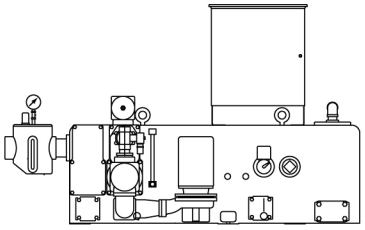
Bell & Gossett® Domestic® Pump Series VL™ Vacuum Heating Units

Guide Specification Index

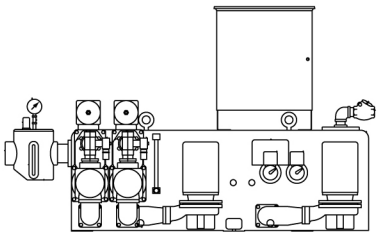
Domestic Pump Series VL™ Simplex Units . . . . . Pages 2-3

Simplex VL Units feature 1 pump assembly for air removal and condensate transfer. VL units are available for applications from 25,000 to 65,000 sq. ft. EDR (6,250 to 16,250 lbs/hr STM) to 40 psi (276kPa) discharge; 1 or 3 phase at 1750 RPM or 3500 RPM.



Domestic Pump Series VL™ Duplex Units . . . . . Pages 4-5

Duplex VL Units feature two pump assemblies to provide twice the rated capacities. Available for applications from 25,000 to 65,000 sq. ft. EDR (6,250 to 16,250 lbs/hr STM) to 40 psi (276kPa) discharge.



Description of Standard and Optional Equipment and Controls . . . . . Page 6

Model Designations and Arrangements

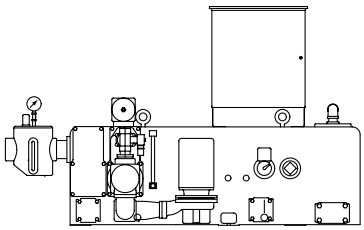
Series VL vacuum units feature combination air and water pumps; i.e., each pump and motor assembly performs the dual function of removing air from the system and pumping condensate to the boiler. Units feature low heights (14½" [368mm] Max.) for installation where returns are lower than standard. Cast iron receivers for maximum corrosion resistance are standard with 20 year corrosion warranties.

Series VL Units are available in the following arrangements:

SIMPLEX	Model VL 1, standard capacity Model VLS 1, special capacity
DUPLEX	Model VL 2, standard capacity Model VLS 2, special capacity

Guide Specification

Domestic® Series VL™ Simplex Vacuum Heating Unit



NOTE: Optional Accessories are Underlined

Part 1 - GENERAL

1.1 SECTION INCLUDES
- A. Unit shall be a Domestic Series VL™ simplex vacuum heating and condensate pumping unit as manufactured by Bell & Gossett and shall consist of:
  1. (1) Cast iron receiver
  2. (1) Dual purpose pump
  3. (1) Multijet vacuum producer
  4. (1) Discharge valve assembly
  5. (1) Vacuum and float controls
  6. (1) Pump Control Panel

1.2 REFERENCES
- A. HI - Hydraulic Institute
- B. NEMA - National Electric Manufactures 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 manufacture 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 VL™
  2. Pre-approved equal

2.2 COMPONENTS
- A. CAST IRON RECEIVER
  1. The receiver shall be of close grained cast iron construction (warranted for 20 years from the date of shipment against failure due to corrosion).
  2. Receiver inlet centerline shall be no higher than 14.5 inches (368mm) as shown on the drawings.
  3. Condensate discharge shall be controlled by a solenoid operated discharge valve.
  4. Receiver shall be furnished with:
     - a. Control equipment:
       - 1.) (1) Vacuum switch
       - 2.) (1) Float switch
     - b. (1) Vacuum gauge
     - c. (1) Angle Thermometer
     - d. (1) Multijet vacuum producer
     - e. (1) Solenoid operated discharge valve
     - f. (1) Vacuum breaker
     - g. (1) Water level gauge glass for visual tank inspection
     - h. (2) Lifting eye bolts
     - i. (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 flange mounted for vertical operation.
  2. Capacities and electrical characteristics for the pump shall be scheduled on the drawings.
  3. Each pump shall be close-coupled to a 1750 or 3500 rpm, vertical, drip-proof motor.
  4. Carbon/ceramic mechanical shaft seal shall be rated for 250°F (121°C).
  5. The pump shall be rated and tested according to the latest ASRAE Standard Code for Return Line Low Vacuum Heating Pumps 5.5 inches Hg and 160°F (71°C).
  6. Each pump shall include:
     - a. Dynamically balanced cast bronze impeller
     - b. Renewable bronze wearing ring
     - c. Stainless steel shaft
     - d. Discharge gauge port tapping
     - e. Drain tapping
- C. 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 overload protection with fused disconnect and cover interlock
     - b. (1) "OFF – Float Only – Float and Vacuum – Continuous" selector switch
     - c. (1) Numbered terminal strip
     - d. (1) Fused control circuit transformer when the motor voltage exceeds 230 Volts

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 manufacture 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 VL™ as manufactured by Bell & Gossett, Morton Grove, IL.

Domestic® Series VL™
Simplex Vacuum Heating Unit

STANDARD UNIT FEATURES:

- Cast iron receiver with low inlet
- Cast Iron Receiver warranted for 20 years from date of shipment against failure due to corrosion.
- Multi-jet vacuum producer
- Vacuum switch, diaphragm type, double pole
- Float switch, double pole, externally adjustable with seamless float and stainless steel rod
- Centriflo® centrifugal pump with open drip proof motor
- Discharge and solenoid pilot valve
- Solenoid operated discharge valves
- Vacuum gauge, vacuum breaker, gauge glass and thermometer
- NEMA 2 Control Panel – U.L. Listed. Mounted and wired with liquid tight conduit
- Inlet basket strainer

OPTIONAL EQUIPMENT AS SPECIFIED:

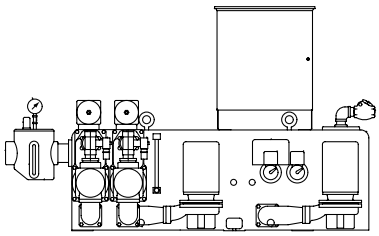
- TEFC motors
- Combination magnetic contactor and fused disconnect switch or circuit breaker
- Control circuit transformer

10 SOLID REASONS TO CHOOSE DOMESTIC®:

- Cast iron receiver for years of dependable service
- Bronze fitted centrifugal pumps
- Stainless steel pump shaft
- Renewable bronze pump wearing ring
- Mechanical seal construction
- Factory wired and tested before shipment
- Packaged construction for compact installation
- Quiet ball-bearing motors
- Engineered reliability
- 100 years of experience

Guide Specification

Domestic® Series VL™ Duplex Vacuum Heating Unit



NOTE: Optional Accessories are Underlined

Part 1 - GENERAL

1.1 SECTION INCLUDES
- A. Unit shall be a Domestic Series VL™ duplex vacuum heating and condensate pumping unit as manufactured by Bell & Gossett and shall consist of:
  1. (1) Cast iron receiver
  2. (2) Dual purpose pumps
  3. (2) Multijet vacuum producers
  4. (2) Discharge valve assemblies
  5. (2) Vacuum and float controls
  6. (1) Pump Control Panel

1.2 REFERENCES
- A. HI - Hydraulic Institute
- B. NEMA - National Electric Manufactures Association
- C. UL - Underwriters Laboratories
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- E. ISO - International Standards Organization
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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 manufacture 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 VL™
  2. Pre-approved equal

2.2 COMPONENTS
- A. CAST IRON RECEIVER
  1. The receiver shall be of close grained cast iron construction (warranted for 20 years from the date of shipment against failure due to corrosion).
  2. Receiver inlet centerline shall be no higher than 14.5 inches (368mm) as shown on the drawings.
  3. Condensate discharge shall be controlled by a solenoid operated discharge valve.
  4. Receiver shall be furnished with:
     - a. Control equipment:
       - 1.) (2) Vacuum switches
       - 2.) (2) Float switches
     - b. (1) Vacuum gauge
     - c. (1) Angle Thermometer
     - d. (2) Multijet vacuum producer
     - e. (2) Solenoid operated discharge valve
     - f. (1) Vacuum breaker
     - g. (1) Water level gauge glass for visual tank inspection
     - h. (2) Lifting eye bolts
     - i. (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 pumps shall be centrifugal design, bronze fitted with enclosed cast bronze centrifugal impeller, permanently aligned and flange mounted for vertical operation.
  2. Capacities and electrical characteristics for the pump shall be scheduled on the drawings.
  3. Each pump shall be close-coupled to a 1750 or 3500 rpm, vertical, drip-proof motor.
  4. Carbon/ceramic mechanical shaft seal shall be rated for 250°F (121°C).
  5. The pump shall be rated and tested according to the latest ASRAE Standard Code for Return Line Low Vacuum Heating Pumps 5.5 inches Hg and 160°F (71°C).
  6. Each pump shall include:
     - a. Dynamically balanced cast bronze impeller
     - b. Renewable bronze wearing ring
     - c. Stainless steel shaft
     - d. Discharge gauge port tapping
     - e. Drain tapping
- C. 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 contactor with adjustable thermal overload protection with fused disconnect and cover interlock
     - b. (2) "OFF – Float Only – Float and Vacuum – Continuous" selector switch
     - c. (1) Numbered terminal strip
     - d. (1) Fused control circuit transformer when the motor voltage exceeds 230 Volts
     - e. Electrical alternator

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 manufacture 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 VL™ as manufactured by Bell & Gossett, Morton Grove, IL.

Domestic® Series VL™ Duplex Vacuum Heating Unit

STANDARD UNIT FEATURES:

- Cast iron receiver with low inlet
- Cast Iron Receiver warranted for 20 years from date of shipment against failure due to corrosion.
- Multi-jet vacuum producer
- Vacuum switch, diaphragm type, double pole
- Float switch, double pole, externally adjustable with seamless float and stainless steel rod
- Centriflo® centrifugal pump with open drip proof motor
- Discharge and solenoid pilot valves
- Vacuum gauge, vacuum breaker, gauge glass and thermometer
- NEMA 2 Control Panel – U.L. Listed. Mounted and wired with liquid tight conduit
- Inlet basket strainer

OPTIONAL EQUIPMENT AS SPECIFIED:

- Automatic alternation – mechanical or electrical
- TEFC motors
- Combination magnetic contactor and fused disconnect switch or circuit breaker
- Control circuit transformer

10 SOLID REASONS TO CHOOSE DOMESTIC®:

- Cast iron receiver for years of dependable service
- Bronze fitted centrifugal pumps
- Stainless steel pump shaft
- Renewable bronze pump wearing ring
- Mechanical seal construction
- Factory wired and tested before shipment
- Packaged construction for compact installation
- Quiet ball-bearing motors
- Engineered reliability
- 100 years of experience

Domestic® Series VL™ Vacuum Heating Units

Description of Standard and Optional Equipment and Controls

Receiver – Close grained cast iron construction with low inlet.

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.

Inlet strainer – has vertical self-cleaning bronze screen with large dirt pocket.

Pressure gauge – dial type for pump discharge are available.

Vertical pump and motor assembly – close-coupled and permanently aligned, features bronze fitted construction with enclosed impeller and renewable bronze wear ring. Oversized suction passages with low inlet velocities are specially designed for handling hot water.

Multi-jet vacuum producer – consists of a simple, yet efficient nozzle and venturi assembly. This sound design does not require close clearances or critical adjustments. Its proven ability to retain original efficiencies eliminates the need for oversizing.

Electric Motors – are vertically mounted drip-proof, ball bearing type. Standard voltages are: Three phase – 208-230/460. Single phase – 115/230.

Special motors wound for 200V single or three phase or other special voltages are available. When open drip-proof motors are not adequate, totally enclosed, explosion-proof or other special motors can be furnished.

Combination magnetic starters – are available with fused disconnect switches or circuit breakers. Safety cover interlocking switches are furnished with all combination starters. Enclosures are available to comply with NEMA or JIC specifications. (NEMA 2 – U.L. Listed panels are standard.)

Control circuit transformers – are available and required for all JIC specifications and recommended for all units over 250 volts.

Automatic pump controls for duplex units:

(1) Electric Alternators – This control consists of an automatic electrical sequence relay used in conjunction with 2 magnetic starters, 2 float switches, 2 vacuum switches and 2 selector switches. This control provides for, (1) automatic change of operating sequence after each cycle, (2) simultaneous operation 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.

(2) Mechanical Alternator – This control consists of a 2-level, no mechanical, double pole alternating switch, operated by 1 float switch. This control, (1) automatically alternates operation of the two pumps, (2) provides simultaneous operation of both pumps to deliver double capacity under peak conditions and (3) automatically operates the second pump should the first pump fail.

(3) Manual Sequence Control (Lead-Lag) – This control consists of 3 selector switches uses in conjunction with 2 magnetic starters, 2 float switches and 2 vacuum switches. The third selector switch, supplied in addition to two standard switches, has the following complete reading: “Vacuum Pump No. 1 Leads – Vacuum Pump No. 2 Leads.” 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.

Float switches – are double pole type, externally adjustable, operated by seamless float, mounted on a stainless steel rod.

Vacuum switch – diaphragm type, double pole switch, with minimum differential of 4” Hg.

Discharge valves – positive acting float switch actuates solenoid operated discharge valve to control discharge of condensate while retaining adequate “hurling” water for air evacuating cycle.

Selector switches – with “Off – Float Only – Float & Vacuum – Continuous” positions furnished in unit “Consolitrol” panel when magnetic starters are supplied. A selector switch with “Float – Float & Vacuum – Continuous” positions is installed on the vacuum switch when starters are not supplied on 1 phase applications 2 HP and smaller.

Return lines too low* – whem the pump cannot be located so that the inlet is below the lowest return, one of the following devices may be used:

(a) Mechanical Lift – Available for any lift height and any flow rate.

(b) Accumulator tanks – Practical limit: 4 ft. (1219 mm) lift and any flow rate required. See below.

(c) Lift Fitting – Practical limit: 5 ft. (1524 mm) lift and small flow rate only.

Accumulator Tanks* – There is a definite relationship between the size of pump receivers and accumulator tanks. For best pump and system performance, the following accumulator tanks are sized as closely as practical to the pump receiver:

Type of Tank	Dimen. Drwg. No.	Single or Duplex Pump EDR (lb./hr.)	Tank No.
Cast Iron Rectangular	1DPD49	25,000 (55115)	21CR
		30,000 (66138)	21CR
		40,000 (88183)	46CR
		65,000 (110229)	46CR

When an accumulator tank is furnished with a VL unit, the float switches are omitted. Float switch(es) and vacuum breaker are installed in the accumulator tank.

*See Pg. 3 of Installation-Operation DNO134 manual for piping details and Section 390 for dimension drawings.

xylem
Let’s Solve Water

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