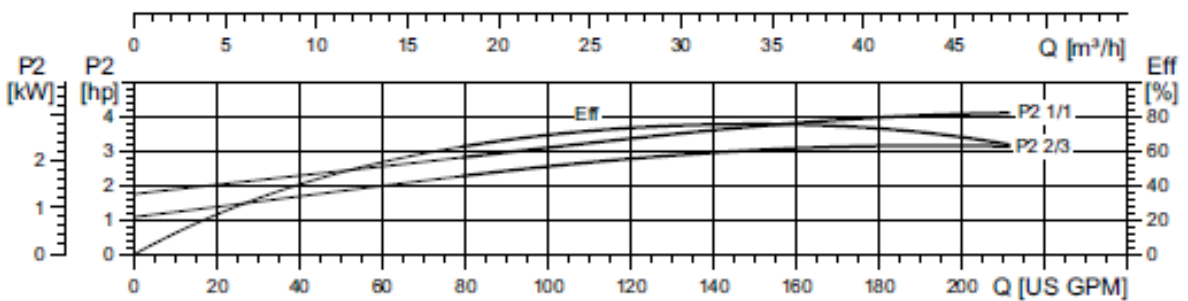
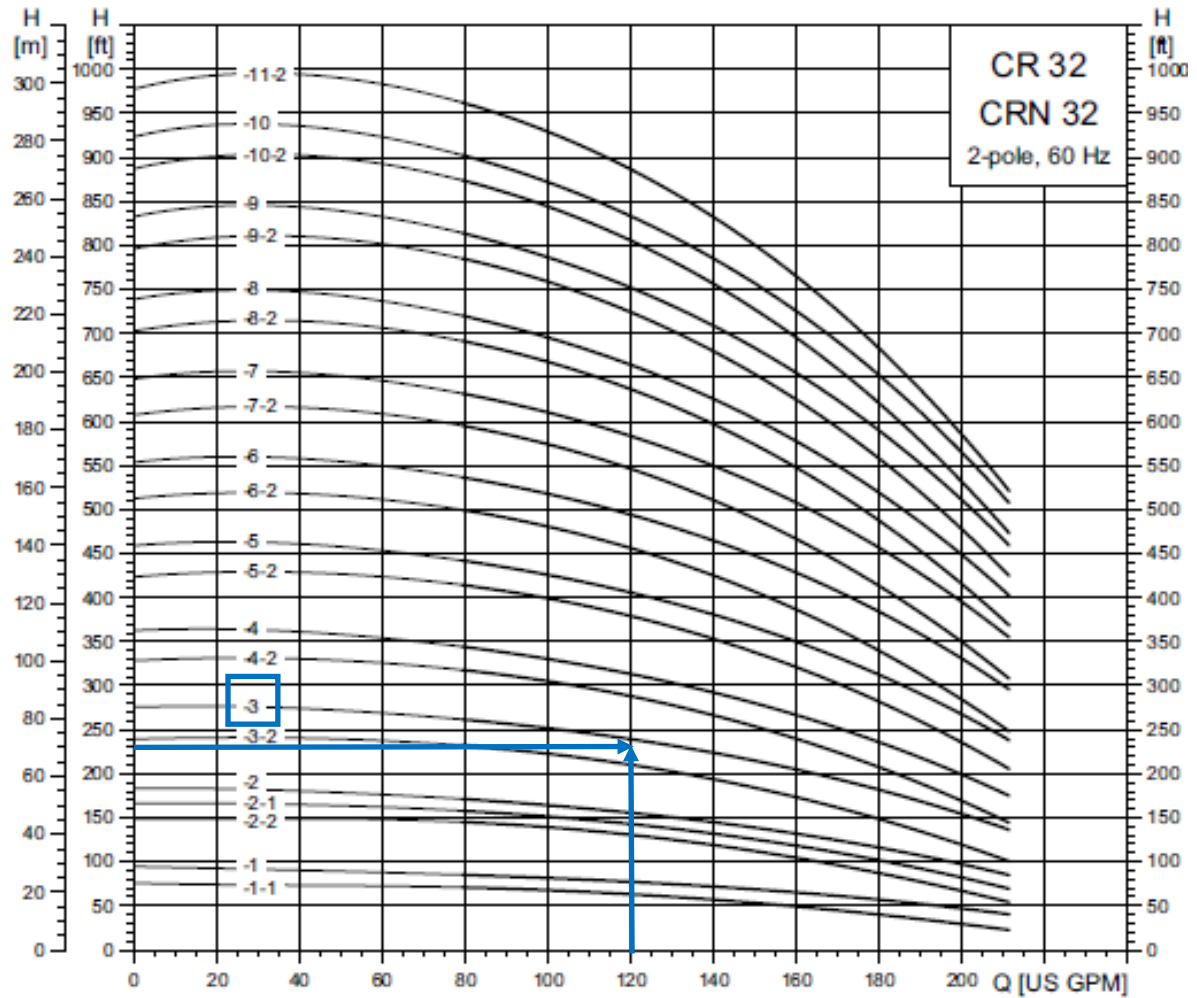
Rectorseal Nokorode Flux NSF 61

Worthington SILVER Solder NSF 61

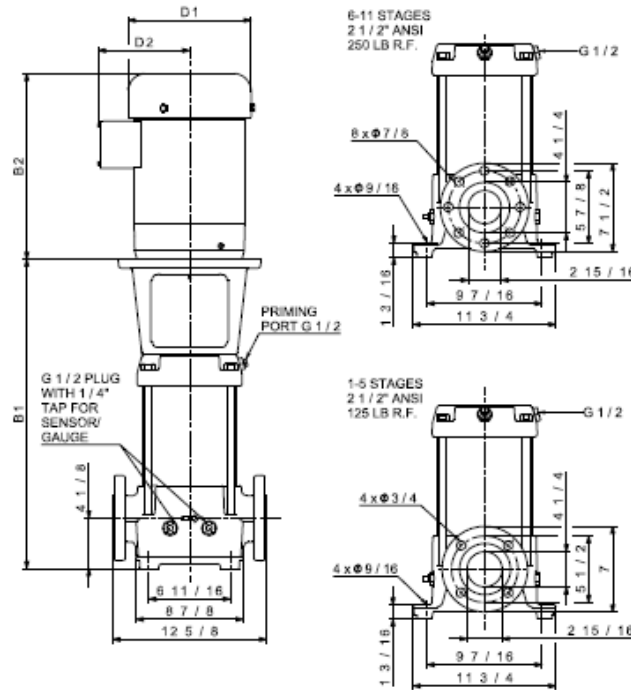
LocTite 567 Thread Sealant NSF 61

Gasoil Thread Sealant NSF 61

CR, CRN 32



CR 32



TMO2 7699 1009

Pump-type	P2 [Hp]	Ph.	ANSI dimensions [inch (mm)]								
			B1	TEFC			ODP			Ship. wt. ¹⁾ [lbs (kg)]	
				D1	D2	B1+B2	D1	D2	B1+B2		
CR 32-1-1	5	3	20.08 (511)	10.62 (270)	7.46 (190)	35.60 (905)	-	-	-	240 (109)	
			19.88 (505)	8.66 (220)	5.28 (135)	35.39 (899)	-	-	-	218 (99)	
CR 32-1	5	1	20.08 (511)	10.62 (270)	7.46 (190)	35.60 (905)	-	-	-	228 (104)	
			19.88 (505)	8.66 (220)	5.28 (135)	35.39 (899)	-	-	-	218 (99)	
CR 32-2-2	7 1/2	3	22.83 (580)	10.22 (260)	7.62 (194)	38.36 (975)	-	-	-	245 (112)	
			22.64 (576)	8.66 (220)	5.28 (135)	38.15 (970)	-	-	-	229 (104)	
CR 32-2-1	7 1/2	1	22.83 (580)	10.22 (260)	7.62 (194)	38.36 (975)	-	-	-	245 (112)	
			22.64 (576)	8.66 (220)	5.28 (135)	38.15 (970)	-	-	-	229 (104)	
CR 32-2	10	3	22.83 (580)	10.23 (260)	10.30 (262)	38.90 (989)	-	-	-	300 (137)	
			22.64 (576)	10.24 (261)	6.26 (160)	37.87 (962)	-	-	-	229 (104)	
CR 32-3-2	10	1	25.59 (650)	10.23 (260)	10.30 (262)	41.66 (1059)	-	-	-	295 (134)	
			25.39 (645)	10.24 (261)	6.26 (160)	40.12 (1020)	-	-	-	236 (108)	
CR 32-3	15	3	29.72 (755)	12.36 (314)	8.00 (204)	48.28 (1228)	10.62 (270)	7.33 (187)	46.03 (1170)	332 (151)	
CR 32-4-2	15	3	32.48 (825)	12.36 (314)	8.00 (204)	51.02 (1296)	10.62 (270)	7.33 (187)	48.79 (1240)	339 (154)	
CR 32-4	20	3	32.48 (825)	12.36 (314)	8.00 (204)	51.02 (1296)	11.50 (293)	8.92 (227)	52.17 (1326)	344 (157)	
CR 32-5-2	20	3	35.24 (896)	12.36 (314)	8.00 (204)	53.78 (1367)	11.50 (293)	8.92 (227)	54.93 (1396)	351 (160)	
CR 32-5	20	3	35.24 (896)	12.36 (314)	8.00 (204)	53.78 (1367)	11.50 (293)	8.92 (227)	54.93 (1396)	351 (160)	
CR 32-6-2	25	3	37.99 (965)	12.36 (314)	8.00 (204)	60.38 (1534)	11.50 (293)	8.94 (228)	58.80 (1494)	351 (160)	
CR 32-6	25	3	37.99 (965)	12.36 (314)	8.00 (204)	60.38 (1534)	11.50 (293)	8.94 (228)	58.80 (1494)	351 (160)	
CR 32-7-2	30	3	40.75 (1036)	12.36 (314)	8.00 (204)	63.14 (1604)	11.50 (293)	8.94 (228)	62.56 (1590)	444 (202)	
CR 32-7	30	3	40.75 (1036)	12.36 (314)	8.00 (204)	63.14 (1604)	11.50 (293)	8.94 (228)	62.56 (1590)	423 (192)	
CR 32-8-2	30	3	43.50 (1105)	15.32 (390)	8.00 (204)	65.89 (1674)	11.50 (293)	8.94 (228)	65.31 (1659)	436 (198)	
CR 32-8	40	3	43.50 (1105)	15.32 (390)	13.11 (333)	66.69 (1694)	13.25 (337)	12.21 (311)	66.75 (1696)	631 (287)	
CR 32-9-2	40	3	46.26 (1176)	15.32 (390)	13.11 (333)	69.45 (1765)	13.25 (337)	12.21 (311)	69.51 (1766)	637 (289)	
CR 32-9	40	3	46.26 (1176)	15.32 (390)	13.11 (333)	69.45 (1765)	13.25 (337)	12.21 (311)	69.51 (1766)	637 (289)	
CR 32-10-2	40	3	49.02 (1246)	15.32 (390)	13.11 (333)	72.21 (1835)	13.25 (337)	12.21 (311)	72.27 (1836)	645 (293)	
CR 32-10	40	3	49.02 (1246)	15.32 (390)	13.11 (333)	72.21 (1835)	13.25 (337)	12.21 (311)	72.27 (1836)	645 (293)	
CR 32-11-2	50	3	51.77 (1315)	16.88 (429)	14.12 (359)	79.58 (2022)	13.25 (337)	12.21 (311)	74.52 (1893)	671 (305)	

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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

PNEUMATIC EXPANSION TANK SPECIFICATIONS



PRO-LINE®
Diaphragm Well Tanks: PL Series

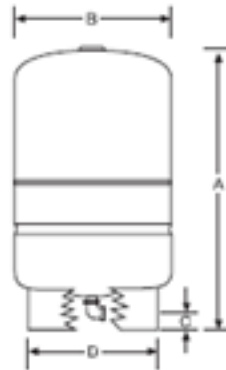
125 PSIG Working Pressure

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)

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		Lbs	Kg
PL-14	14.0	53	0.81	25	635	15	381	1 1/4	40	12	304	1	22	10
PL-20	20.0	76	0.57	32	813	15	381	1 1/4	40	12	304	1	28	13
PL-26	26.0	98	0.44	39	991	15	381	1 1/4	40	12	304	1	34	15
PL-32	32.0	121	0.35	47	1194	15	381	1 1/4	40	12	304	1	40	18
PL-34	34.0	129	1.00	30	762	22	559	1 1/4	49	20 1/2	521	1 1/4	50	23
PL-44	44.0	167	0.77	38	914	22	559	1 1/4	49	20 1/2	521	1 1/4	57	26
PL-62	62.0	235	0.55	47	1194	22	559	1 1/4	49	20 1/2	521	1 1/4	75	34
PL-81	81.0	301	0.41	57	1448	22	559	1 1/4	49	20 1/2	521	1 1/4	92	42
PL-86	86.0	326	0.54	47	1194	26	660	2 1/4	52	20 1/2	521	1 1/4	99	45
PL-119	119.0	450	0.39	62	1575	26	660	2 1/4	52	20 1/2	521	1 1/4	133	60

All dimensions and weights are approximate.



ECONO/HAT-RA

PUMP THERMAL RELIEF VALVE



BENEFITS

- Protects pump and pump seals from over-temperature damage
- Prevents potentially scalding water from being distributed to users
- Totally self-operating, no power or signal required
- Completely mechanical thermal relief for booster pumps and cooling jackets.
- Temperature response is unaffected by pressure variations
- Wrench flats for easy installation

DESIGN FEATURES

- Compact, low mass
- Corrosion resistant, long service life
- Ram-type plug for tight, reliable shutoff
- Narrow temperature band

APPLICATIONS

The ECONO/HAT-RA valve is perfect for thermal relief of booster pumps; controlling cooling water outlet temperature; and controlling flow of cooling water, glycol or other cooling media in applications requiring economical removal of heat from equipment or a process. Since the ECONO/HAT-RA valves open on rising temperatures, they can be used in many other thermal relief valve applications.



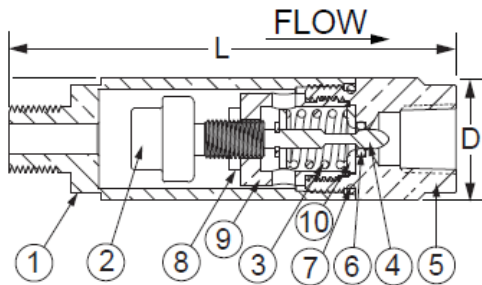
OPERATION

As the fluid temperature increases to within the operating range of the ECONO/HAT-RA, the thermal actuator modulates the valve open. If the fluid temperature is above the acceptable range, the valve will continue to modulate open allowing additional fluid discharge. As the outlet temperature falls slightly, the valve then modulates toward the closed position, reducing flow. This modulating action maintains a relatively constant fluid temperature even as operating conditions vary.

ECONO/HAT-RA
PUMP THERMAL RELIEF VALVE



PARTS & MATERIALS



ITEM	DESCRIPTION	MATERIAL
1	VALVE BODY	Brass or 300 Series S/S
2	THERMAL ACTUATOR	Brass or 300 Series S/S
3	OPERATING SPRING	300 Series S/S
4	RAM-TYPE PLUG	300 Series S/S
5	SEAT FITTING	Brass or 300 Series S/S
6	SEAT SEAL	PTFE
7	BODY SEAL	BUNA (NSF-61 Certified)
8	CALIBRATION LOCKNUT	300 Series S/S
9	SEAT RETAINER	Brass or 300 Series S/S
10	SEAT INSERT	Brass or 300 Series S/S

DIMENSIONS & CAPACITIES

SIZE (NPT)	D		L		Weight		C _v	Maximum Operating Pressure	Maximum Temperature
	in	mm	in	mm	Lb	Kg			
1/4" Brass	1.00	25	3.6	89	0.35	0.16	0.5	300 PSIG (20.7 BAR)	250°F (121°C)
1/4" S/S								400 PSIG (27.6 BAR)	

ORDERING

Part Number	Description
242 - 000000 - XXX	1/4" ECONO/HAT-RA M/F
242 - 010000 - XXX	1/4" ECONO/HAT-RA M/F S/S

NOTES

- Standard open temperatures "XXX" available: 040°F, 045°F, 050°F, 060°F, 070°F, 075°F, 085°F, 095°F, 100°F, 105°F, 110°F, 115°F, 120°F, 125°F, 130°F, 140°F, 150°F, 160°F, 170°F, 175°F, 180°F, 190°F, 200°F and 210°F.
a. Note: Closing temperature is typically 10°F below opening temperature.
- All brass ECONO/HAT-RA valves are factory tested and covered by a 18 month prorated warranty; 36 for stainless steel.
- A #20 mesh strainer is recommended for use with all port sizes.



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 Whitney.

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.