

March, 2002

# INSTALLATION AND SERVICE MANUAL

## Type GLW – Low Water Temperature Greenhouse Heating and Ventilating Units

**THIS MANUAL IS THE PROPERTY OF THIS OWNER, PLEASE  
BE SURE TO LEAVE IT WITH HIM WHEN YOU LEAVE THE JOB.**

### Inspection on Arrival

1. Inspect unit upon arrival. In case of damage, report immediately to transportation company and your local Modine sales representative.
2. Check rating plate on unit and motor to verify that power supply and motor specification requirements meet available electric power at the point of installation.
3. Inspect unit received for conformance with description of product ordered (including specifications where applicable).

### General Information

The heat exchanger is warranted for operation at hot water pressures up to 300 lbs. per sq. in. gauge, and/or temperatures up to 180°F.

### Special Precautions

1. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage. All units must be wired strictly in accordance with wiring diagram furnished with unit.
2. Units should not be installed in atmospheres where corrosive fumes or sprays are present.
3. Units with power codes 01, 02, 03, 04, or 05 must not be installed in potentially explosive or flammable atmospheres.
4. Be sure no obstructions block air intake or air discharge of unit.

### Locating GLW Units

In locating units consider the general heating and ventilating requirements of the greenhouse. Arranging units to simplify piping and electrical supply systems should also be given consideration.

### Installing GLW Units

Because of their weight it is generally not feasible to suspend a GLW unit from the roof supports of a greenhouse. No provision for overhead suspension is provided on GLW660S units. Brackets to facilitate overhead suspension of model GLW330S units can be provided. Normal practice is to place this GLW unit on a field fabricated stand or platform that is fastened to the floor. Be sure the means of support is adequate to support the weight of the unit. For proper operation the unit must be installed in a level horizontal position.

As Modine Manufacturing Company has a continuous product improvement program, it reserves the right to change design and specifications without notice.

### MODEL GLW660S



### Piping

Proper operation of the GLW greenhouse heating unit is dependent on correct arrangement of unit piping. The points listed below generally outline the areas which must be considered. For more complete coverage on the subject of piping, reference should be made to a reputable engineer's handbook or the ASHRAE guide.

1. Piping should be sized to properly handle the required flow (GPM) of water.
2. In the absence of engineered data on an individual application, piping the full size of the GLW unit connections should be used. Supply and return runouts must be the same size. The inlet is on the bottom. Inlet and outlet connections are clearly marked on each GLW unit.
3. Air must be continuously eliminated from the GLW unit to secure rated performance and avoid premature coil failure.

### Wiring

## **CAUTION**

Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage. All units must be wired strictly in accordance with wiring diagram furnished with this unit.

All wiring must be done in accordance with the National Electric Code and applicable local codes. In Canada, wiring must conform to the Canadian Electric Code. Power supply

# INSTALLATION/OPERATION

to these unit heaters must be protected by a fused disconnect switch. It is recommended that all wiring be adequately grounded.

## Wiring

Electric wiring must be sized to carry the full load amp draw of the motor, starter, and any controls that are used with the unit heater. All units with power codes 04, 05, 08, or 09 (polyphase motors) must be provided with suitable overcurrent protection in circuit supplying heater at installation. Overcurrent protectors should be sized based on motor current rating shown on motor rating plate, and applicable national electric code procedures.

All units are provided with electrical junction boxes. The GLW660 may be field wired from either junction box. Any damage to or failure of Modine units caused by incorrect wiring of the units is not covered by Modine's standard warranty. See Page 4.

## Prior to Operation

1. Make sure fuses are installed in fused disconnect switches.
2. Check all electrical connections to assure they are secure.
3. Check rigidity of unit mounting. Tighten all fasteners, if necessary.
4. Inspect piping, strainers, fittings, etc.

## Initial Start-Up

1. Set thermostat to lowest position.
2. Turn on power supply to unit.
3. Open return gate valve, and then open supply gate valve to unit.
4. Raise thermostat setting to desired position.
5. To insure proper sequence of operation, cycle unit on and off a few times by raising and lowering thermostat setting.
6. Check for proper rotation of fan. All fans must rotate in a counter-clockwise direction when viewed from the back of the GLW unit. Do not attach polytubes to GLW unit until proper rotation of fans is assured.

## Installation of Polyethylene Air Distributing Tube (Polytube)

### Tube Installation

The polyethylene tube providing air distribution throughout the greenhouse, is simply and directly connected to the heater outlet transition with a gasket and a clamp. The clamp and gasket are shipped attached to the unit. To install:

1. Remove clamp.
2. Thread a tube end through the clamp about 2 to 4 inches.
3. Orient the tube so that the distribution holes are in the desired position.
4. Fit tube end clamp over the gasketed outlet transition and secure clamp with a screwdriver.
5. Unroll tube to length desired and tie up opposite end.
6. Add air distribution holes as needed if polytube has been shortened from standard length.
7. A minimum number of 100-3" diameter holes are required for a 24" diameter polytube.

## Tube Suspension

For optimum air distribution the tube should be suspended about 7 to 9 feet above the floor with the hoops and key rings supplied. The tube must be hung without sharp bends or twists. The hoops supplied are special straps of cross-laminated plastic for durability that include eyelets at each end for clipping into key ring. The key rings, with strap and tube, may be clipped onto either a long lead wire or an eyebolt in the truss construction of the greenhouse. Because of the variety of greenhouse constructions, no further provisions for suspension are provided other than the hoops and key rings.

Recommended tube suspension with hoops is approximately eight feet apart, which will be adequate for polytube weight (12 lbs. per 100 feet) and sufficient to dampen out snapping action when the tube is initially inflated. For wire suspension, make sure the key rings are properly anchored, i.e., either tied, taped, or looped into the wire to prevent shifting. While the tube is inflated, stretch tube slightly and tie end to greenhouse frame. This will reduce the chance of tube flutter and increase the life of the tube.

## Replacement Parts

All replacement parts and controls are proprietary in that all have been designed, tested, and approved for the particular application to insure both physical and electrical fit and performance. Any substitution of parts or controls not approved by Modine will be at customer's risk.

**NOTE:** Modine Manufacturing Company reserves the right to substitute parts of advanced design and to change specifications or prices without advance notice or without incurring obligations.

Replacement parts can be obtained by submitting the model number, power code control code and serial number shown on the rating plate attached to the unit, along with a description of the part, to the Service Dept., Modine Manufacturing Company, West Kingston, Rhode Island 02892.

# PERFORMANCE/DIMENSIONS

## Performance Date

Example of computing heating capacity in BTU/HR for model GLW660S.

ETD is the difference between the entering water temperature and the entering air temperature.

At 20 GPM with 100°F entering water temperature and 70°F entering air temperature.

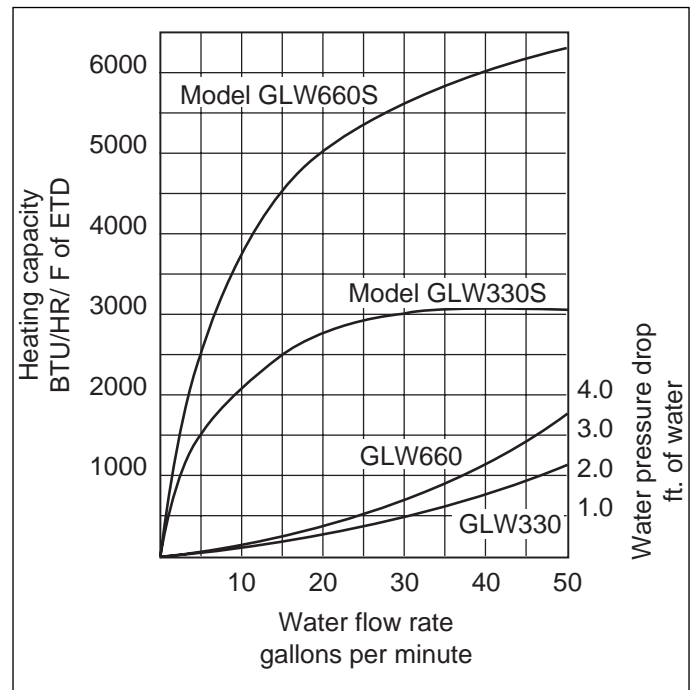
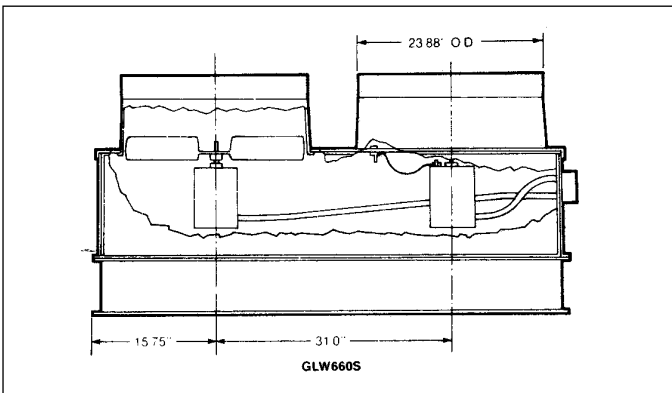
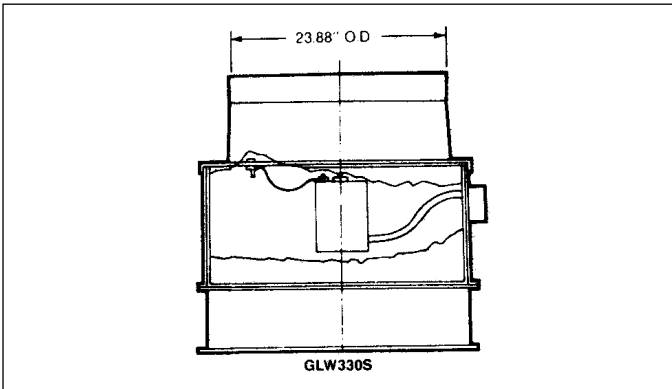
$$ETD = 100 - 70 = 30^\circ\text{F}$$

BTU/HR/°F of ETD from the curve = 4900

$$\text{Heating capacity} = 4900 \times 30 = 147,000 \text{ BTU/HR}$$

Water pressure drip = 0.7 Ft. of water

$$\text{Water temperature drop in } ^\circ\text{F} = \frac{\text{BTU/HR}}{500 \times \text{GPM}}$$



## Dimensions and Specifications – Model GLW660S, GLW330S

(All dimensions in inches)

- Hot Water Coil** – 1/2" O.D. copper tubes; aluminum fins
- 1-1/2" MPT copper connections
- Frame - galvanized steel
- Maximum operating pressure - 300 PSI
- Maximum operating water temperature - 180°F

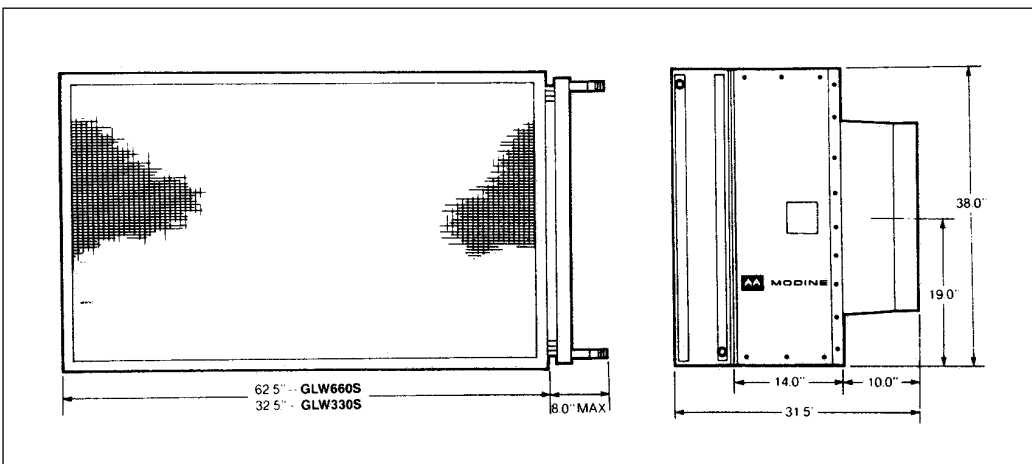
**Panels and Transitions** – Galvanized steel

**Motors** – 1/2 H.P.; Single- or three-phase available (two motors on GLW660S)

**Polytubes are Available for Specific Applications** – 24" diameter

**Air Flow** – GLW660S-7700 CFM; GLW330S-3850 CFM

**Weight** – GLW660S-380 Lbs.; GLW330S-200 Lbs.



# MAINTENANCE

## Inspect Regularly

Under average conditions, it is recommended that GLW units be inspected before every heating season. Check for dirty, clogged condensers, excessive vibration and loose connections.

## Motors

### A. Cleaning

Remove grease and dirt on motor during each inspection or lubrication, or whenever condensers are cleaned, whichever is sooner.

### B. Lubrication

1. Lubricate motor according to manufacturer's instructions located on the motor.
2. When no motor oiling instructions are on the motor, oil the motor every two thousand hours of operation with SAE20 motor oil for units in normal applications. Adjust oiling according to usage and atmosphere.
3. Some motors do not have oil fittings. These motors are lubricated for long life and do not require further lubrication.

### C. Overload Protection

A change in line voltage higher or lower than motor nameplate rating may cause overheating and serious motor damage. Check voltage conditions. A separate manual starter with thermal overload protection device is recommended for those units that do not have motors with built-in overload protection.

## Condensers

### A. Cleaning

Clean condenser at least once a year; more often under unfavorable conditions. Unless condenser is kept reasonably free of dirt, lint and grease, its original heating capacity will be reduced...possibly to a serious degree, and motor damage may result.

### B. Internal Corrosion Safeguards

Provide controlled water treatment...Contact your compound supplier for proper usage or the services of a water treatment laboratory.

Periodic internal flushing of the coils is recommended in areas where water supply is suspected of causing scale.

## **WARNING**

Using inorganic or mineral acids such as muriatic (hydrochloric) acid, even though inhibited, may lead to severe damage, including corrosion and leakage.

## Casings

### A. Cleaning

Periodic cleaning of casings is recommended to remove dirt, grease and corrosive substances that may injure finish.

### B. General Inspection

Tighten fan guard and motor bracket, Check fan for proper clearance, free rotation and firm connection to shaft.

When servicing is complete, tag unit to indicate date of inspection, lubrication and cleaning.

## WARRANTY

Modine warrants its products to be free from defects in material and workmanship, exclusive, however, of failures attributable to the use of materials substituted under emergency conditions for materials normally employed. This warranty covers replacement of any parts furnished from the factory of Modine, but does not cover labor of any kind and materials not furnished by Modine, or any charges for any such labor or materials, whether such labor, materials or charges thereon are due to replacement of parts, adjustments, repairs, or any other work done. This warranty does not apply to any equipment which shall have been repaired or altered outside the factory of Modine in any way so as, in the judgement of Modine, to affect its stability, nor which has been subjected to misuse, negligence, or operating conditions in excess of those for which such equipment was designed.

BUYER AGREES THAT MODINE'S WARRANTY OF ITS PRODUCTS TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP, AS LIMITED HEREIN, SHALL BE IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, WHETHER ARISING FROM LAW, COURSE OF DEALING, USAGE OF TRADE, OR OTHERWISE. **THERE ARE NO OTHER WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.**

BUYER'S REMEDY FOR BREACH OF WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, IS LIMITED TO REPAIR OR REPLACEMENT AT THE FACTORY OF MODINE, ANY PART OF PARTS WHICH SHALL, WITHIN ONE YEAR FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN ONE YEAR FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN EIGHTEEN MONTHS FROM DATE OF SHIPMENT FROM MODINE, WHICHEVER OCCURS FIRST, BE RETURNED THERETO WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF MODINE SHALL DISCLOSE TO HAVE BEEN DEFECTIVE; EXCEPT THAT WHEN THE PRODUCT IS TO BE USED BY BUYER AS A COMPONENT PART OF EQUIPMENT MANUFACTURED BY BUYER, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT FROM MODINE.

BUYER AGREES THAT IN NO EVENT WILL MODINE BE LIABLE FOR COSTS OF PROCESSING, LOST PROFITS, INJURY TO GOODWILL, OR ANY OTHER CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND RESULTING FROM THE ORDER OR USE OF ITS PRODUCT, WHETHER ARISING FROM BREACH OF WARRANTY, NONCONFORMITY TO ORDERED SPECIFICATIONS, DELAY IN DELIVERY, OR ANY LOSS SUSTAINED BY THE BUYER.

Modine warrants Polytube (Air Distribution Tubes) for a period of three months from date of first beneficial use by buyer or any other user, within three months from date of resale by Buyer in any unchanged condition, or within six months from date of shipment from Modine, whichever occurs first.



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