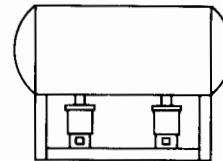


Guide Specification Index

Bell & Gossett® Domestic® Series SA™ High Temperature Condensate Units

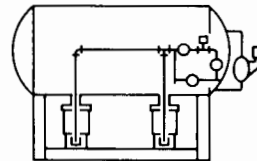
Domestic® Series SA Duplex Condensate Unit . Pages 2-3

Float-switch-operated. Systems to 30,000 Lbs./hr.



Domestic® Series SA-P Duplex Condensate Unit . Pages 4-5

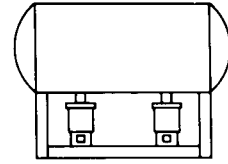
Proportioning pneumatic or electric level control with proportioning valve. Systems to 30,000 Lbs./hr.



Description of Standard and Optional Equipment and Controls Page 6

Suggested Applications Page 7

No specifications are included for Simplex versions; if desired, please contact your Bell & Gossett representative or consult the factory.



Guide Specification

Domestic® Series SA™ Duplex High Temperature Condensate Unit

NOTE: Optional Accessories are Underlined.

Furnish and install according to manufacturer's instructions the quantity of Duplex condensate units designed for operation at receiver pressure of up to 15 psig as shown on the drawings. Each unit shall be completely assembled, factory wired and consist of (1) condensate receiver, (2) water pumps, (2) float switch(es) and all accessories as hereafter specified.

The condensate receiver shall be ASME Code stamped for 150 psig for 66 gallon receivers and 125 psig for 99 and 122 gallon receivers. The head and shell thickness shall not be less than $\frac{3}{16}$ ". Its size and capacity shall be as indicated on the drawings. The receiver shall be elevated 27" above floor and have a fabricated steel base. The receiver shall be equipped with air vent valve, gauge glass, pressure relief valve rated for a maximum of 15 psi, compound gauge, electrolytic corrosion inhibitor (anode), inlet baffle, dial temperature gauge, drain valve and gate valves in pump section. Receiver shall be sized for 1 minute net storage based upon the system return rate.

The (2) two stage centrifugal water pumps shall be mounted on steel base. Pumps shall be close-coupled vertical design, permanently aligned, bronze fitted and be equipped with stainless steel shaft, bronze axial flow impeller, bronze diffuser, enclosed bronze impeller, and renewable bronze wearing ring. The carbon/ceramic mechanical seal shall be rated 250°F for maximum life. Each pump shall be driven by a vertical drip proof 3500 rpm motor and shall deliver its rated capacity at 2' NPSH, (net positive suction head).

Pump capacities, motor HP and electrical characteristics shall be as scheduled on the drawings. Each pump gpm shall be sized for 2 times the system return rate.

The unit manufacturer shall furnish, mount on the unit and wire the following electrical controls.

- (2) Heavy duty double pole float switches rated to 250°F.
- (1) NEMA 2, drip proof, control cabinet with drip lip and piano hinged doors enclosing the following:
 - (2) Combination magnetic starters (each having 3 overload relays) with fused disconnect and cover interlock.
 - (2) Selector switches for water pumps with "Off-Hand-Lead-Lag" positions
 - (1) Numbered terminal block.

All Control Cabinet Components shall be U.L. Listed or Recognized. The Control Panel Assembly shall be listed by Underwriters Laboratories, Inc.

A control circuit transformer shall be provided when the motor voltage exceeds 230 volts.

"Lead Lag" manual sequence controls shall provide for manual selection of the lead or active pump, automatic simultaneous operation of both pumps to provide double capacity under abnormal load conditions, and automatic operation of the lag or inactive pump should the lead pump motor fail.

When a transformer is not used, each pump control circuit shall be completely independent of the other. If a transformer is required, the control power will be supplied downstream of pump #1's disconnect switch. A control power switching relay should be supplied to allow the switch over of control power from pump #1 to pump #2 in the event of a failure or a no power condition of pump #1.

All factory installed wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagrams. All interconnecting wiring between pumps, controls and control panel shall be enclosed in liquid tight conduit.

The pump manufacturer shall furnish a certified test report showing pump performance, wiring diagram, complete installation and operation instructions.

Unit shall be a Domestic® Series SA™ as manufactured by Bell & Gossett, ITT Fluid Technology Corporation, Morton Grove, IL.

CAPACITY SCHEDULE (Required to complete specification)

Series SA™ HIGH TEMPERATURE CONDENSATE UNIT(S):

CATALOG NO. _____

RECEIVER SIZE: _____" Dia. × _____" Long Shell

PUMP: _____ GPM @ _____ psig Differential Pressure

MOTORS: _____ HP @ 3500 rpm

ELECTRICAL: _____ Phase, 60 Hertz, _____ volts

Domestic® Series SA™ Duplex High Temperature Condensate Unit

STANDARD UNIT FEATURES:

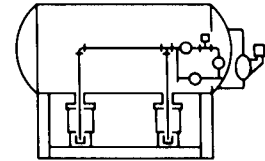
- Steel Receiver, ASME Code stamped for 125 or 150 psig design pressure, $\frac{3}{16}$ " thickness, elevated 27".
- Centrifugal Type B35® 2' NPSH pumps with open drip proof motors. Pump capacity sized for 2 times the system return rate.
- Float switches double pole and externally adjustable. Suitable for high temperature applications.
- Electrolytic corrosion inhibitor
- Gauge Glass
- Dial Thermometer
- Compound Gauge
- Pressure relief valve and thermostatic Vent Trap
- Suction piping and gate valves

OPTIONAL EQUIPMENT AS SPECIFIED:

- Discharge Pressure Gauges
- NEMA 2 — U.L. Listed Control Panel mounted and wired with liquid tight conduit
- TEFC or Explosion Proof motors and controls
- Automatic Electric Alternation

9 SOLID REASONS TO CHOOSE DOMESTIC®:

- ASME Code constructed and stamped receiver
- Quiet ball-bearing type motor
- Bronze-fitted 2' NPSH Centrifugal Pump
- Mechanical Seal construction
- Stainless Steel pump shaft
- Renewable bronze pump wearing ring
- Factory wired and tested before shipment
- Packaged construction for compact installation
- Engineered Reliability



Guide Specification

Domestic® Series SA-P™ Duplex High Temperature Condensate Unit

NOTE: Optional Accessories are Underlined.

Furnish and install according to plans and manufacturer's instructions the quantity of Duplex condensate units designed for operation at receiver pressure up to 15 psig as shown on the drawings. The unit shall be completely assembled, factory wired and consist of (1) condensate receiver, (2) water pumps, proportioning pump control and all accessories as hereafter specified.

The condensate unit shall be ASME Code stamped for 150 psig for 66 gallon receivers and 125 psig for 99 and 122 gallon receivers. The head and shell thickness shall not be less than $\frac{3}{16}$ ". Its size and capacity shall be as indicated on the drawings. The receiver shall be elevated 27" above floor and have a fabricated steel base. The receiver shall be equipped with thermostatic air vent valve, gauge glass, pressure relief valve rated for a maximum of 15 psi, compound gauge, electrolytic corrosion inhibitor (anode), inlet baffle, dial temperature gauge, drain valve and isolation valves in pump section. Receiver shall be sized for 1 minute net storage based upon the system return rate.

The (2) two-stage centrifugal water pumps shall be mounted on the steel base. Pumps shall be close-coupled vertical design, permanently aligned, bronze, fitted and equipped with stainless steel shaft, bronze axial flow impeller, bronze diffuser, enclosed bronze impeller, and renewable bronze wearing ring. The carbon/ceramic mechanical seal shall be rated 250°F for maximum life. Each pump shall be driven by a vertical drip proof 3500 rpm motor and shall deliver its full capacity at 2' NPSH. Pump capacities, motor HP and electrical characteristic shall be as scheduled on the drawings. Each pump gpm shall be sized for 2 times the system return rate.

An electrical, (pneumatic) proportioning regulator, with low water cut-off, shall be mounted on the receiver and wired to a proportioning electric motorized valve, factory installed in the common pump discharge line. The valve shall be equipped with an end switch and be provided with a factory installed 3 valve by-pass. A high level float switch shall be installed on the receiver.

A NEMA 2 drip proof control cabinet with drip lip and piano hinged door shall be mounted on the receiver and wired to motor and controls. The enclosure shall contain:

- (2) Combination magnetic starters (each having 3 overload relays) with fused disconnected and cover interlocks.
- (1) Disconnect switch with cover interlock for the control circuit.
- (2) Selector switches for water pumps with "Off-Hand-Lead-Lag" positions.
- (1) Numbered terminal block.

All Control Cabinet Components shall be U.L. Listed or Recognized. The Control Panel Assembly shall be listed by Underwriters' Laboratories, Inc.

"Lead-Lag" manual sequence controls shall provide for manual selection of the lead or active pump, automatic simultaneous operation of both pumps to provide double capacity under abnormal conditions, and automatic operation of the lag or inactive pump should be lead pump motor fail. A control circuit transformer shall be provided when the motor voltage exceeds 230 volts.

When a transformer is not used, each pump control circuit shall be completely independent of the other. If a transformer is required, the control power will be supplied downstream of pump #1's disconnect switch. A control power switching relay should be supplied to allow the switch over of control power from pump #1 to pump #2 in the event of a failure or a no power condition of pump #1.

All factory installed wiring shall be numbered for easy identification and the number shall coincide with those shown on the wiring diagram.

The unit manufacturer shall furnish a certified test report showing pump performance, wiring diagram, complete installation and operation instructions.

Unit shall be a Domestic® Series SA-P™ as manufactured by Bell & Gossett, ITT Fluid Technology Corporation, Morton Grove, IL.

CAPACITY SCHEDULE (Required to complete specification)

SERIES SA-P™ HIGH TEMPERATURE CONDENSATE UNIT(S):

CATALOG NO. _____

RECEIVER NO. _____" Dia. × _____" Long Shell

PUMP: _____ gpm @ _____ psig differential pressure

MOTOR: _____ HP @ 3500 rpm

ELECTRICAL: _____ phase, 60 Hertz, _____ volts

Domestic® Series SA-P™ Duplex High Temperature Condensate Unit

STANDARD UNIT FEATURES:

- Steel Receiver, ASME Code stamped for 125 or 150 psig design pressure, $\frac{3}{16}$ " thickness elevated 27".
- Centrifugal Type B35® 2' NPSH pumps with open drip proof motors. Pump capacity sized for 2 times the system return rate.
- Proportioning regulator and proportioning electric valve with standby switch for second pump.
- Electrolytic corrosion inhibitor
- Gauge Glass
- Dial Thermometer
- Compound Gauge
- Pressure relief valve and Thermostatic Vent Trap
- Suction piping and gate valves

OPTIONAL EQUIPMENT AS SPECIFIED:

- Discharge Pressure Gauges
- NEMA 2 — U.S. Listed Control Panel mounted and wired with liquid tight conduit
- TEFC or Explosion Proof motors and controls
- Pneumatic pump controls

9 SOLID REASONS TO CHOOSE DOMESTIC®:

- ASME Code constructed and stamped receiver
- Balanced discharge flow
- Bronze-fitted 2' NPSH Centrifugal Pump
- Mechanical Seal construction
- Stainless Steel pump shaft
- Factory wired and tested before shipment
- Packaged construction for compact installation
- Engineered Reliability
- Quiet ball-bearing type motor

Guide Specification

Domestic® Series SA™, SA-P™

Description of Standard and Optional Equipment and Controls

Series SA™ units are available in three standard control arrangements to meet most conditions and any can be furnished with single or duplex pumps.

Series SA-P™ units, equipped with proportioning electric regulator and discharge control valve, are recommended when the back pressure at the pump discharge may be less than the internal receiver pressure.

The Series SA-P™ controls provide for balancing condensate output with input resulting in continuous pump operation even at reduced loads. SA-P maintains constant level in tank. Discharge rate is equal to incoming rate. Controls shut off pumps at no flow condition.

Series SA™ units with float switch controls are recommended when the back pressure at the pump discharge will always be greater than the internal receiver pressure.

Series SA™ units may be furnished with an optional back pressure valve when the pressure in the receiver exceeds pressure in the discharge line thereby preventing steam blow through.

Steel Receiver — is ASME Code stamped for 125 psig design pressure; shell and head thickness will not be less than 3/16".

Type B Centrifugal Pumps — close coupled and permanently aligned, feature 2-stage bronze fitted construction, with stainless steel shaft, bronze axial flow impeller for the first stage, enclosed bronze impeller for the second stage, bronze wearing ring, and premium quality mechanical seal designed for temperatures up to 250°F. The pumps are designed for 2' net positive suction head.

Type B 2' NPSH — Pumps are equipped with a seal cavity bleed line to provide seal lubrication and permit operation at a no flow shutoff condition minimizing the probability of premature seal failure.

Electric Motors — vertically mounted drip proof ball bearing type.

Standard voltages are: Three phase — 208-230/460V. Single phase — 115/230V.

Proportioning Electric Regulator and Proportioning Electric Valve — are used on type SA-P units only.

Float Switch(es) — heavy duty, 2 pole switches. Externally adjustable.

Pressure Relief Valve — furnished with pressurized receivers, is factory preset to open at 15 psig maximum. Lower pressure settings are available.

Thermostatic Vent Trap — furnished with pressurized receivers only, discharges air but closes against steam to provide venting of non-condensable gasses.

Special Motors — wound for other than standard voltages are available at extra cost. When open drip proof construction is not adequate, motors with totally enclosed or explosion proof enclosure or special insulation can be furnished.

Magnetic Starters — can be furnished in consolidated control cabinets (NEMA 2 — U.L. Listed is standard) to comply with NEMA or JIC specifications. Combination magnetic starters are available with fusible disconnect switches or circuit breakers. All disconnect devices are furnished with cover interlock.

Starters with (3) manual reset overload relays are available and highly recommended for the protection of all windings of 3 phase motors against open circuit and/or conditions.

A starter is capable of interrupting several times motor full load current, but short circuit currents may be many times greater. Fuses or a circuit breaker must be installed ahead of the starter according to NEC recommendations to clear any such faults that may occur to protect the line wiring.

Selector Switches — are furnished with "Auto-Off-Hand" positions for all single units and duplex pumps except when "Lead-Lag" controls are supplied. Selector switches with "Off-Hand-Lead-Lag" positions are furnished with "Lead-Lag" controls.

Manual Sequence Control (Lead-Lag) — for duplex units, consists of 2 selector switches used in conjunction with 2 magnetic starters and 2 float switches. This control provides for: (1) manual selection of the active pump, (2) simultaneous operation of both pumps under abnormal load conditions, and (3) automatic operation of the inactive or lag pump if the lead pump or its control fails.

Electric Alternator — for duplex units. This control consists of an automatic electrical sequence relay used in conjunction with 2 magnetic starters, 2 float switches, and 2 selector switches. When magnetic starters and selector switches are furnished the alternator is installed in "Consolitol" control cabinet. This control provides for: (1) automatic transfer of operating sequence after each cycle, (2) simultaneous operations of both pumps under peak load conditions, and (3) automatic operations of the inactive or lag pump if the lead pump or its control fails.

Control Circuit Transformers — are available. They are required for all JIC specifications and voltages exceeding 250 volts.

Control power switching relay — should be supplied in Duplex or Triplex units when individual pump disconnect switches are specified and a control power transformer is required. This relay is recommended in order to maintain control power in the event pump #1's disconnect switch is turned off or pump #1 fails. In this event the control power will be automatically supplied by pump #2.

Vacuum Pump — When low pressure waste steam is being used for steam absorption chillers, the steam coil may be under vacuum for sustained periods. A small auxiliary vacuum (Domestic® Series MJ™) can be furnished as part of the assembly to assure continuous removal of non-condensable gasses. Please consult your Bell & Gossett Representative.

Domestic® Series SA™ and SA-P™

High Temperature Condensate Return Units

Suggested Applications

1. Steam Absorption Refrigeration Systems.

Generally, absorption chiller generators operate at steam pressures varying from a maximum of 9 to 12 psig, down to a vacuum of about 15" Hg. At full loads, the generator will operate at the design steam pressure. At reduced loads, however, the steam control valve will throttle the steam flow, resulting in reduced pressures in the generator. At some partial load point, the steam pressure will be 0 psig; further reduction in load will cause the generator to operate below atmospheric pressure (vacuum), causing condensate to be held up in the generator.

It is highly desirable to select a condensate return system capable of continuously draining the generator coil irrespective of the steam pressure and the condensate temperature.

The principal objections to previously used systems involve the use of float and thermostatic traps and condensate coolers. Series SA units, using neither traps nor a condensate cooler, offer simple, effective answers to ALL operating conditions. The need for a condensate cooler is eliminated because Domestic® B-35® centrifugal pumps, used with Series SA units, are designed to operate with a very low NPSH (net positive suction head), and will pump condensate at temperatures up to 250°F. The small amount of submergence required on the pumps (2 ft.) is provided for by elevating the receiver accordingly.

The several advantages of Domestic® Series SA™ units are as follows:

- The condensate drainage from the lithium bromide system is continuous, without hold-up.
- Float and thermostatic traps are not required between the absorption system and the Series SA receiver.
- A condensate cooler is not required.
- Energy is conserved resulting in improved economies. Condensate is returned to the boiler at higher temperatures and no cooling tower water is required for condensate cooling.
- Non-condensable and dissolved gasses are more effectively removed, since the condensate is at a higher temperature (usually at the boiling point).
- When exhaust steam from a steam turbine driven centrifugal compressor refrigeration system is supplied to a lithium bromide absorption system, or when low pressure waste steam is being utilized, Series SA units offer other advantages. In either case, the generator may operate under vacuum for prolonged periods or continuously. A small auxiliary vacuum pump (Domestic® Series MJ™) can be furnished as part of the assembly to handle the non-condensables. Alternatively, if the system is part of a vacuum heating system, the outlet from the air vent valve can be connected to the vacuum return line.

2. High Temperature Condensate Application (Process or Heating).

Similar conditions are encountered with heating and process equipment when modulating supply valves are used. Continuous coil drainage eliminates destructive water hammer and reduces the corrosive action of air being frequently introduced through vacuum breakers, which are not required with Series SA™ units.

3. Combination Flash Tank and Condensate Units.

Series SA™ units are efficient combination flash tanks and condensate units. For example, trapped high pressure returns can be piped to the receiver and flash steam piped to a low pressure main. Thus, the unit effectively replaces three normally separate pieces of equipment; flash tank, steam trap, and condensate pump.

Sizing of Units

The selection table in the Series SA bulletin shows pump capacities at various discharge pressures. Other discharge pressures are available, consult your Bell & Gossett Representative. Receivers are generously sized for the type of service indicated. When used as combination flash tanks and condensate units, the receivers are suitable for reevaporation (flash) rates of up to 15% of the returns, assumed to be 50% of the pump capacity. Example: Assuming returns of 7500 lbs./hr. or 15 gpm, a pump capacity of 30 gpm is suggested. The receiver cataloged for a 30 gpm pump will handle a flash rate of 1125 lbs./hr. (15% of 7500).

NOTE: WHEN USED AS OUTLINED ABOVE AND DIAGRAMED IN THE SALES BULLETIN ONE SERIES SA™ UNIT IS REQUIRED FOR EACH CHILLER.



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