Quality People. Building Solutions.

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Date: 5/23/2023
Return Request: 6/2/2023
Project: Farm Credit Office
Supplier: Falk
Submittal: Circulation Pump
Submittal Number: 22 00 00-02
Drawing # and Installation: Plumbing Drawings

ARCHITECT
Hight Jackson
5201 W. Village Parkway, Suite 300
Rogers, AR 72758
479-464-4965

ENGINEER
HAS Engineering
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GENERAL CONTRACTOR
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501-834-3320

Notes:

CSUSA PROJECT NO.
23-1013
jon@comfortar.com

Bell & Gossett
a xylem brand

INSTRUCTION MANUAL
P58671G

NRF/NBF/SSF Circulator

INSTALLER: PLEASE LEAVE THIS MANUAL FOR THE OWNER'S USE.

NOTE: Bell & Gossett recommends Bronze or Stainless Steel Booster Pumps be used for pumping potable water.

This pump is for indoor use only.

SAFETY INSTRUCTIONS

This safety alert symbol will be used in this manual and on the pump Safety Instruction decal to draw attention to safety related instructions. When used, the safety alert symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.

Your NRF/NBF/SSF Booster Pump should have the warning/caution label and nonsubmersible warning label displayed to the right (Fig. 1) on the pump conduit box. If this warning and caution label is missing or illegible, contact your local B&G Representative for a replacement.

⚠ WARNING

BEFORE INSTALLING, USING OR SERVICING THIS PRODUCT, READ THE INSTRUCTIONS. TO REDUCE RISK OF ELECTRICAL SHOCK SEE INSTRUCTIONS FOR PROPER INSTALLATION.

⚠ CAUTION

FOR SUPPLY CONNECTIONS USE WIRE SUITABLE FOR AT LEAST 90°C. USE COPPER CONDUCTORS ONLY. EMPLOYER DES FILS D'ALIMENTATION ADEQUATS POUR 90°C. FOR INDOOR USE ONLY. EMPLOYER UNIQUEMENT A L'INTERIEUR.

⚠ WARNING

RISK OF ELECTRIC SHOCK; THIS PUMP HAS NOT BEEN INVESTIGATED FOR USE IN SWIMMING POOL AND MARINE AREAS. -NONSUBMERSIBLE PUMP-

P86313

FIG. 1

DESCRIPTION

The Model NRF/NBF/SSF Circulator Pump features system liquid lubricated bearings, non-overloading permanent split capacitor motor with impedance protection and quiet operation.

PUMP APPLICATION

The Model NRF/NBF/SSF Booster Pump may be used for water circulating applications in hydronic and solar systems. This pump is nonsubmersible, for indoor use only. It has not been investigated for use in swimming pool and marine areas.

OPERATIONAL LIMITS

These pumps are designed to pump liquids compatible with their iron, bronze or stainless steel body constructions.

Maximum Operating Pressure: 150 PSI (10 bars)
Maximum Operating Temperature:
NRF-22 & NRF-9F/LW, 240°F (115° C)
NBF Pumps (except NBF-33), 230°F (110°C)
NRF-33 & NBF-33, 225°F (107°C)
SSF Pumps, 230°F (110°C)

Electrical Rating: 115V, 60Hz, 1Ø; 220V, 60Hz, 1Ø;
220V, 50Hz, 1Ø; 230V, 60Hz, 1Ø

If your NBF pump is equipped with a sweat connected pump body, the maximum operating pressure is limited to 150 PSI (10 bars) or a lower value determined by the type of solder used and pressure/temperature limitations listed below:

Do not exceed these values.
(Solder type limits per ASTM STD. B16.18-1978)

PUMP BODY	TYPE OF SOLDER	MAXIMUM LIMITATIONS	
		PRESSURE PSI	TEMPERATURE °F
SWEAT	95-5 TIN-ANTIMONY	300	200
		250	225
		200	250

WARNING:
Damage to the pump or failure of solder sealing joints may occur if these operational limits are exceeded. This can result in water leakage. Failure to follow this instruction could cause serious personal injury and/or property damage.

SAFETY REQUIREMENTS

MECHANICAL SAFETY

WARNING: EXCESSIVE SYSTEM PRESSURE HAZARD
The maximum working pressure of the pump is listed on the nameplate – DO NOT EXCEED THIS PRESSURE. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

WARNING: EXCESSIVE PRESSURE HAZARD VOLUMETRIC EXPANSION
The heating of water and other fluids causes volumetric expansion. The associated forces may cause failure of system components and the release of high temperature fluids. This can be prevented by installing properly sized and located compression tanks and pressure relief valves. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

THERMAL SAFETY

WARNING: EXTREME TEMPERATURE HAZARD
If the pump, motor or piping are operating at extremely high or low temperature, guarding or insulation is required. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

ELECTRICAL SAFETY

WARNING: ELECTRICAL SHOCK HAZARD
Electrical connections are to be made by a qualified electrician in accordance with all applicable codes, ordinances and good practices. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

WARNING: ELECTRICAL GROUNDING HAZARD
Adequate electrical grounding is required for the safe operation of B&G Pumps. The use of grounded metal conduit assures this requirement. If the means of connection to the supply – connection box (wiring compartment) is other than grounded metal conduit, ground the pump back to the service. Use a copper conductor at least the size of the circuit connectors supplying the pump. Connect the ground wire to the green grounding screw in the wiring compartment. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

WARNING: RISK OF ELECTRIC SHOCK
Do not install this pump in swimming pool or marine areas. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

REMOVAL OF PUMP FROM EXISTING SYSTEM FOR REPLACEMENT

WARNING: ELECTRICAL SHOCK HAZARD
Disconnect and lockout the power before servicing. Failure to follow these instructions could result in serious personal injury or death.

1. Close the valves on the suction and discharge sides of the pump. (If no valves have been installed, it may be necessary to drain the system.)

WARNING: HOT WATER HAZARD
Before draining the system, allow water to cool to at least 100°F, open the drain valve (take precautions against water damage) and leave the drain valve open until servicing is complete. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

WARNING: ELECTRICAL SHOCK HAZARD
Be certain the electrical power is not present at the motor leads before continuing. Failure to follow these instructions could result in serious personal injury or death

2. Loosen the conduit box cover screw and remove the cover.
3. Disconnect the electrical supply lines to the pump.

WARNING: HIGH PRESSURE HAZARD
Pressure may be present in the pump body. This pressure can be relieved by loosening the flange bolts and shifting the pump assembly slightly to allow the pressurized water to escape. Failure to follow these instructions could result in serious personal injury or death.

4. Remove the flange nuts and bolts or loosen the union ring nuts. Then remove the pump from the piping.

PUMP INSTALLATION

Locate the pump so there is sufficient room for inspection, maintenance and service. Bell & Gossett recommends the installation of service valves on the suction and discharge of all circulators to facilitate servicing or replacement of the circulator without draining the system.

CAUTION: The use of PTFE impregnated pipe compound and PTFE tape on pipe threads provides lubricity which can lead to overtightening and breakage. Do not overtighten. Failure to follow this instruction can result in moderate personal injury from hot water and/or property damage.

Install suction and discharge flanges or union connectors on the pipe ends. The use of PTFE tape sealer or a high quality thread sealant is recommended.

Be sure to minimize any pipe-strain on the pump. Support the suction and discharge piping by the use of pipe hangers near the pump. Line up the vertical and horizontal piping so that the bolt-holes in the pump flanges match the bolt-holes in the pipe flanges. If union connections are used, line up the pump threads with union tail pieces. DO NOT ATTEMPT TO SPRING THE SUCTION OR DISCHARGE LINES IN POSITION. THIS MAY RESULT IN UNWANTED STRESS IN THE PUMP BODY, FLANGE CONNECTIONS AND PIPING. The code for Pressure Piping (ANSI B31.1) lists many types of supports available for various applications.

Bell & Gossett flange/union gaskets must be installed between the NRF/NBF/SSF pump body flanges and the suction and discharge pipe flanges/union tail pieces. Use $^{7}/_{16}$" diameter x $1^{1}/_{2}$" long cap screw and matching nut to connect the pump to the flanges.

WARNING: HOT WATER HAZARD
When disassembling a gasketed joint, always use a new gasket upon reassembly. NEVER RE-USE OLD GASKETS. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

WARNING: HOT WATER HAZARD
Make sure that each flange gasket remains seated in the flange groove during and after installation. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

Apply torque in even increments to both flange bolts until a value of 115 in-lbs. is reached. Both the suction and discharge flange bolts must be torqued in this manner.

If your NBF pump is equipped with a sweat connected pump body, see the following instructions:

1. Use a torch with a sharp pointed flame.
2. Clean tube ends and pump connections thoroughly.
3. Use 95-5 (Tin-Antimony); and a good grade of flux.

CAUTION:
Heat associated with the use of silver solder may damage a pump voiding the warranty. Do not use silver solder. Failure to follow these instructions could result in property damage and/or moderate personal injury.

CAUTION:
Excessive use of solder in a vertical installation may result in damage to the pump impeller. Do not use excessive flux. Failure to follow these instructions could result in property damage and/or moderate personal injury.

4. When sweating the joints, first wrap the pump body with a cool wet rag, then direct the flame with care to avoid subjecting the pump to excessive heat.
5. Check soldered connections for leaks. If resoldering is required, take care to avoid subjecting the pump to excessive heat.

WARNING: WATER LEAKAGE HAZARD
To prevent leakage, make certain that the flange bolts or ring nuts have been adequately tightened and that the solder connections do not leak. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

MODE OF DISCHARGE

The Model NRF/NBF/SSF Circulator can be installed to discharge up or down, horizontally, left or right, but the motor shaft must remain in the horizontal position, the arrow on the body must point in the direction of the flow, the conduit box must be positioned on the top or to the side of the motor housing (see figure 2). If the conduit box position must be changed, it is best to do so before installation. However, if the pump is already installed, see the section titled “REMOVAL OF PUMP FROM EXISTING SYSTEM FOR REPLACEMENT” before proceeding.

CAUTION:
Make sure the power is turned off before placing anything inside the discharge opening to move the impeller.

TO CHANGE THE CONDUIT POSITION

1. Remove the four (4) $^{1}/_{4}$-20 Allen screws ($^{3}/_{16}$ wrench) while supporting the motor assembly.
2. Remove the motor assembly from the pump body and rotate it to the desired position (see figure 2).
3. Replace the Allen screws and tighten evenly in a diagonal method to 60 in-lbs.
4. Check to see that the impeller turns freely. Insert your finger in the discharge port of the pump body (the arrow on the pump body points in the direction of the discharge) until you can feel the impeller and rotate it with your fingertip. If the impeller does not turn easily, repeat the disassembly/reassembly process.

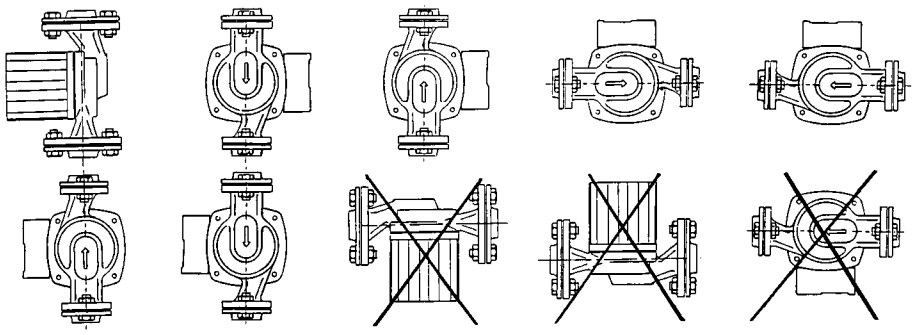

FIG. 2

WARNING: ELECTRICAL SHOCK HAZARD
Disconnect and lock out the power before making electrical connections. Failure to follow these instructions could result in serious personal injury or death.

WIRING INSTRUCTIONS

A. Loosen the screw securing the conduit box cover (wiring compartment), and remove the screw & cover.

B. Attach the appropriate size connector to the hole in the side of the conduit box.

C. Using a minimum size of 14 AWG copper electrical wire (refer to your local code for wiring restrictions), wire the motor to a single phase power source that matches the electrical rating on the pump nameplate. See Fig. 3. Use the size of electrical wire as dictated by local code.

D. Connect the ground wire to the inside of the conduit box with one of the green screws provided inside the box. See Fig. 4.

NOTE: Electrical supply and grounding wires must be suitable for at least 90°C (194°F).

NOTE: Model NRF/NBF/SSF Circulators are impedance protected and do not require external overload protection.

WARNING: ELECTRICAL SHOCK HAZARD
Be certain that all connections are secure and the conduit box cover is closed before electrical power is connected. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

TYPICAL WIRING INSTALLATION SCHEMATIC
1Ø POWER SOURCE

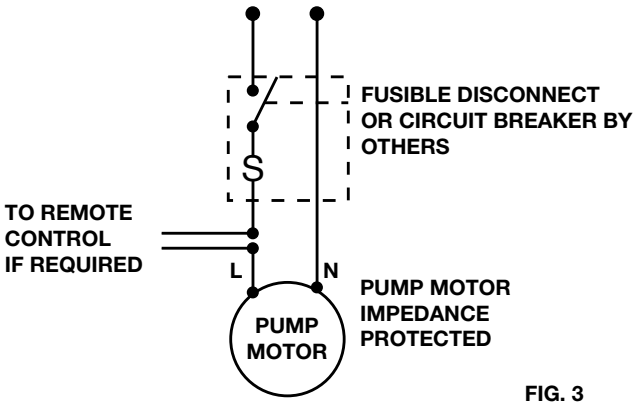

FIG. 3

CONDUIT BOX WIRING DETAIL

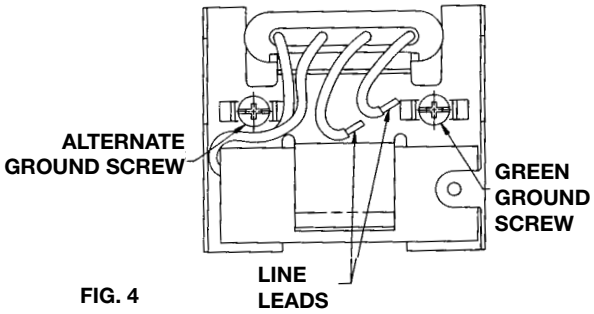

FIG. 4

SYSTEM PREPARATION

Prior to pump start-up, closed heating and cooling systems should be cleaned, drained, and refilled with clean water. The system fluid pH must be maintained between 7 and 9.

START-UP

Do not start pump until the system has been filled and vented. Air should be vented from the system by means of an air vent located at a high point in the system. The system must be completely vented prior to pump operation. Do not run NRF/NBF/SSF circulators dry. Pump operation without water circulation could result in pump and motor damage.

WARNING: HOT WATER LEAKAGE HAZARD
Pressurize the body slowly while checking for leaks at all joints with gaskets or solder connections. Failure to follow these instructions could result in serious personal injury and/or property damage.

PERIODIC INSPECTION

Bell & Gossett NRF/NBF/SSF Circulators are designed to provide years of trouble free service. It is recommended that periodic inspections be made to check for potential problems with the pump. If any leakage or evidence of leakage is present, repair or replace the unit.

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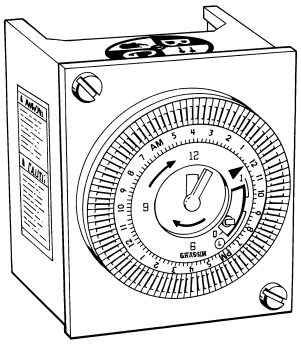
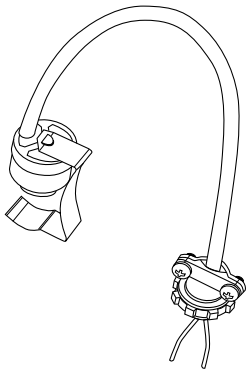
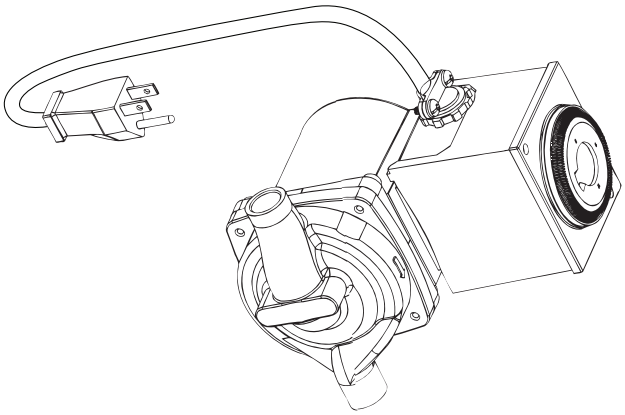
Bell & Gossett
a xylem brand

INSTRUCTION MANUAL
P58749C

Bell & Gossett Automatic Timer Kit Model TC-1 Aquastat Models AQS-1/2, AQS-3/4 Pumps With Plug-In Cords

INSTALLER: PLEASE LEAVE THIS MANUAL FOR THE OWNER'S USE.

SAFETY INSTRUCTIONS

This safety alert symbol will be used in this manual and on the pump Safety Instruction decal to draw attention to safety related instructions. When used, the safety alert symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! FAILURE TO FOLLOW THE INSTRUCTIONS MAY RESULT IN A SAFETY HAZARD.

APPLICATION

To increase the overall efficiency of a hot water recirculation system, the TC-1 timer control kit and the AQS-1/2 and AQS-3/4 aquastat kits can be installed for use on any B&G NRF, NBF or Series PL circulator. The TC-1 timer control is programmable to turn the circulator ON and OFF automatically at preset times. The aquastat kits switch the pump OFF at 120°F (48.9°C) and ON at 100°F (37.8°C). The timer and aquastat kits can be used in combination or they can be used separately. This permits the user to have the pump circulate hot water only during those times when high usage can be expected throughout the day. When the aquastat kit and timer are used together, the pump will only circulate water when the ON time conditions are met and when the water temperature is low enough to cause the aquastat to switch ON.

OPERATIONAL LIMITS

For use on B&G models NRF/NBF/Series PL, indoor use only

Power supply: 115-120 VAC, 60Hz, 1Ø

Minimum switch interval: 15 minutes

Run Modes: ON (continuous run), OFF (off at all times), TIMER (run at programmed intervals)

Maximum switch current: 16 amps

Aquastat switch modes: OFF (open) at 120°F (48.9°C) and ON (closed) at 100°F (37.8°C)

Aquastat type: Bimetal element, senses surface temperature of outside diameter of pipe

Pipe Size: AQS-1/2 clips onto 1/2" copper pipe or 3/8" steel pipe (OD of pipe 5/8")

AQS-3/4 clips onto 3/4" copper pipe or 1/2" steel pipe (OD of pipe 7/8")

Mounting: May be installed to sense temperature at the suction or discharge pipe of the pump

NOTE! Aquastat operation is dependent on ambient evironment. In installations with excessive heat gain or loss in the ambient may affect the on/off operating temperatures.

TIMER INSTALLATION

1. Disconnect the electrical supply to the pump.

> **WARNING: ELECTRICAL SHOCK HAZARD**
> Disconnect and lock out the power before making electrical connections. Failure to follow these instructions could result in serious personal injury or death.

2. Remove the screw that holds the steel conduit box cover to the pump.
3. Remove the conduit box cover. The timer assembly replaces the conduit box cover.
4. Disconnect the black and white motor leads from the power supply.
5. Position the plastic base for the timer assembly onto the steel conduit box with the warning/caution label to the rear of the pump.
6. Secure the plastic timer base to the conduit box with one 8-32 screw provided.
7. Verify that the electrical rating of the timer matches the values shown on the nameplate of the circulator.
8. Make the electrical connections according to the wiring diagram provided. (See Figure 2)

> **WARNING: ELECTRICAL SHOCK HAZARD**
> Electrical connections are to be made by a qualified electrician in accordance with all applicable codes, ordinances and good practices. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

9. Position the cover/timer assembly over the base while insuring that all wires are inside the box. Note that the cover/timer assembly can only be assembled in one direction on the base. Line up the screw holes in the cover with the screw holes in the base.
10. Fasten the cover to the base using (2) 8-32 screws provided.

AQUASTAT INSTALLATION

1. Follow steps 1 and 2 in the timer installation section.
2. Remove the conduit box cover. If the aquastat is installed without the timer, the steel cover is reassembled on the pump after the aquastat installation is complete.
3. Fasten the aquastat clip to the discharge or suction pipe of the pump.
4. Make the electrical connections according to the wiring diagram provided. (See Figure 1)

> **WARNING: ELECTRICAL SHOCK HAZARD**
> Electrical connections are to be made by a qualified electrician in accordance with all applicable codes, ordinances and good practices. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

5. Reassemble the conduit box cover to the conduit box while insuring that all wires are inside the box. Reinstall the 8-32 screw to secure the cover to the conduit box.

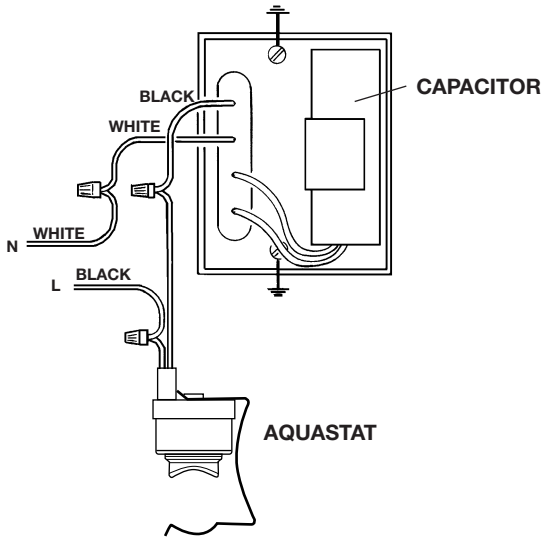


FIGURE 1

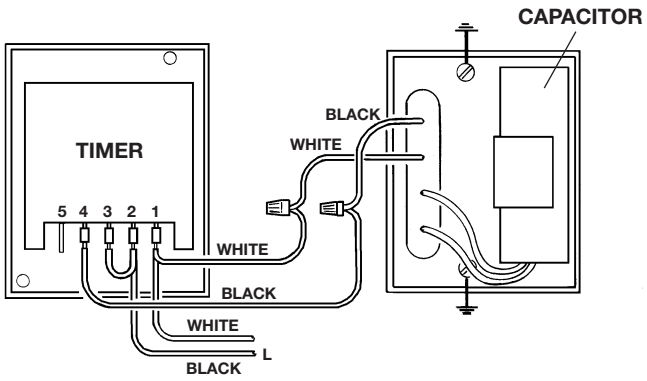


FIGURE 2

AQUASTAT AND TIMER INSTALLATION

1. Follow the installation steps in both sections and see Figure 3 for wiring connections.

TIMER PROGRAMMING

1. Adjust the programming ring on the unit by turning it in the direction of the rotation arrow until the timing arrow points to the actual time of day. (This can also be accomplished by rotating the minute hand on the real time clock, (shown in figure 5) clockwise, until both the real time clock and the timing arrow indicate the actual time of day.)
2. Restore power to the circulator and set the switch on the timer dial to the "I" (ON) position.
3. Program the "ON/OFF" times by pushing the programming tabs toward the center of the dial for "OFF" operation and toward the outside of the programming ring for "ON" time periods. A pencil, pen or similar object may be used in making adjustments to the programming tabs.
4. Set the manual switch to the "TIMER" position, which is centered between the "I" and "O" on the timer dial, in order to cycle the pump according to the programming tab settings. The pump will run continuously when the switch is set to the "I" (ON) position. The "O" (OFF) position of the switch will shut the circulator off at all times.
5. In the event of a power outage, the timer must be adjusted for the correct time of day after power is restored.

FIGURE 3

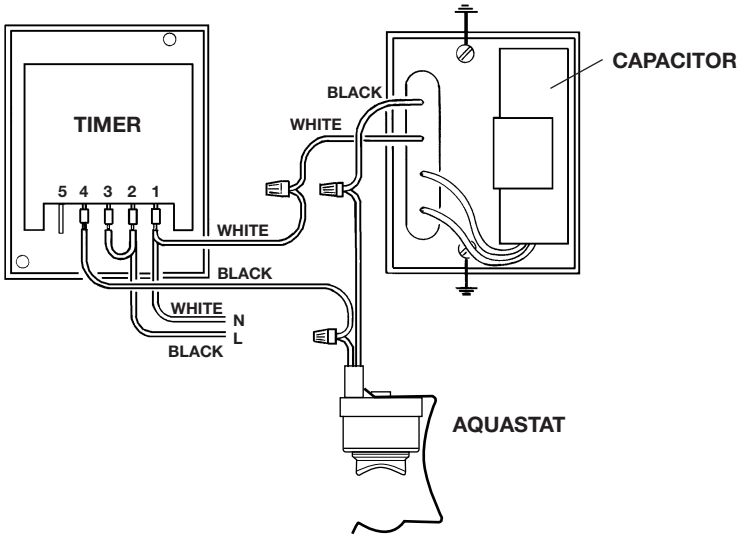


FIGURE 4

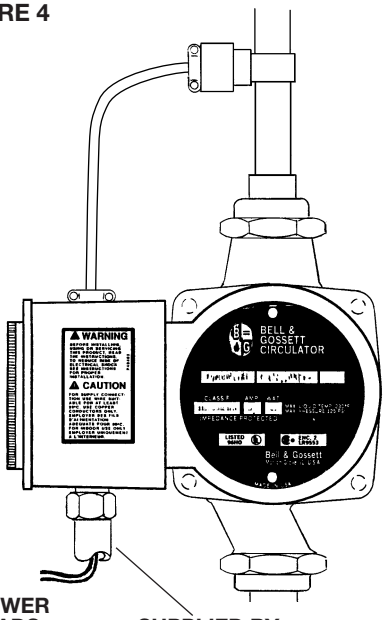
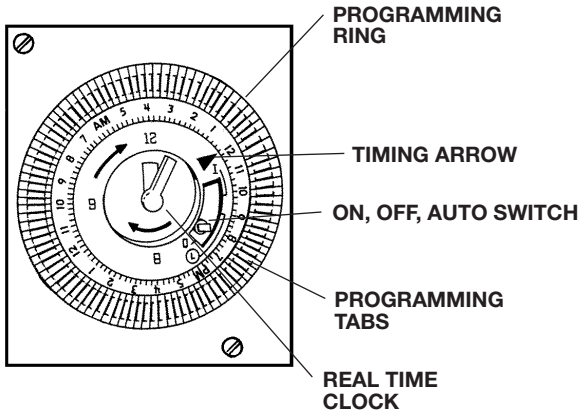


FIGURE 5



PUMPS WITH FLEXIBLE CORD

1. Refer to instruction Manual P58671 or P48419 for installation of the pump.
2. If your pump is equipped with a flexible cord, insert the 115V plug into a properly grounded 115V outlet. (see Figure 6)

WARNING: ELECTRICAL SHOCK HAZARD
This pump is supplied with a grounded conductor. To reduce the risk of electric shock, connect only to a properly grounded, grounding-type receptacle. Failure to follow these instructions could result in serious personal injury or death.

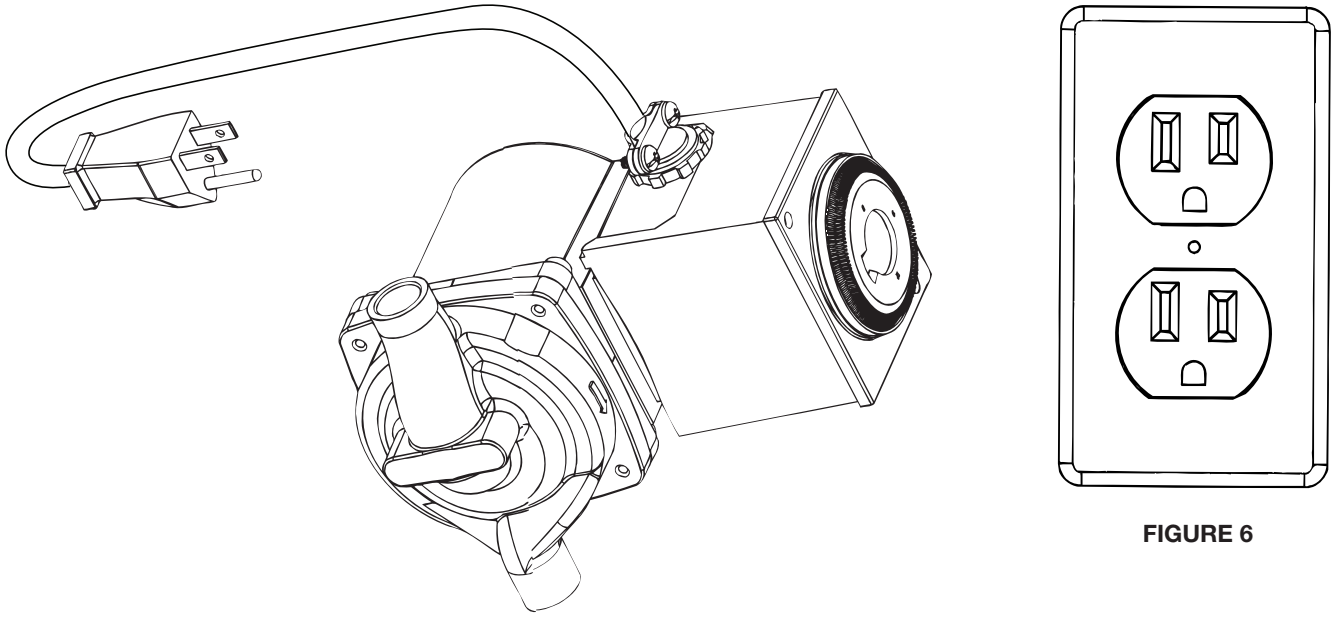


FIGURE 6

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TO: Hight Jackson Associates
jandrade@hjarch.com

ATTN: Jorge Andrade
RE: Farm Credit - Russellville, AR
Plumbing
DATE: 08/29/2023 JOB NO. 22-166

ELECTRONIC SUBMITTAL WAS REVIEWED AS FOLLOWS:

☒ CUT SHEETS	☒ NO EXCEPTIONS TAKEN	☒ APPROVED
☐ DRAWINGS	☐ NOTE MARKINGS	☐ REJECTED
☐ OTHER	☐ COMMENTS ATTACHED	☐ RESUBMIT
		☐ RESUBMIT only items marked

REMARKS:

Submittal - 22 05 13 - Circulation Pump

ENGINEER'S REVIEW IS FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT AND CONTRACT DOCUMENT. MARKINGS OR COMMENTS SHALL NOT BE CONSTRUED AS RELIEVING THE CONTRACTOR FROM COMPLIANCE WITH THE PROJECT PLANS AND SPECIFICATIONS, NOR DEPARTURE THEREFROM. THE CONTRACTOR REMAINS RESPONSIBLE FOR DETAILS AND ACCURACY, FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, FOR SELECTING FABRICATION PROCESSES, FOR TECHNIQUES OF ASSEMBLY AND PERFORMING HIS WORK IN A SAFE MANNER.

SUBMITTAL

Copies To:
X File
Owner
X Architect
Other BY: Nathan Wilson, PE

HSA Engineering Consulting Services, Inc.
7405 Ellis Street
Fort Smith, AR 72916
479.452.8922
www.hsaconsultants.com

Project Name: Farm Credit
Project Number: 02-23-2720
Subcontractor: Comfort Systems
Specification: 22 05 13 - Recirculation Pump
Submittal Number: #220513-1

Construction Manager:

NABHOLZ CONSTRUCTION SERVICES

- ☐ Revise & Resubmit
- ☐ Reviewed & Amend As Noted
- ☒ Reviewed

By: William Ray Date: 08/10/2023

- ☐ APPROVED
- ☐ APPROVED AS CORRECTED
- ☑ REVIEWED BY CONSULTANT
- ☐ REVISE AND RESUBMIT
- ☐ NOT APPROVED
- ☐ SUPPLEMENTAL HJ COMMENTS

Checking is only for conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication process or to the techniques of construction; and for coordination of the work of all trades.

BY: Jorge Andrade

DATE: 8/29/2023

Design Review Comments:

Hight Jackson ASSOCIATES

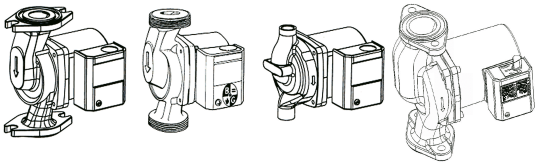
CP-1

ITT

SUBMITTAL

A-127K

JOB:	**REPRESENTATIVE:**	
UNIT TAG:	**ORDER NO.**	**DATE:**
ENGINEER:	**SUBMITTED BY:**	**DATE:**
CONTRACTOR:	**APPROVED BY:**	**DATE:**



Lead-Free** Bronze and Stainless Steel Bodied

System Lubricated Circulators

c UL us LISTED

DESCRIPTION

A series of in-line wet rotor circulation pumps designed specifically for quiet operation in open (potable) water systems. These pumps have lead-free** bronze or stainless steel bodies.

Automatic Timer and Aquastat accessories are available. (See Submittal A-128A for details).

CONSTRUCTION MATERIALS

Pump Body:
- NBF: Bronze
- SSF: Stainless Steel

Bearings: Carbon

Impeller: Noryl

Shaft: Ceramic

OPERATING DATA

Maximum Working Pressure: 150 psi (10.3 Bar)

Minimum Operating Temperature: 40°F (5°C)

Maximum Operating Temperature

NBF-25, NBF-33, NBF-36, NBF-45: 225°F (107°C)

All Others: 230°F (110°C)

MODEL NUMBER	PART NUMBER	CONNECTION	APPROX. SHPG. WT. Lbs. (Kg)	STANDART 60 CYCLE 115 VOLT SINGLE PHASE			TAGGING INFORMATION	QUANTITY
				WATTS	F.L. AMPS	RPM		
NBF-8S/LW	103257LF	1/2" Sweat	9.0 (4.1)	39	0.38	2800		
NBF-9U/LW	103258LF	Union (See Following Page)	9.3 (4.2)	41	0.40	2800		
SSF-9U/LW	103360LF	Union (See Following Page)	9.3 (4.2)	41	0.40	2800		
NBF-10S/LW	103259LF	1/2" Sweat	9.0 (4.1)	52	0.46	2800		
NBF-12U/LW	103261LF	Union (See Following Page)	9.3 (4.2)	55	0.48	2800		
SSF-12U/LW	103361LF	Union (See Following Page)	9.3 (4.2)	55	0.48	2800		
NBF-12F/LW	103260LF	Flange 3/4, 1, 1-1/4, 1-1/2	9.5 (4.3)	55	0.48	2800		
SSF-12F/LW	103358LF	Flange 3/4, 1, 1-1/4, 1-1/2	9.5 (4.3)	55	0.48	2800		
NBF-18S	103316LF	1/2" Sweat	9.0 (4.1)	90	0.74	3000		
NBF-22U	103255LF	Union (See Following Page)	9.3 (4.2)	92	0.80	2940		
SSF-22U	103362LF	Union (See Following Page)	9.3 (4.2)	92	0.80	2940		
NBF-22	103252LF	Flange 3/4, 1, 1-1/4, 1-1/2	9.5 (4.3)	92	0.80	2940		
SSF-22	103357LF	Flange 3/4, 1, 1-1/4, 1-1/2	9.5 (4.3)	92	0.80	2940		
NBF-25*	103418LF	Flange 3/4, 1, 1-1/4, 1-1/2	10.4 (4.7)	125	1.10	2950		
NBF-33	103351LF	Flange 3/4, 1, 1-1/4, 1-1/2	10.4 (4.7)	125	1.10	2950		
X NBF-36*	103401LF	Flange 3/4, 1, 1-1/4, 1-1/2	13.1 (6.0)	270	2.30	3300		
NBF-45*	103405LF	Flange 1, 1-1/4, 1-1/2	14.5 (6.6)	270	2.30	3300		

*3-speed circulators

**Contains less than 0.25% lead content on wetted surface

TYPICAL SPECIFICATIONS

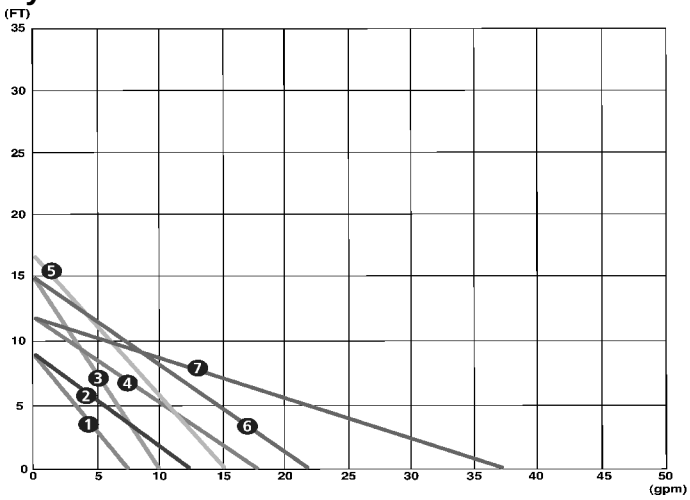
The contractor shall furnish and install in-line circulating pumps as illustrated on the plans and in accordance with the following specifications:

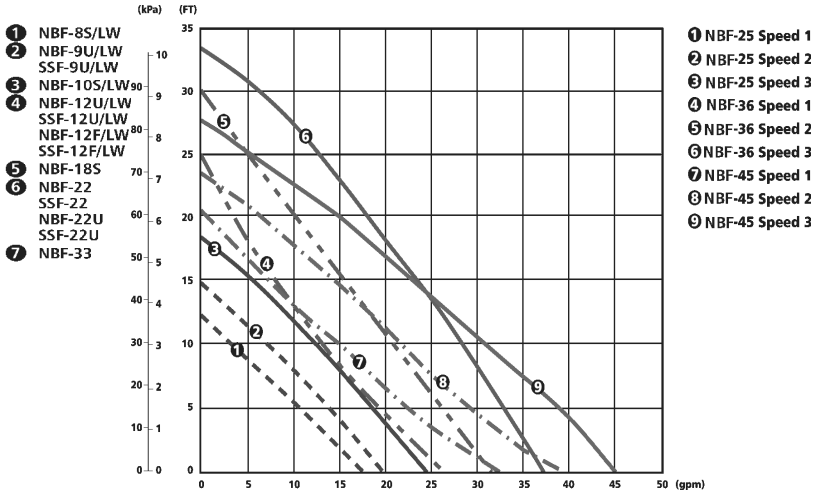
1. The pumps shall be of the horizontal system lubricated type specifically designed and guaranteed for quiet operation.
2. Pump to be suitable for _____ºF (_____ºC) [choose one: 225ºF (107ºC) for NBF-25, NBF-33, NBF-36, NBF-45 or 230°F (110°C) for all other circulators] operation at 150 psig (10.3 Bar) working pressure.
3. The pumps shall have a ceramic shaft supported by carbon bearings. Bearings are to be lubricated by the circulating fluid.
4. Pump body shall be lead-free bronze for NBF circulators or stainless steel for SSF circulators.
5. Motor stator to be isolated from circulating fluid through use of stainless steel can. Rotor to be sheathed in stainless steel.
6. Motors shall be non-overloading at any point on the pump curve. NBF-36 & NBF-45 to have built-in thermal protection. All other motors to have built-in impedance protection.
7. NBF-25 has an optional check valve.

Pumps to have a capacity of _____GPM at _____ foot head when powered by 115 volt, 60 cycle single phase electrical supply.

All pumps are to be ITT Industries - Bell & Gossett Model _____.

Bell & Gossett

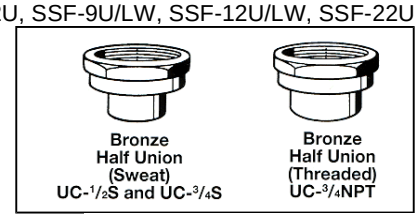


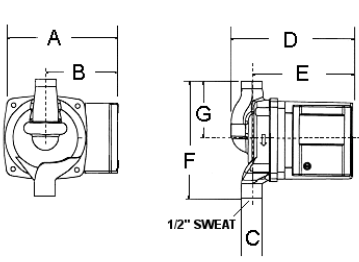


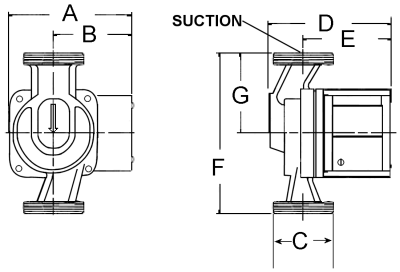
HALF UNION CONNECTIONS

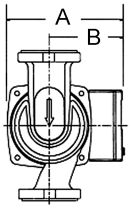
For NBF-9U/LW, NBF-12U/LW, NBF-22U, SSF-9U/LW, SSF-12U/LW, SSF-22U

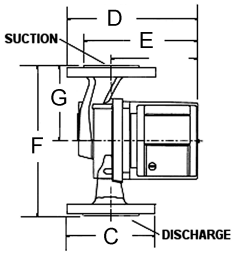
MODEL NUMBER	PART NUMBER	DESCRIPTION (SETS OF 2)
UC-1/2S	113203LF	1/2" Bronze Union Sweat
UC-3/4S	113201LF	3/4" Bronze Union Sweat
UC-3/4NPT	113202LF	3/4" Bronze Union NPT Female











MODEL	PART NUMBER	A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	F in (mm)	G in (mm)
NBF-8S/LW	103257LF	4-7/8 (124)	3-3/16 (81)	1/2 (13)	5-7/32 (132)	4-9/32 (109)	5 (127)	2-1/2 (63)
NBF-9U/LW	103258LF	4-7/8 (124)	3-3/16 (81)	1-1/4 (32)	5-1/16 (129)	3-11/16 (93)	6-1/8 (156)	3-1/16 (78)
SSF-9U/LW	103360LF	4-7/8 (124)	3-3/16 (81)	1-1/4 (32)	5-1/16 (129)	3-11/16 (93)	6-1/8 (156)	3-1/16 (78)
NBF-10S/LW	103259LF	4-7/8 (124)	3-3/16 (81)	1/2 (13)	5-7/32 (132)	4-9/32 (109)	5 (127)	2-1/2 (63)
NBF-12U/LW	103261LF	4-7/8 (124)	3-3/16 (81)	1-1/4 (32)	5-1/16 (129)	3-11/16 (93)	6-1/8 (156)	3-1/16 (81)
SSF-12U/LW	103361LF	4-7/8 (124)	3-3/16 (81)	1-1/4 (32)	5-1/16 (129)	3-11/16 (93)	6-1/8 (156)	3-1/16 (78)
NBF-12F/LW	103260LF	4-7/8 (124)	3-3/16 (81)	3-3/16 (81)	5-9/16 (141)	3-11/16 (93)	6-3/8 (162)	3-3/16 (82)
SSF-12F/LW	103358LF	4-7/8 (124)	3-3/16 (81)	3-3/16 (81)	5-9/16 (141)	3-11/16 (93)	6-3/8 (162)	3-3/16 (82)
NBF-18S	103316LF	4-7/8 (124)	3-3/16 (81)	1/2 (13)	5-7/32 (132)	4-9/32 (109)	5 (127)	2-1/2 (63)
NBF-22U	103255LF	4-7/8 (124)	3-3/16 (81)	1-1/4 (32)	5-1/16 (129)	3-11/16 (93)	6-1/8 (156)	3-1/16 (78)
SSF-22U	103362LF	4-7/8 (124)	3-3/16 (81)	1-1/4 (32)	5-1/16 (129)	3-11/16 (93)	6-1/8 (156)	3-1/16 (78)
NBF-22	103252LF	4-7/8 (124)	3-3/16 (81)	3-3/16 (81)	5-9/16 (141)	3-11/16 (93)	6-3/8 (162)	3-3/16 (82)
NBF-25*	103418LF	5-1/8 (130)	3-3/16 (81)	3-3/16 (81)	6-3/16 (157)	4-7/8 (124)	6-3/8 (162)	2-1/2 (63)
NBF-33	103351LF	4-7/8 (124)	3-3/16 (81)	3-3/16 (81)	6-3/16 (157)	3-11/16 (94)	6-3/8 (162)	3-3/16 (82)
NBF-36*	103401LF	5-3/4 (146)	3-9/16 (91)	3-3/16 (81)	6-3/16 (157)	5-3/8 (137)	6-3/8 (162)	3-3/16 (82)
NBF-45*	103405LF	5-3/4 (146)	3-9/16 (91)	3-7/16 (87)	7-3/8 (187)	5-1/2 (140)	8-1/2 (216)	4-1/4 (108)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

Companion Flanges Available in Sizes: 3/4", 1", 1-1/4", and 1-1/2"

* 3-speed circulators

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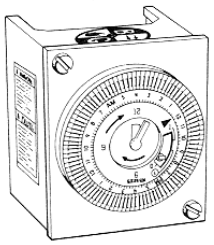
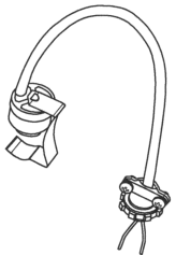
Bell & Gossett

SUBMITTAL

A-128C

JOB:	**REPRESENTATIVE:**	
UNIT TAG:	**ORDER NO.**	**DATE:**
ENGINEER:	**SUBMITTED BY:**	**DATE:**
CONTRACTOR:	**APPROVED BY:**	**DATE:**





Automatic Timer Kit

Model TC-1

Aquastat

Models: AQS-1/2, AQS-3/4

DESCRIPTION

TC-1 AUTOMATIC TIMER KIT - To increase the overall efficiency of a hot water recirculation system, the TC-1 timer control kit can be installed for use on any B&G NBF/NRF/SSF circulator. The TC-1 timer control is programmable to turn the circulator ON and OFF automatically at preset times. This permits the user to have the pump circulate hot water only during those times when high usage can be expected throughout the day.

AQS-1/2 and AQS-3/4 AQUASTAT - are designed to thermostatically turn any B&G NBF/NRF/SSF circulator ON and OFF. The AQS-1/2 or AQS-3/4 will switch the pump OFF at 120ºF (48.9ºC) and ON at 100ºF (37.8ºC). The aquastats are available in separate models that will sense the temperature for either 1/2" or 3/4" copper pipe.

AUTOMATIC TIMER KIT and AQUASTAT COMBINATION - The automatic timer and aquastat kits can be used in combination. When they are used together, the pump will only circulate water when the ON time conditions are met and when water temperature is low enough to cause the aquastat to switch ON.

OPERATIONAL LIMITS

TC-1 AUTOMATIC TIMER KIT:

Power Supply: 115/120 VAC, 60 HZ, 1Ø

Minimum Switch Interval: 15 minutes

Run Modes: ON (continuous run), OFF (at all times), TIMER (run at programmed intervals)

Maximum Switch Current: 16 amps

AQS-1/2, AQS-3/4 AQUASTATS

Thermostatic Switch Modes: OFF (open) at 120°F (48.9°C) water temperature and ON (closed) at 100°F (37.8°C) water temperature.

Thermostatic Element: Bimetal, senses surface temperature of outside diameter of pipe.

Pipe Size: AQS-1/2 clips onto 1/2" copper pipe or 3/8" steel pipe (OD of pipe 5/8"). AQS-3/4 clips onto 3/4" copper pipe or 1/2" steel pipe (OD of pipe 7/8").

Mounting: May be installed to sense temperature at the suction or discharge pipe of the pump.

CONSTRUCTION MATERIALS

TC-1 AUTOMATIC TIMER KIT:

Timer Body: Noryl Plastic

AQS-1/2, AQS-3/4 AQUASTATS:

Thermostat Covering: Epoxy (Environmentally Sealed)
Pipe Clip: Stainless Steel
Sensing Element: Bimetal
Wire Leads: Insulated 18" (457mm) #18 AWG

APPROX. SHIPPING WEIGHT

TC-1: 11oz. (.31Kg)
AQS-1/2: 5oz. (.14Kg)
AQS-3/4: 5oz. (.14Kg)

SCHEDULE

	MODEL NUMBER	PART NUMBER	SIZE INCHES	VOLTAGE RATING 60 HZ 1Ø	TAGGING INFORMATION	QUANTITY
X	TC-1	113210	–	115-120		
	AQS-1/2	113223	1/2	115-120		
X	AQS-3/4	113224	3/4	115-120		

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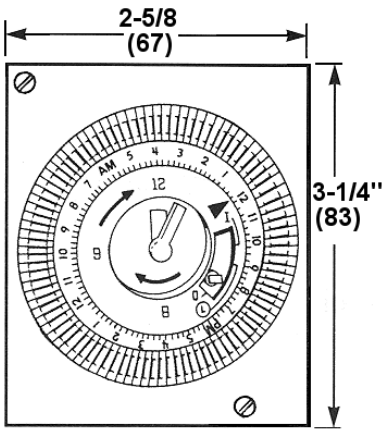
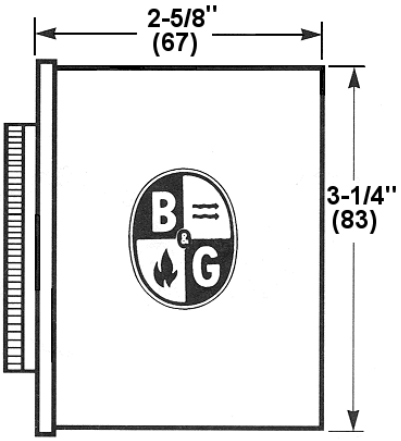
AUTOMATIC TIMER KIT AQUASTATS

A-128C

TIMER KIT DIMENSION IN INCHES (MM)



FRONT VIEW



SIDE VIEW

TYPICAL SPECIFICATIONS

Furnish and install as shown on the circulator plans and in accordance with the following specifications:

AUTOMATIC TIMER KIT:

1. The timer kit shall be UL approved.
2. The timer kit shall be installed on the connection box of any Bell & Gossett NBF/NRF/SSF system lubricated circulator.
3. The timer kit will be suitable for 115/120V, 60 HZ operation.
4. The timer shall provide automatic ON-OFF control at minimum interval of every 15 minutes. It shall also have the option of providing manual ON-OFF control.

All units shall be Bell & Gossett Model No.: TC-1

AQUASTATS:

1. The aquastat shall be UL approved.
2. The aquastat shall be connected to the lead wires in the connection box of any Bell & Gossett NBF/NRF/SSF system lubricated circulator.
3. The aquastat will be suitable for 115/120V, 60 HZ operation.
4. The aquastat shall provide thermostat control to the circulator. It will turn OFF (open) at 120ºF (48.9ºC) water temperature and ON (closed) at 100ºF (37.8ºC) water temperature.

All units shall be Bell & Gossett Model No.:
(Choose: AQS-1/2 or AQS-3/4).

AUTOMATIC TIMER KIT AND AQUASTAT COMBINATION:

1. The automatic timer kit and either aquastat model can be combined to provide automatic time and temperature control to any Bell & Gossett NBF/NRF/SSF circulator.
2. When the automatic timer and the aquastat are used together, the pump will only circulate water when the ON time conditions are met and when the water temperature is low enough to cause the aquastat to switch ON.

All units shall be Bell & Gossett Model No.: TC-1 and Bell & Gossett Model No.: (Choose: AQS-1/2 or AQS-3/4).

ITT Industries

Bell & Gossett

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