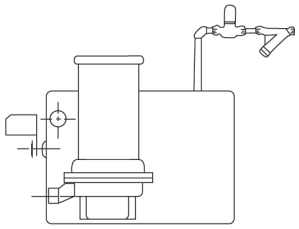
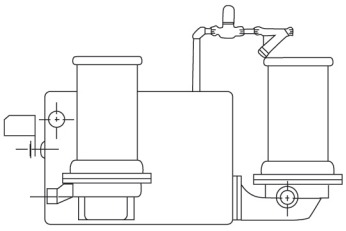
Domestic® Pump Series CM™ Boiler Feed Units

Guide Specification Index

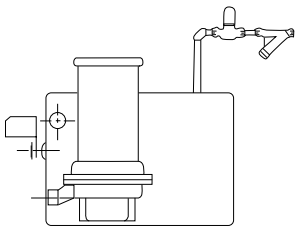




Guide Specification

Domestic® Series CM™ Simplex Boiler Feed Unit

for up to 200°F



NOTE: Optional Accessories are Underlined

Part 1 – GENERAL

1.1 SECTION INCLUDES
- A. Unit shall be a Domestic Series CM™ simplex boiler feed pumping unit as manufactured by Bell & Gossett.
  1. (1) Cast iron receiver
  2. (1) Water pump
  3. (1) Water make up assembly
  4. (1) Pump Control Panel

1.2 REFERENCES
- A. HI – Hydraulic Institute
- B. NEMA – National Electric Manufacturers Association
- C. UL – Underwriters, Laboratories
- D. CSA – Canadian Standards Association
- E. ISO – International Standards Organization
- F. IEC – International Electrotechnical Commission

1.3 SUBMITTALS
- A. Submittals shall include the following:
  1. Submittal data cover sheet
  2. Unit description sheet
  3. Dimensional print
  4. Sales bulletin
  5. Piping diagram
  6. Wiring diagram
  7. Instruction manual

1.4 QUALITY ASSURANCE
- A. The manufacturer shall have a minimum of 20 years experience in the design and construction of condensate return equipment.
- B. The manufacturer shall be fully certified by the International Standards Organization per ISO 9001. Proof of this certification shall be furnished at the time of submittal.
- C. The manufacturer shall carry a minimum product liability insurance of $5,000,000.00 per occurrence.
- D. All control cabinet components shall be U.L. listed or recognized. The control panel assembly shall be listed by Underwriters, Laboratories, Inc.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
- A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
  1. Bell & Gossett Domestic™ CM™
  2. Pre-approved equal

2.2 COMPONENTS
- A. BOILER FEED RECEIVER
  1. The boiler feed receiver shall be of close grained cast iron construction (warranted for 20 years from the date of shipment against failure due to corrosion).
  2. The receiver shall be sized for 5 minutes net storage based on the boiler evaporation rate.
  3. Receiver shall have an inlet, vent and an overflow opening to provide means of secondary venting.
  4. Receiver to have provisions for future addition of second pump.
  5. Receiver shall be furnished with:
     a. (1) Dial pressure gauge for pump discharge
     b. (1) Water level gauge glass for visual tank inspection
     c. (1) Dial thermometer
     d. (1) Bronze fitted, butterfly isolation valve (up to 75 gpm [284 L/M] pump capacity) between pump suction and receiver
     e. (2) Lifting eye bolts
     f. (1) Cast iron inlet strainer with vertical self-cleaning bronze screen and large dirt pocket shall be mounted on the receiver. The screen shall be easily removable for cleaning, requiring no additional floor space for servicing.
- B. WATER PUMP
  1. The water pump shall be centrifugal design, bronze fitted with enclosed cast bronze centrifugal impeller, permanently aligned and flanged mounted for vertical operation.
  2. Capacities and electrical characteristics for the pump shall be scheduled on the drawings.
  3. Each pump shall be sized for 2 times the boiler evaporation rate.
  4. Each pump shall be close-coupled to a 3500 rpm, vertical, drip-proof motor.
  5. Carbon/ceramic mechanical shaft seal shall be rated for 250°F (121°C).
  6. Each pump shall include:
     a. Enclosed cast bronze centrifugal impeller
     b. Discharge gauge port tapping
     c. Renewable bronze case ring
     d. Stainless steel shaft
     e. Drain tapping
- C. THE WATER MAKE UP ASSEMBLY SHALL BE INSTALLED ON THE RECEIVER OF CAPACITY EQUAL TO ONE (1) BOILER FEED PUMP.
  1. The make up assembly shall consist of:
     a. Level control switch
     b. Electric solenoid valve
        1.) The valve shall be packless, piston pilot operated type with cushioned closing feature and epoxy resin molded water proof coil.
        2.) The valve shall be equipped with a strainer, and a manual bypass with air gap shall be provided around the valve.
- D. CONTROL PANEL
  1. The control panel shall be a mounted and wired NEMA 2 control cabinet with drip lip and piano hinged door enclosing the following:
     a. (1) Combination magnetic contactor with adjustable thermal overloads with fused disconnect and cover interlock
     b. (1) "Auto-Off-Hand" selector switch
     c. (1) Numbered terminal strip
     d. (1) Fused control circuit transformer when the motor voltage exceeds 230 Volts
     e. (1) Pump running pilot light

PART 3 - EXECUTION

3.1 INSTALLATION
- A. Install equipment in accordance with manufacturer's instructions.
- B. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal, and local codes.
- C. All factory wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagram.
- D. All interconnecting wiring between the pump controls and control panel shall be enclosed in liquid tight flexible conduit.
- E. The unit shall be factory tested as a complete unit and the unit manufacturer shall furnish elementary and connection wiring diagrams, piping diagrams, installation and operation instructions.
- F. The unit manufacturer shall furnish, mount on the unit and wire a NEMA 2 control cabinet with drip lip and piano hinged door.
- G. The unit shall be shipped completely assembled
- H. Certified test report shall be provided by the factory.
- I. Unit shall be a Domestic Series CM™ as manufactured by Bell & Gossett, Morton Grove, IL.

Domestic® Series CM™ Simplex Boiler Feed Unit

STANDARD UNIT FEATURES:

- Cast Iron Receiver for years of dependable service. Receiver sized for 5 minute net storage. All Simplex Receivers have a blanked opening for a second pump.
- Cast Iron Receiver warranted for 20 years from date of shipment against failure due to corrosion.
- Centrifugal Pump with drip-proof motors. Pump capacity sized for 2 times the boiler evaporation rate.
- Float switch, ½" solenoid valve and "Y' strainer water makeup assembly.
- Quiet ball-bearing motor
- Carbon mechanical seal rated for 250°F (121°C) for maximum life.

10 SOLID REASONS TO CHOOSE DOMESTIC®:

- Close grained, corrosion resistant cast iron receiver
- Quiet ball-bearing type motor
- Bronze-fitted centrifugal pump
- Mechanical seal construction
- Stainless steel pump shaft
- Renewable bronze pump wearing ring
- Factory wired and tested before shipment
- Package construction for compact installation
- Engineered reliability
- 100 years of experience

OPTIONAL EQUIPMENT AS SPECIFIED:

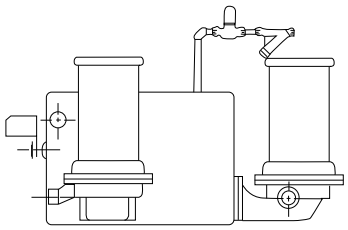
- Water level gauge with shut off valve
- Dial Thermometer
- Inlet Basket Strainer
- Discharge Pressure Gauge
- Suction Butterfly Valve
- Lifting Eye Bolts
- NEMA 2 – U.L. Listed Control Panel
- TEFC or Explosion Proof motors and controls
- 3 Valve bypass around solenoid water makeup valve
- Low water cut off float switch*
- High or low water alarm and required control*
- Air Gap fitting for makeup assembly
- CSA listed control panel
- Larger make-up assemblies

*Availability dependent upon receiver size

Guide Specification

Domestic® Series CM™ Duplex Boiler Feed Unit

for up to 200°F



NOTE: Optional Accessories are Underlined

Part 1 – GENERAL

1.1 SECTION INCLUDES
- A. Unit shall be a Domestic Series CM™ duplex boiler feed pumping unit as manufactured by Bell & Gossett.
  1. (1) Cast iron receiver
  2. (2) Water pumps
  3. (1) Water make up assembly
  4. (1) Pump Control Panel

1.2 REFERENCES
- A. HI – Hydraulic Institute
- B. NEMA – National Electric Manufacturers Association
- C. UL – Underwriters, Laboratories
- D. CSA – Canadian Standards Association
- E. ISO – International Standards Organization
- F. IEC – International Electrotechnical Commission

1.3 SUBMITTALS
- A. Submittals shall include the following:
  1. Submittal data cover sheet
  2. Unit description sheet
  3. Dimensional print
  4. Sales bulletin
  5. Piping diagram
  6. Wiring diagram
  7. Instruction manual

1.4 QUALITY ASSURANCE
- A. The manufacturer shall have a minimum of 20 years experience in the design and construction of condensate return equipment.
- B. The manufacturer shall be fully certified by the International Standards Organization per ISO 9001. Proof of this certification shall be furnished at the time of submittal.
- C. The manufacturer shall carry a minimum product liability insurance of $5,000,000.00 per occurrence.
- D. All control cabinet components shall be U.L. listed or recognized. The control panel assembly shall be listed by Underwriters, Laboratories, Inc.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
- A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
  1. Bell & Gossett Domestic™ CM™
  2. Pre-approved equal

2.2 COMPONENTS
- A. BOILER FEED RECEIVER
  1. The boiler feed receiver shall be of close grained cast iron construction (warranted for 20 years from the date of shipment against failure due to corrosion).
  2. The receiver shall be sized for 5 minutes net storage based on the boiler evaporation rate.
  3. Receiver shall have an inlet, vent and an overflow opening to provide means of secondary venting.
  4. Receiver shall be furnished with:
     a. (2) Dial pressure gauges for pump discharge
     b. (1) Water level gauge glass for visual tank inspection
     c. (1) Dial thermometer
     d. (2) Bronze fitted, butterfly isolation valves (up to 75 gpm [284 L/M] pump capacity) between pump suction and receiver
     e. (2) Lifting eye bolts
     f. (1) Cast iron inlet strainer with vertical self-cleaning bronze screen and large dirt pocket shall be mounted on the receiver. The screen shall be easily removable for cleaning, requiring no additional floor space for servicing.
- B. WATER PUMP
  1. The water pump shall be centrifugal design, bronze fitted with enclosed cast bronze centrifugal impeller, permanently aligned and flanged mounted for vertical operation.
  2. Capacities and electrical characteristics for the pump shall be scheduled on the drawings.
  3. Each pump shall be sized for 2 times the boiler evaporation rate.
  4. Each pump shall be close-coupled to a 3500 rpm, vertical, drip-proof motor.
  5. Carbon/ceramic mechanical shaft seal shall be rated for 250°F (121°C).
  6. Each pump shall include:
     a. Enclosed cast bronze centrifugal impeller
     b. Discharge gauge port tapping
     c. Renewable bronze case ring
     d. Stainless steel shaft
     e. Drain tapping
- C. THE WATER MAKE UP ASSEMBLY SHALL BE INSTALLED ON THE RECEIVER OF CAPACITY EQUAL TO ONE (1) BOILER FEED PUMP.
  1. The make up assembly shall consist of:
     a. Level control switch
     b. Electric solenoid valve
        1.) The valve shall be packless, piston pilot operated type with cushioned closing feature and epoxy resin molded water proof coil.
        2.) The valve shall be equipped with a strainer, and a manual bypass with air gap shall be provided around the valve.
- D. CONTROL PANEL
  1. The control panel shall be a mounted and wired NEMA 2 control cabinet with drip lip and piano hinged door enclosing the following:
     a. (2) Combination magnetic contactors with adjustable thermal overloads with fused disconnect and cover interlock
     b. (2) “Auto-Off-Hand” selector switch
     c. (1) Numbered terminal strip
     d. (1) Electrical alternator
     e. (1) Fused control circuit transformer when the motor voltage exceeds 230 Volts
     f. (2) Pump running pilot lights
     g. (1) Control power switching relay

PART 3 - EXECUTION

3.1 INSTALLATION
- A. Install equipment in accordance with manufacturer’s instructions.
- B. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer’s instructions and applicable state, federal, and local codes.
- C. All factory wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagram.
- D. All interconnecting wiring between the pump controls and control panel shall be enclosed in liquid tight flexible conduit.
- E. The unit shall be factory tested as a complete unit and the unit manufacturer shall furnish elementary and connection wiring diagrams, piping diagrams, installation and operation instructions.
- F. The unit manufacturer shall furnish, mount on the unit and wire a NEMA 2 control cabinet with drip lip and piano hinged door.
- G. The unit shall be shipped completely assembled
- H. Certified test report shall be provided by the factory.
- I. Unit shall be a Domestic Series CM™ as manufactured by Bell & Gossett, Morton Grove, IL.

Domestic® Series CM™ Duplex Boiler Feed Unit

STANDARD UNIT FEATURES:

- Cast Iron Receiver for years of dependable service. Receiver sized for 5 minute net storage.
- Cast Iron Receiver warranted for 20 years from date of shipment against failure due to corrosion.
- Centrifugal Pumps with drip-proof motors. Pump capacity sized for 2 times the boiler evaporation rate.
- Float switch, solenoid valve and "Y' strainer water makeup assembly.
- Quiet ball-bearing motor
- Carbon mechanical seal rated for 250°F (121°C) for maximum life.

10 SOLID REASONS TO CHOOSE DOMESTIC®:

- Close grained, corrosion resistant cast iron receiver
- Quiet ball-bearing type motor
- Bronze-fitted centrifugal pump
- Mechanical seal construction
- Stainless steel pump shaft
- Renewable bronze pump wearing ring
- Factory wired and tested before shipment
- Package construction for compact installation
- Engineered reliability
- 100 years of experience

OPTIONAL EQUIPMENT AS SPECIFIED:

- Water level gauge with shut off valve
- Dial Thermometer
- Inlet Basket Strainer
- Discharge Pressure Gauge
- Suction Butterfly Valve
- Lifting Eye Bolts
- NEMA 2 – U.L. Listed Control Panel
- TEFC or Explosion Proof motors and controls
- 3 Valve bypass around solenoid water makeup valve
- Low water cut off float switch*
- High or low water alarm and required control*
- Air Gap fitting for makeup assembly
- CSA listed control panel
- Larger make-up assemblies

*Availability dependent upon receiver size

Domestic® Series CM™ Units

Description of Standard and Optional Equipment and Controls

Cast Iron Receivers – Close grained cast iron construction. These receivers offer maximum protection from corrosion and feature an inlet, vent and an overflow opening to provide a means of secondary venting.

Cast Iron Receiver Warranty – The Cast Iron Receiver is warranted for 20 years from date of shipment against failure due to corrosion. In the event of receiver failure due to corrosion, the receiver will be replaced free of charge with transportation charges prepaid to any location within the continental U.S.A. Labor charges for replacement are not allowed nor shall Bell & Gossett, be liable for any special indirect or consequential damages. All implied warranties of merchantability and fitness for a particular purpose are hereby disclaimed.

Centriflo® Centrifugal Pumps – permanently aligned, bronze fitted, single stage, vertical design with enclosed bronze impellers, stainless steel shafts, and renewable bronze wearing ring. BUNA/Ceramic mechanical seals are furnished as standard. Normally 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 – 208-230/460. Single phase – 115/230. Single phase motor 2 HP and smaller have built-in overload protection.

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 enclosures or special insulation can be furnished.

Combination Magnetic Starters – are available with fusible disconnect switches or circuit breakers. Safety cover interlocking switches are furnished with combination starters. Enclosures are available to comply with JIC specifications. NEMA 2 enclosures are standard.

Magnetic Starters – automatic across-the-line type are furnished. Manual reset over-loads are standard equipment … for the protection of all windings of 3 phase motors against open circuit and/or unbalanced conditions.

A starter is capable of interrupting ten 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 to clear any such faults that may occur to protect the line wiring.

Selector Switches – can be 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.

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.

Electric Alternator – for duplex units. This control consists of an automatic electrical sequence relay used in conjunction with 2 magnetic starters and 2 selector switches. When magnetic starters and selector switches are furnished, the alternator is installed in “Consolitrol” 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*.

Accessories – Dial thermometer, dial pressure gauge and gauge glass are heavy duty, manufactures by reputable firms or industrial service.

Automatic Make-up Assembly – Standard make-up assembly consists of a float switch-operated solenoid valve, sized to equal the capacity, in gpm, of one boiler feed pump, at the available water supply pressure, as tabulated below:

Approximate solenoid valve capacity in gpm for valve sizes at various supply pressures.

Valve Size	Water Supply Pressure, psig (kPa)						
	25 (172)	30 (207)	40 (276)	50 (345)	60 (414)	75 (518)	100 (690)
1/2" (13mm)	15 (103)	17 (117)	19 (131)	22 (152)	23 (159)	27 (186)	30 (207)
3/4" (19mm)	33 (228)	37 (255)	42 (290)	47 (325)	50 (345)	58 (400)	67 (463)
1" (25mm)	60 (414)	67 (463)	72 (497)	80 (552)	85 (587)	95 (636)	10 (750)

Boiler Level Controls – refer to catalog Section 190 Boiler Feed piping & control. Indicate piping arrangement desired in specification and on purchase order. (Automatic stand-by protection on second pump requires a 2 level pump control independent of boiler low water cut off and alarms).

Control Circuit Transformers – are available. They are required for all JIC specifications and voltages exceeding 230 volts.

Inlet Strainer – cast iron, has vertical self-cleaning screen with large dirt pocket. The screen is easily removable for cleaning or replacement, requiring no additional floor space for servicing.

Butterfly Isolation Valves – between pump assemblies and receiver are available for pump capacities up to 115 gpm (435L/M). They are highly recommended for duplex units to permit removing one pump assembly without shutting the system down. Valves feature bronze fitted construction for effective corrosion resistance.

***NOTE** that a 2 level pump control on the boiler is required for automatic standby pump operation.

xylem
Let’s Solve Water

Xylem Inc.
8200 N. Austin Avenue
Morton Grove, Illinois 60053
Phone: (847) 966-3700
Fax: (847) 965-8379
www.bellgossett.com