

**TW2018V-140R-100  
DUPLEX VERTICAL  
VARIABLE SPEED BOOSTER PUMP SYSTEM**

The *TW2018V-140R-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*

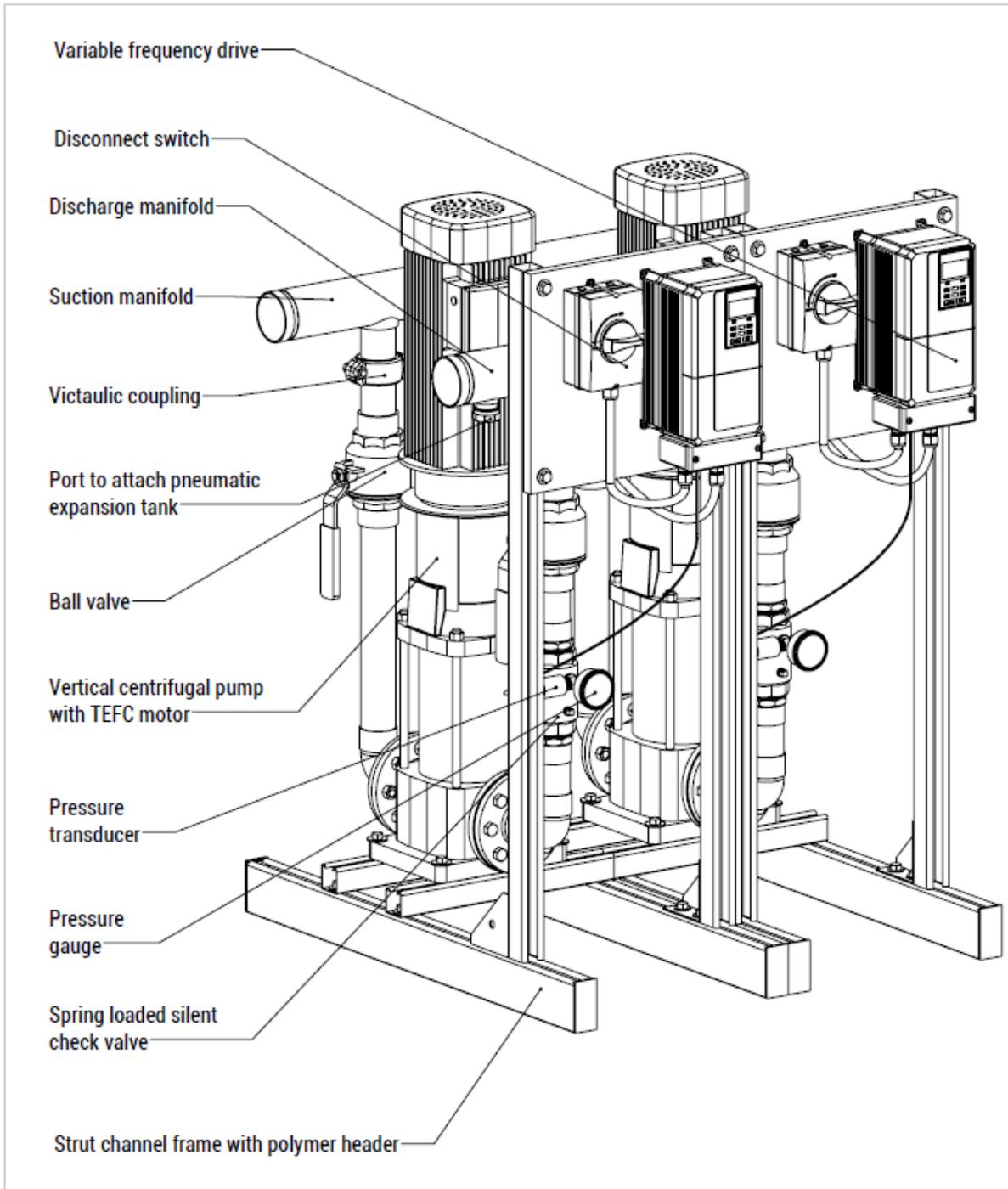
**Lead-Free (Wetted) components:**

- 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 [CR15-5]
- Horse Power:**   10 HP per pump
- Controllers:**     Yaskawa IQPump1000
- Flow Rate:**       140 GPM (70 GPM per pump)
- Boost:**            100 PSI (230' TDH)
- Manifolds:**       3 inch
- Tank:**             26 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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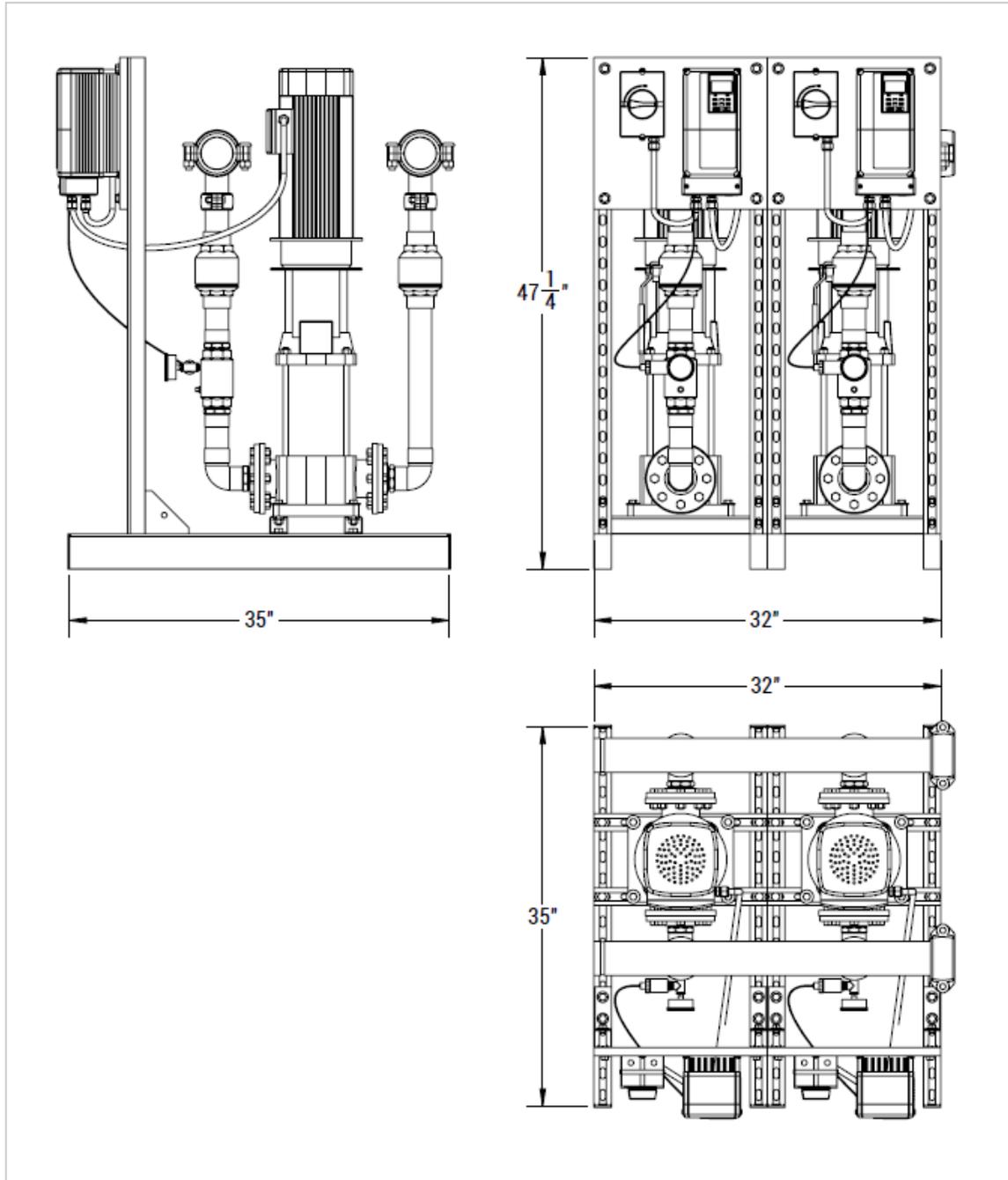
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	NAME	DATE
DRAWN	VID	3/29/22
CHECKED	DW	3/29/22
COMMENTS:		

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

**SYSTEM DIMENSIONS**



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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:**

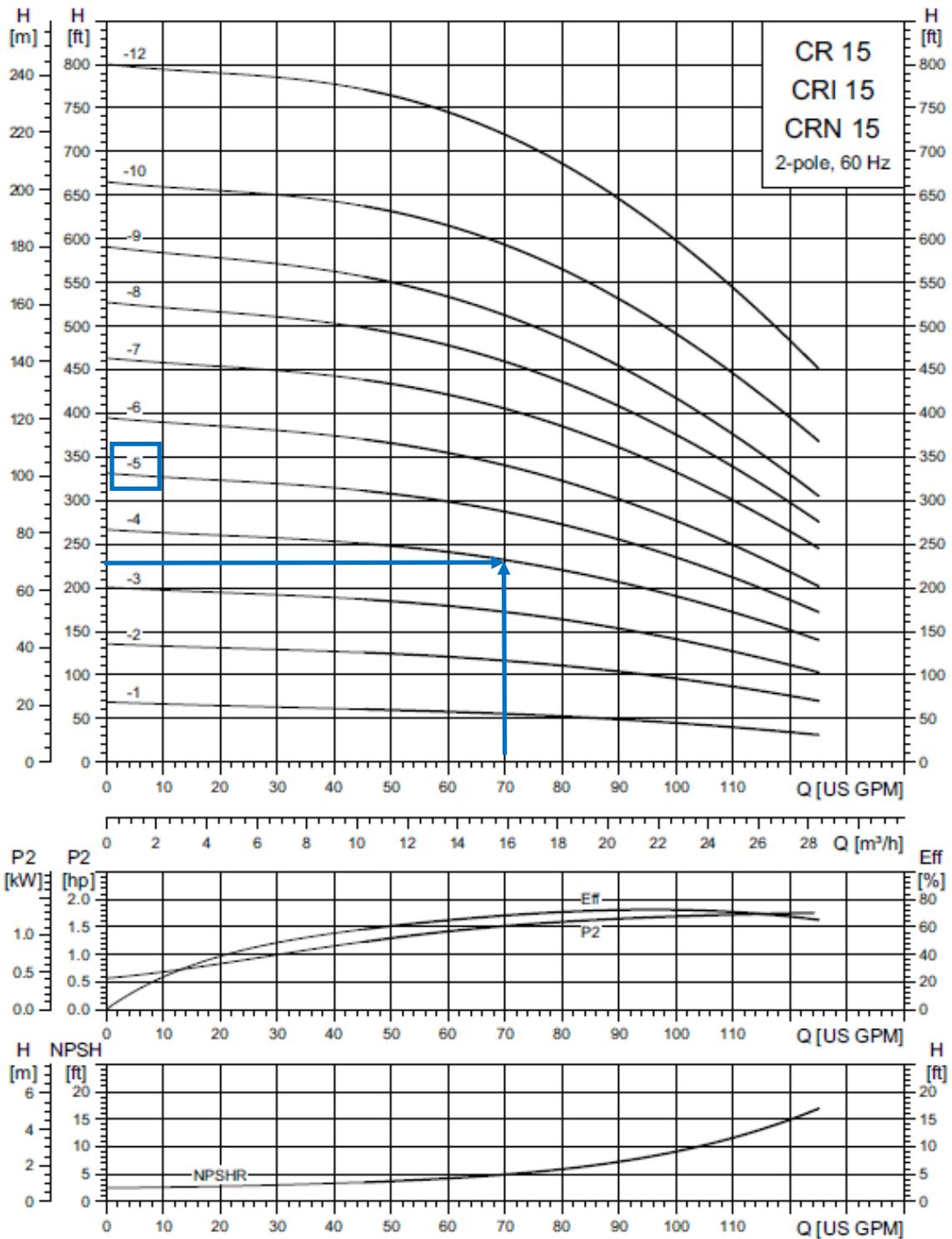
- Manifolds are designed for either right or left access
- Shall be sized appropriately to allow water velocity not exceeding 10 ft/sec, to minimize cavitation and turbulence
- Check valves shall be silent and spring-loaded

**Installation:**

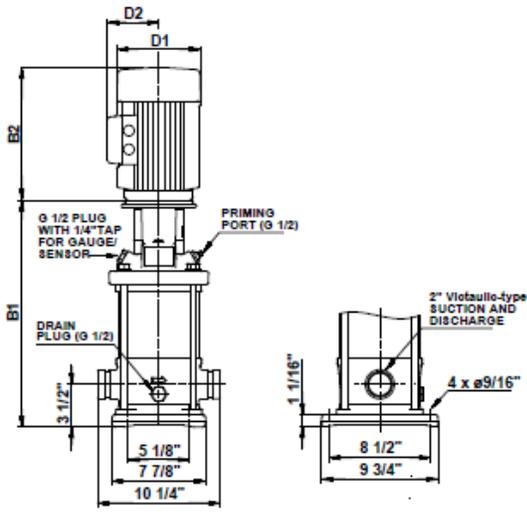
- Equipment shall be installed in accordance with applicable local building, electrical and plumbing codes
- Shall be installed indoors (unless otherwise specified) and protected from water spray



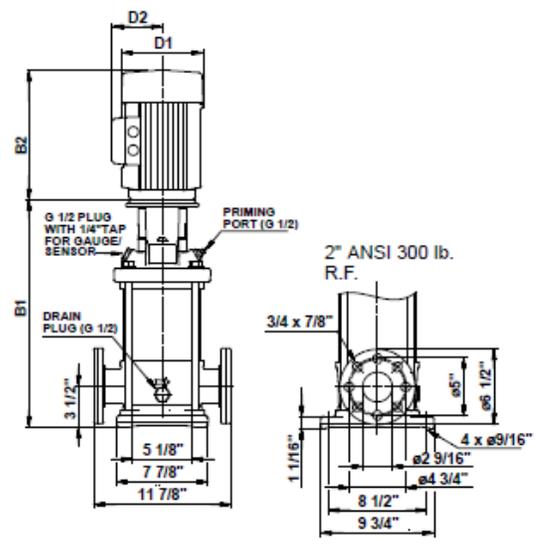
**CR, CRI, CRN 15**



**CRN 15**



TM03 1457 2205



TM03 1459 2205

Pump type	P2 [Hp]	Ph.	PJE*	ANSI dimensions [inch (mm)]							Ship. wt. [lbs (kg)]
				B1	TEFC			ODP			
					D1	D2	B1+B2	D1	D2	B1+B2	
CRN 15-1	2	1	-	16.38 (417)	7.19 (183)	5.73 (146)	28.94 (736)	-	-	-	130 (59)
		3	-	16.38 (417)	7.01 (179)	4.33 (110)	27.6 (702)	-	-	-	121 (55)
CRN 15-2	5	1	-	17.44 (443)	10.62 (270)	7.46 (190)	32.96 (838)	-	-	-	203 (93)
		3	-	17.13 (436)	8.66 (220)	5.28 (135)	32.64 (830)	-	-	-	195 (89)
CRN 15-3	7 1/2	1	-	19.21 (488)	10.22 (260)	7.62 (194)	34.74 (883)	-	-	-	216 (98)
		3	-	19.21 (488)	8.66 (220)	5.28 (135)	34.72 (882)	-	-	-	205 (93)
CRN 15-4	7 1/2	1	-	20.98 (533)	10.22 (260)	7.62 (194)	36.51 (928)	-	-	-	218 (99)
		3	-	20.98 (533)	8.66 (220)	5.28 (135)	36.49 (927)	-	-	-	207 (94)
CRN 15-5	10	1	-	22.76 (579)	10.23 (260)	10.30 (262)	38.83 (987)	-	-	-	335 (152)
		3	-	22.76 (579)	10.24 (261)	6.26 (160)	37.49 (953)	-	-	-	214 (98)
CRN 15-6	15	3	-	27.05 (688)	12.36 (314)	8.00 (204)	45.59 (1158)	10.62 (270)	7.33 (187)	43.36 (1102)	336 (153)
CRN 15-7	15	3	-	28.82 (733)	12.36 (314)	8.00 (204)	47.36 (1203)	10.62 (270)	7.33 (187)	45.13 (1147)	369 (168)
CRN 15-8	15	3	-	30.59 (777)	12.36 (314)	8.00 (204)	49.13 (1248)	10.62 (270)	7.33 (187)	46.90 (1192)	402 (183)
CRN 15-9	20	3	-	32.36 (822)	12.36 (314)	8.00 (204)	50.90 (1293)	11.50 (293)	8.92 (227)	52.05 (1323)	410 (186)
CRN 15-10	20	3	-	34.13 (867)	12.36 (314)	8.00 (204)	52.67 (1338)	11.50 (293)	8.92 (227)	53.82 (1368)	413 (188)
CRN 15-12	25	3	-	37.05 (942)	12.36 (314)	8.00 (204)	59.44 (1510)	11.50 (293)	8.94 (228)	57.86 (1470)	413 (188)

All dimensions in inches unless otherwise noted.  
 \* PJE flanged pump B1 and B1+B2 dimension is equal to ANSI flanged pump and weight is approximately 9 lbs. less.  
 • Available.



**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**



**WELL-X-TROL®**

Diaphragm Well Tanks: WX-100, 200 and 300 Series

**150 PSIG Working Pressure**

**Construction**

Shell	High Strength Steel
Diaphragm	Heavy Duty Butyl
Liner	Antimicrobial
System Connection	Stainless Steel
Finish	Tuf-Kote™ HG Blue
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	150 PSIG (10.3 bar)
Maximum Relief Valve Setting	125 PSIG (8.6 bar)
Warranty	7 Year

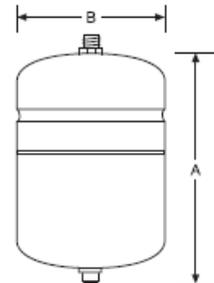
**Application**

- Controls pump cycling in residential well water systems.
- Can be installed indoors or outdoors.

**In-Line Models**

Model Number	Tank Volume		Max. Acceptance Factor	A Tank Height		B Tank Diameter		System Connection (NPTM)	Shipping Weight	
	Gal	Lit		In	mm	In	mm		Lbs	Kg
WX-101	2.0	8	0.45	13	330	8	203	¾	5	2
WX-102	4.4	17	0.55	15	381	11	279	¾	9	4
WX-103	7.6	29	0.43	22	559	11	279	¾	15	7
WX-104	10.3	39	1.00	18	457	15	381	1	20	9
WX-200	14.0	53	0.81	22	559	15	381	1	22	10

Available in gray. Use suffix G.

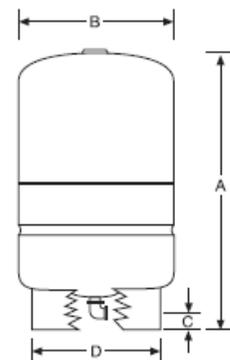


**Stand Models**

Model Number	Tank Volume		Max. Accept. Factor	A Tank Height		B Tank Diameter		C Sys. Conn. Centerline		D Stand Diameter		System Conn. (NPTM)	Shipping Weight	
	Gal	Lit		In	mm	In	mm	In	mm	In	mm		Lbs	Kg
WX-201	14.0	53	0.81	25	635	15	381	1 1/32	40	12	304	1	25	11
WX-202	20.0	76	0.57	32	813	15	381	1 1/32	40	12	304	1	33	15
WX-202XL	26.0	98	0.44	39	991	15	381	1 1/32	40	12	304	1	36	16
WX-203	32.0	121	0.35	47	1194	15	381	1 1/32	40	12	304	1	43	20
WX-205	34.0	129	1.00	30	762	22	559	1 1/16	49	20 1/2	521	1 1/4	61	28
WX-250	44.0	167	0.77	36	914	22	559	1 1/16	49	20 1/2	521	1 1/4	69	31
WX-251	62.0	235	0.55	47	1194	22	559	1 1/16	49	20 1/2	521	1 1/4	92	42
WX-255	81.0	306	0.41	57	1448	22	559	1 1/16	49	20 1/2	521	1 1/4	103	47
WX-252*	86.0	326	0.39	62	1575	22	559	1 1/16	49	20 1/2	521	1 1/4	114	52
WX-302	86.0	326	0.54	47	1194	26	660	2 1/16	52	20 1/2	521	1 1/4	123	56
WX-350	119.0	450	0.39	62	1575	26	660	2 1/16	52	20 1/2	521	1 1/4	166	75

\*WX-252: Maximum Working Pressure: 100 PSIG. Available in Blue only. Available in Tan and Gray. Use suffix T or G.

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.



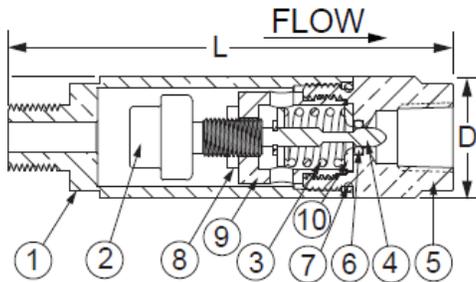
### ***OPERATION***

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 <sub>v</sub>	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.