



**BTW3018V-420R-70-SPC
TRIPLEX
VARIABLE SPEED BOOSTER SYSTEM**

The **BTW3018V-420R-70-SPC 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: Stainless Steel
- 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

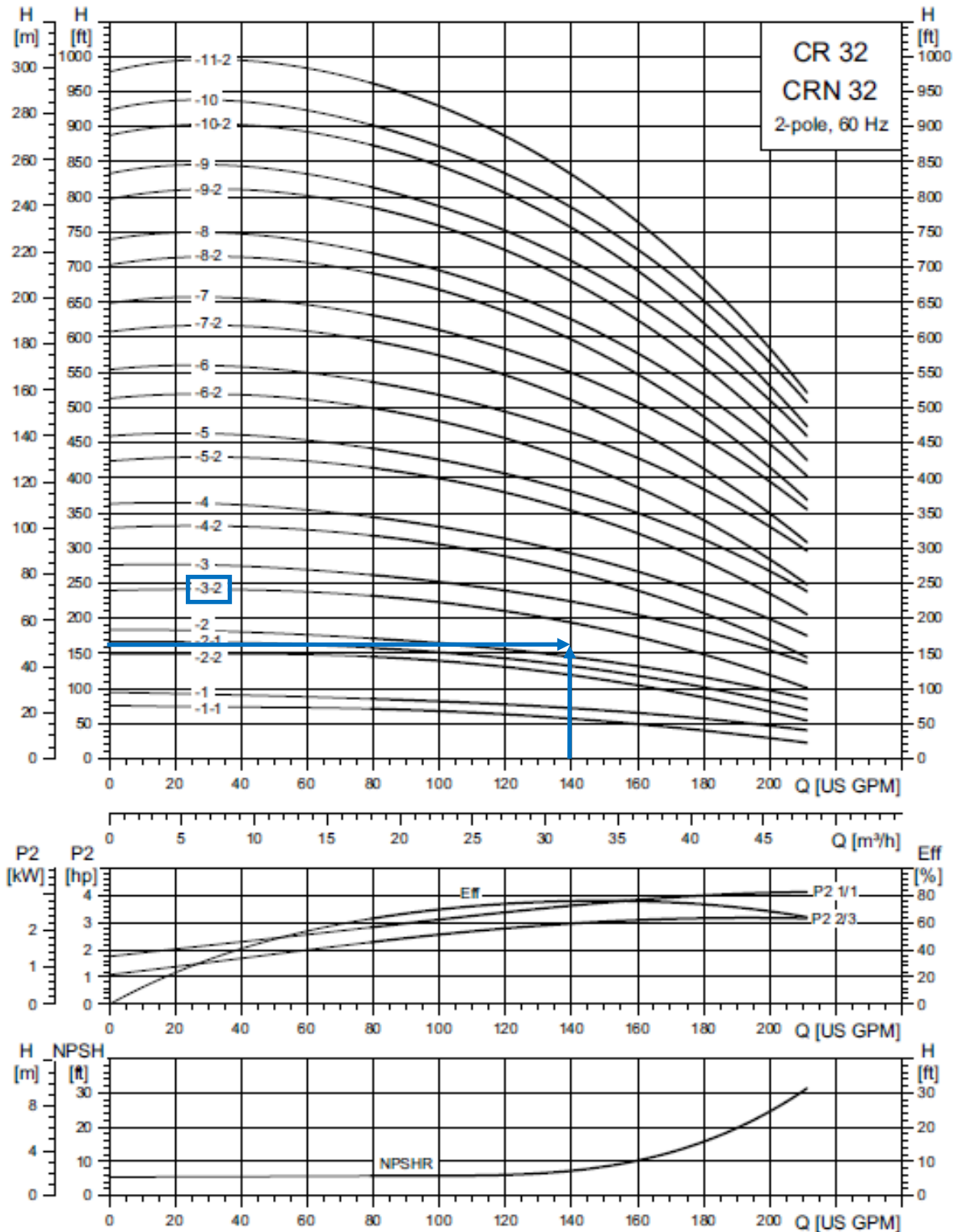
* All lead free brass shall contain < .25% Pb

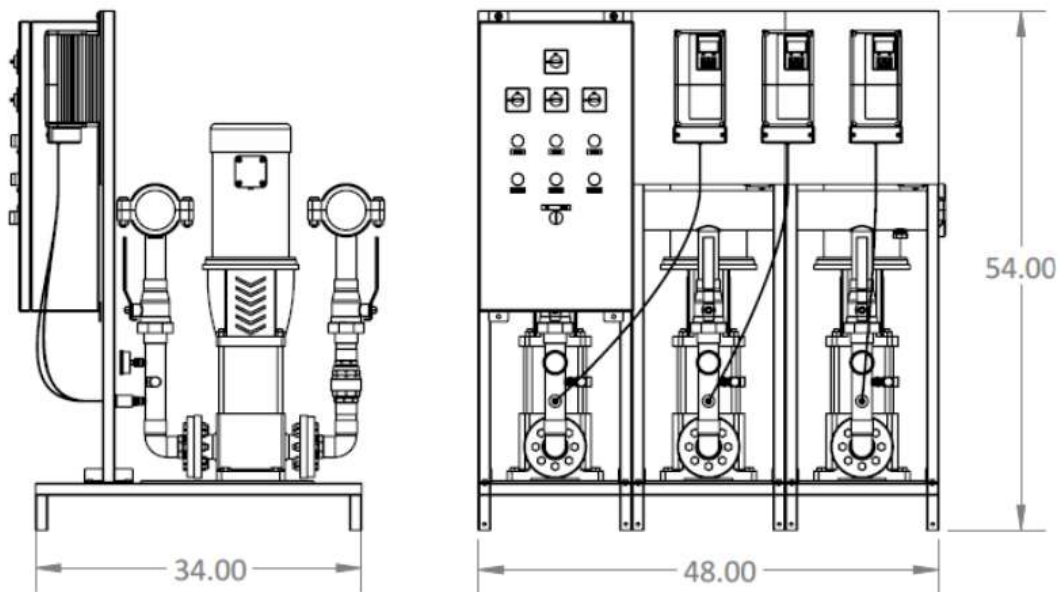
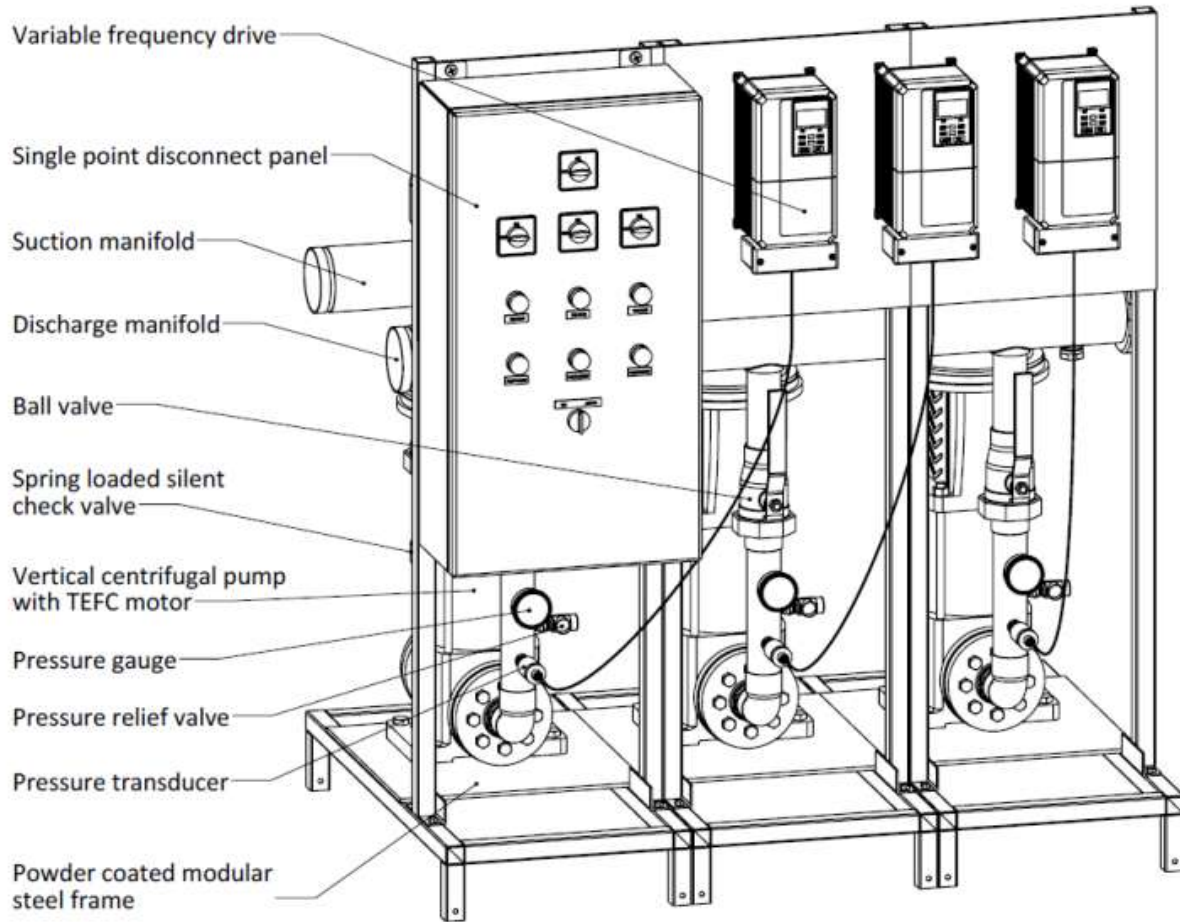
Technical Specifications:

- Pump:** Grundfos CR32-3-2
- Horse Power:** 7-1/2 HP
- Controller:** Yaskawa IQPump1000
BACnet Compatible
- Flow Rate:** 420 GPM (140 GPM / Pump)
- Boost:** 70 PSI (162')
- Setpoint:** 125 PSI
- Manifolds:** 4 inch
- Tank:** SUPPLIED BY OTHERS
- Frame Size:** 48" W x 54" H x 34" D
- Power:** 480V/3

SINGLE POINT CONNECTION

CR, CRN 32





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.
- Shall have Single Point Connection for power.

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 stainless steel internals.
- 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

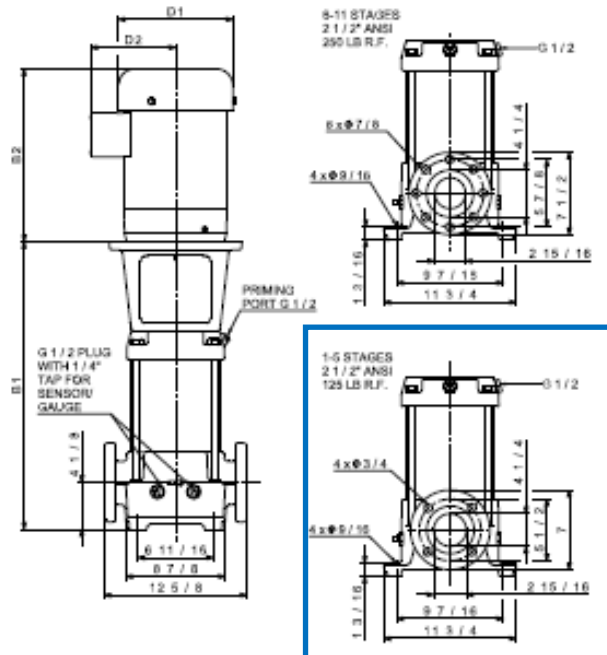
Pneumatic expansion tank: SUPPLIED BY OTHERS**Manifolds, valves and fittings:**

- 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 32



TMC2 7699-1009

Pump type	P2 [Hp]	Ph.	ANSI dimensions [Inch (mm)]									Ship. wt. ¹⁾ [lbs (kg)]
			B1	TEFC			ODP					
				D1	D2	B1+B2	D1	D2	B1+B2			
CR 32-1-1	5	1	20.08 (511)	10.62 (270)	7.46 (190)	35.60 (905)	-	-	-	240 (109)		
		3	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)		
		3	19.88 (505)	8.66 (220)	5.28 (135)	35.39 (899)	-	-	-	218 (99)		
CR 32-2-2	7 1/2	1	22.83 (580)	10.22 (260)	7.62 (194)	38.36 (975)	-	-	-	245 (112)		
		3	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)		
		3	22.64 (576)	8.66 (220)	5.28 (135)	38.15 (970)	-	-	-	229 (104)		
CR 32-2	10	1	22.83 (580)	10.23 (260)	10.30 (262)	38.90 (989)	-	-	-	300 (137)		
		3	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)		
		3	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)	48.26 (1226)	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)	12.36 (314)	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)		

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



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.



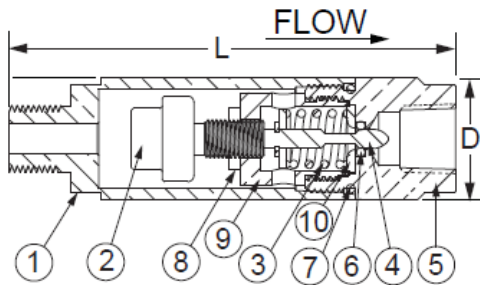
OPERATION

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 _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.