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VARIABLE SPEED BOOSTER  
SYSTEMS

**BTW SERIES**

**60 HZ**



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## TW3018V-480R-120 TRIPLEX VARIABLE SPEED BOOSTER SYSTEM



The **BTW3018V-480R-120 Triplex 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.

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. 2nd pump will remain in standby.



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

### Lead-Free (Wetted) components:

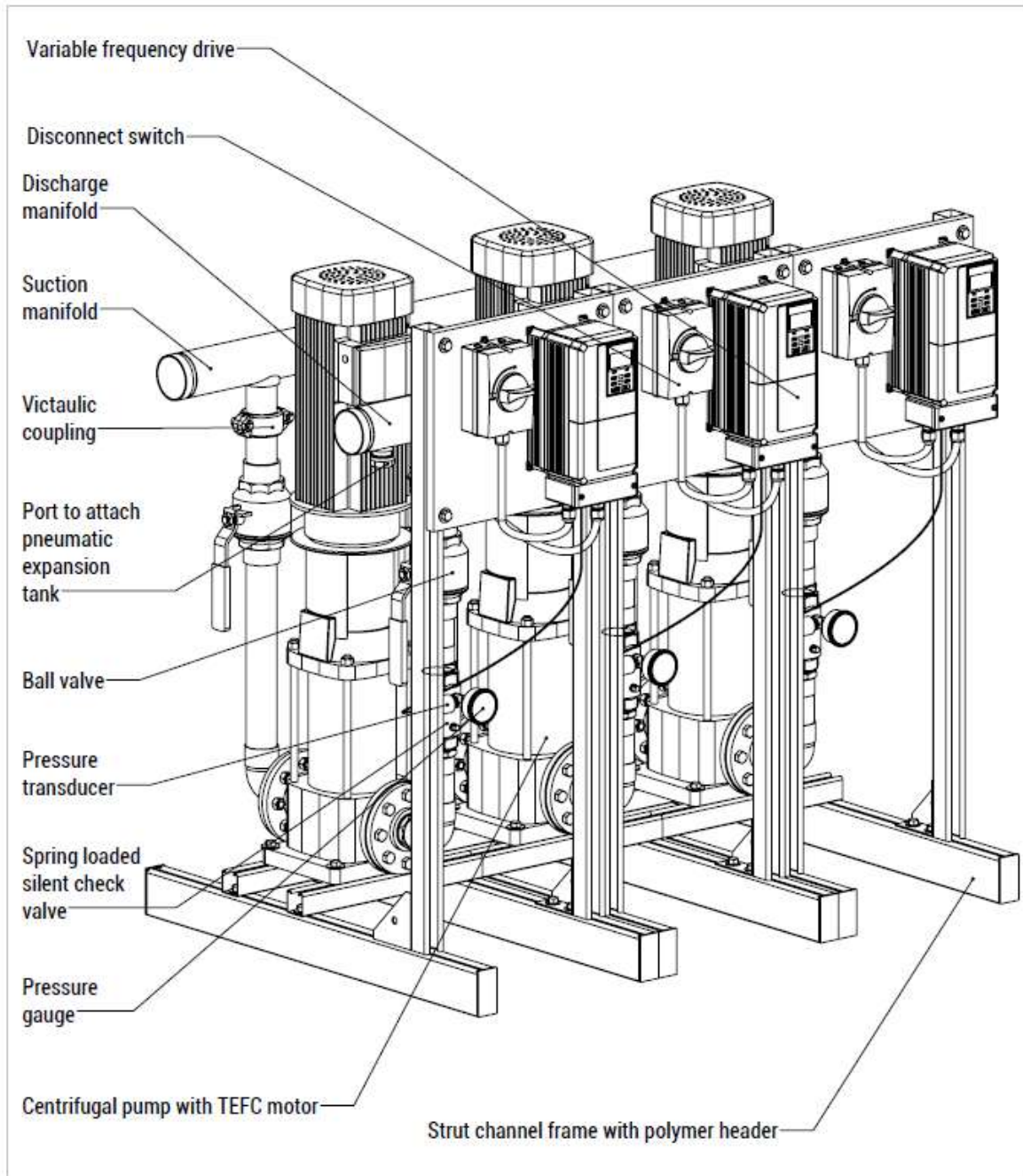
- Pumps: SS and Cast Iron
- Relief valves: Lead Free Brass
- Pressure Gauges: Stainless Steel
- Transducer: Stainless Steel
- Check valves: Lead Free Brass
- Ball Valves: Lead Free Brass
- Manifolds: Stainless Steel
- Fittings: Lead Free Copper
- Flanges: Stainless Steel
- Thermal Valves: Stainless Steel

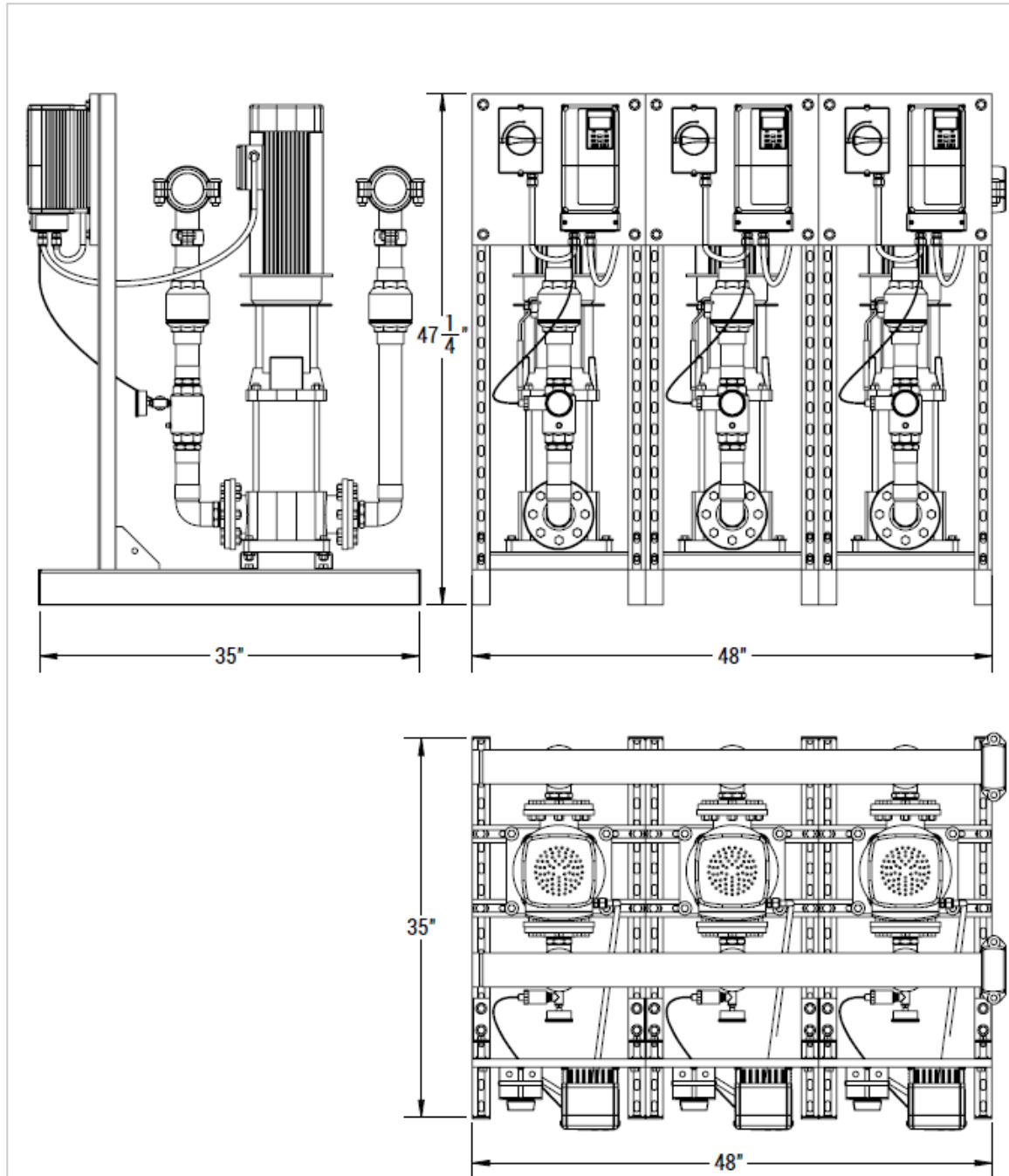
\* All lead free brass shall contain < .25% Pb

### Technical Specifications:

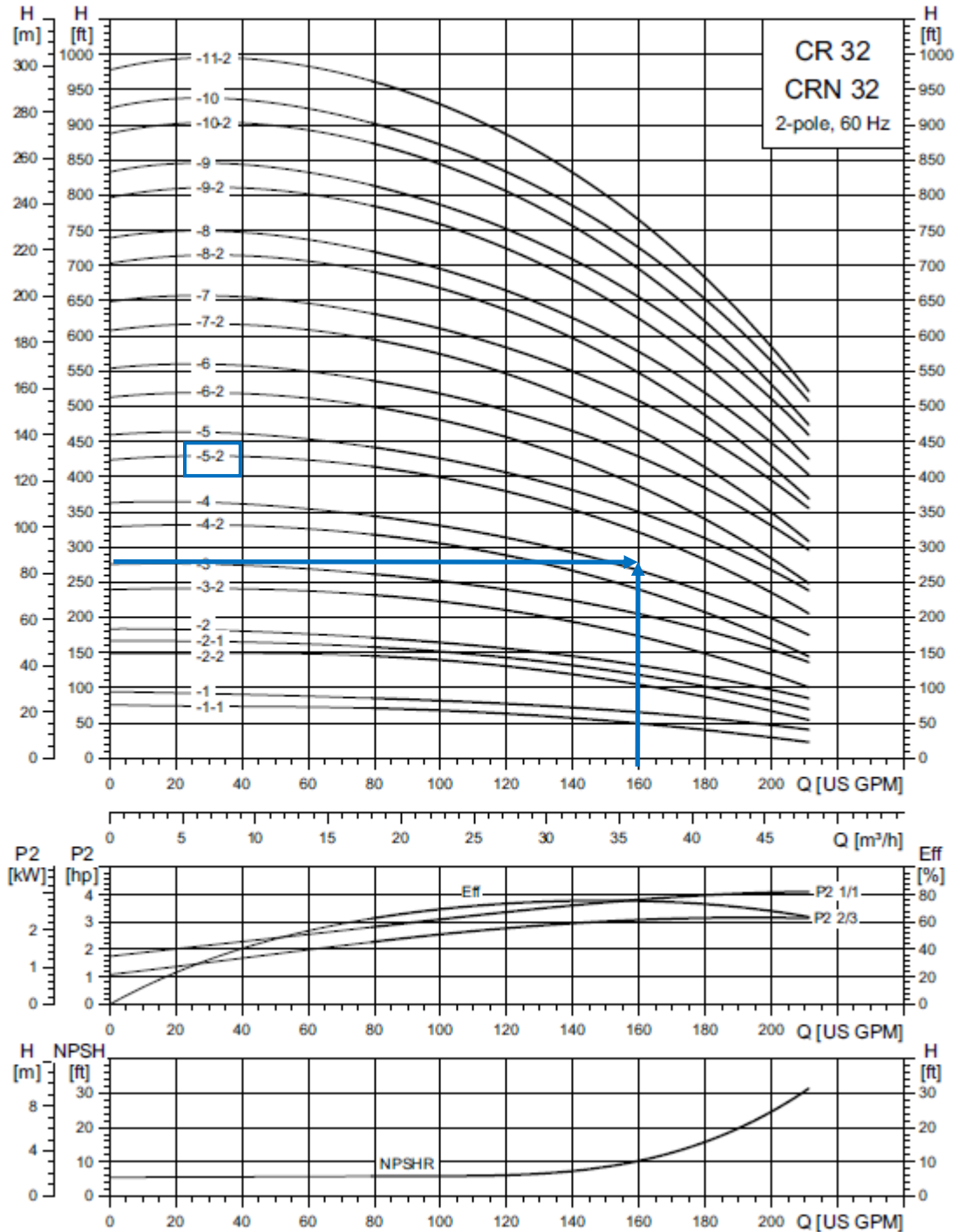
- Pump:** Gould CR32-5-2
- Horse Power:** 20 HP
- Controller:** Yaskawa
- Flow Rate:** 480 GPM (160 GPM / Pump)
- Boost:** 120 PSI boost (280' tdh)
- Manifolds:** 6 inch
- Tank:** 32 Gallon
- Frame Size:** 48" W x 54" H x 34" D
- Power:** 460V/3

*Three Independent circuits recommended*

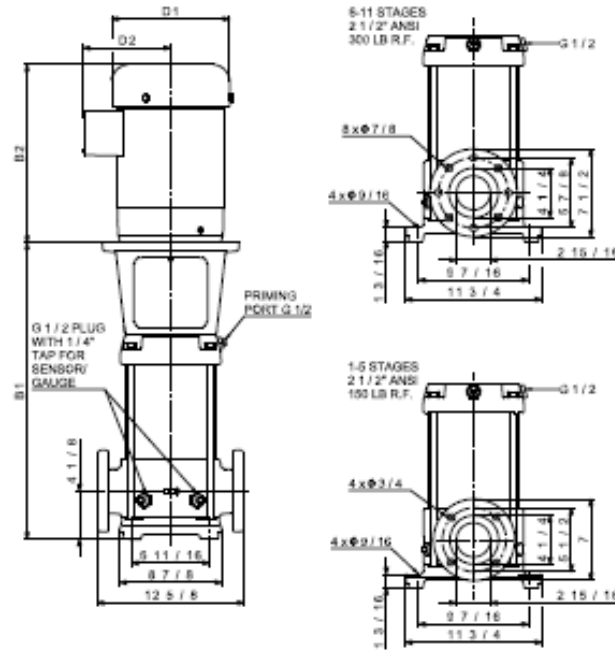




### CR, CRN 32



### CRN 32



TM02 7703 1009

Pump type	P2 [Hp]	Ph.	ANSI dimensions [inoh (mm)]						Ship. wt. <sup>1)</sup> [lbc (kg)]	
			B1	TEFC		ODP				
				D1	D2	B1+B2	D1	D2	B1+B2	
CRN 32-1-1	5	1	20.08 (511)	10.62 (270)	7.46 (190)	35.60 (905)	-	-	-	245 (112)
		3	19.88 (505)	8.66 (220)	5.28 (135)	35.39 (899)	-	-	-	223 (102)
CRN 32-1	5	1	20.08 (511)	10.62 (270)	7.46 (190)	35.60 (905)	-	-	-	233 (106)
		3	19.88 (505)	8.66 (220)	5.28 (135)	35.39 (899)	-	-	-	223 (102)
CRN 32-2-2	7 1/2	1	22.83 (580)	10.22 (260)	7.62 (194)	38.36 (975)	-	-	-	250 (114)
		3	22.64 (576)	8.66 (220)	5.28 (135)	38.15 (970)	-	-	-	234 (107)
CRN 32-2-1	7 1/2	1	22.83 (580)	10.22 (260)	7.62 (194)	38.36 (975)	-	-	-	250 (114)
		3	22.64 (576)	8.66 (220)	5.28 (135)	38.15 (970)	-	-	-	234 (107)
CRN 32-2	10	1	22.83 (580)	10.23 (260)	10.30 (262)	38.90 (989)	-	-	-	305 (139)
		3	22.64 (576)	10.24 (261)	6.26 (160)	37.37 (950)	-	-	-	234 (107)
CRN 32-3-2	10	1	25.59 (650)	10.23 (260)	10.30 (262)	41.66 (1059)	-	-	-	300 (137)
		3	25.39 (645)	10.24 (261)	6.26 (160)	40.12 (1020)	-	-	-	241 (110)
CRN 32-3	15	3	29.72 (755)	12.36 (314)	8.00 (204)	48.26 (1226)	10.62 (270)	7.33 (187)	46.03 (1170)	337 (153)
CRN 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)	343 (156)
CRN 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)	348 (158)
CRN 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)	355 (162)
CRN 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)	355 (162)
CRN 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)	355 (162)
CRN 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)	355 (162)
CRN 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)	448 (204)
CRN 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)	427 (194)
CRN 32-8-2	30	3	43.50 (1105)	12.36 (314)	8.00 (204)	65.89 (1674)	11.50 (293)	8.94 (228)	65.31 (1659)	440 (200)
CRN 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)	635 (289)
CRN 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)	641 (291)
CRN 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)	641 (291)
CRN 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)	648 (294)
CRN 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)	648 (294)
CRN 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)	674 (306)

<sup>1)</sup> Weights are based on pump with TEFC motor (see price list for individual weights).  
All dimensions in inches unless otherwise noted.

**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

**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 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 142 PSI
- Motor shall be 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



**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  
 Grundfos CR(I) SS Series      NSF 61  
 Goulds 2MS Series      NSF 61  
 Walrus TPH Series      NSF 372



CE



CE



CE

CE

RoHS

**Plumbing**

Bluefin BVT200 Ball Valves      NSF 61  
 Wilkins 375XL RPZ:      NSF 61  
 Watts LF777SM3 Strainer      NSF 61  
 Bonomi Check 1000012      NSF 61  
 ThermOmega Thermal Valve      NSF 61  
 Victaulic 607 "E" Coupling      NSF 61  
 Victaulic 660 Cap      NSF 61  
 Flexcon H2P25 Tank      NSF 61  
 Amtrol Tank      NSF61  
 Manifolds / piping      Type L Copper  
 Fittings      Copper  
 Discharge Riser      Copper  
 - Pressure Relief valve:  
 - SS 4-20mA Transducer:  
 - Pressure Gauges:      CA AB1953

CE

**Sealants**

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



**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.

**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



### 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.



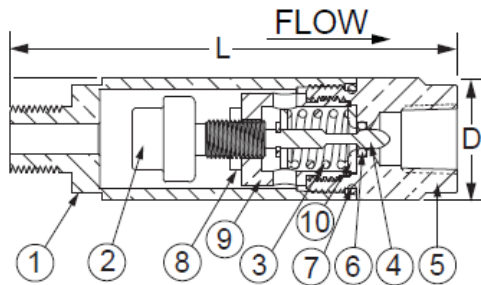
#### *OPERATION*

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.



# 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

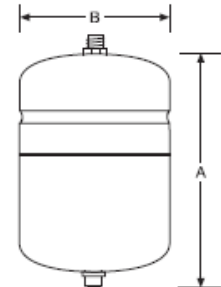
### Application

- 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	1½	40	12	304	1	25	11
WX-202	20.0	76	0.57	32	813	15	381	1½	40	12	304	1	33	15
WX-202XL	26.0	98	0.44	39	991	15	381	1½	40	12	304	1	36	16
WX-203	32.0	121	0.35	47	1194	15	381	1½	40	12	304	1	43	20
WX-205	34.0	129	1.00	30	762	22	559	1½	49	20½	521	1¼	61	28
WX-250	44.0	167	0.77	36	914	22	559	1½	49	20½	521	1¼	69	31
WX-251	62.0	235	0.55	47	1194	22	559	1½	49	20½	521	1¼	92	42
WX-255	81.0	306	0.41	57	1448	22	559	1½	49	20½	521	1¼	103	47
WX-252*	86.0	326	0.39	62	1575	22	559	1½	49	20½	521	1¼	114	52
WX-302	86.0	326	0.54	47	1194	26	660	2½	52	20½	521	1¼	123	56
WX-350	119.0	450	0.39	62	1575	26	660	2½	52	20½	521	1¼	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.

