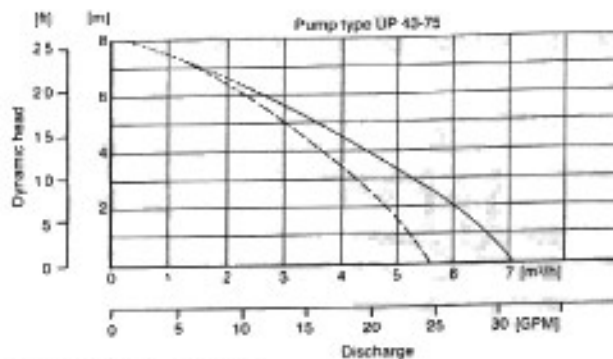
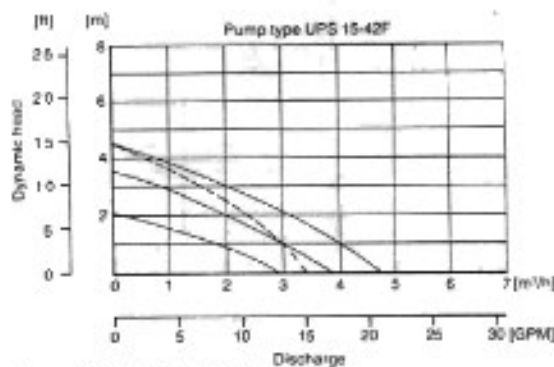
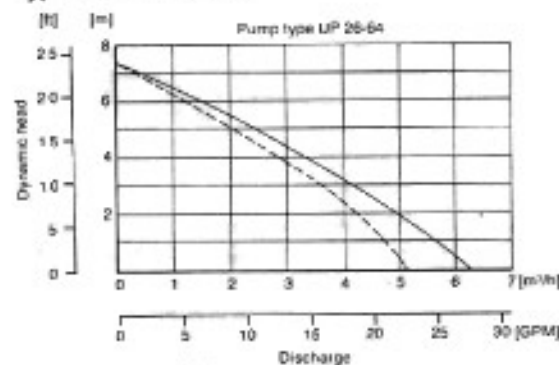


The tekmar pump-mixer-block is an inexpensive method of providing fully variable water temperature to any radiant, convective, or fan coil heating system. This compact unit includes supply and return thermometers, a self-lubricating circulation pump, and a manually operated 4-way mixing valve with an automatic bypass valve. Optionally, the mixing valve can be operated automatically by a tekmar motor-electronic; (and the resulting annual energy savings can approach 25%.)

Specifications

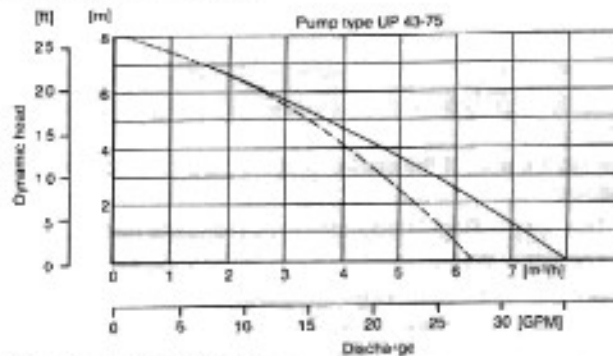


Type 109 for 1" pipes

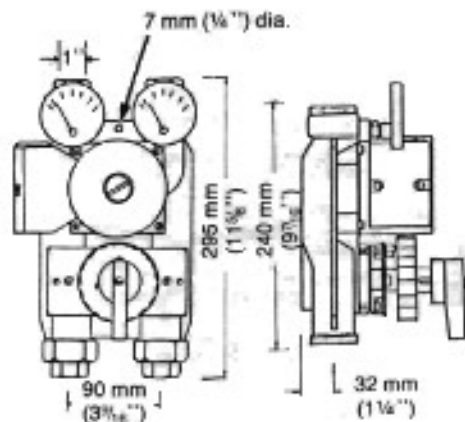


Type 110 for 1" pipes

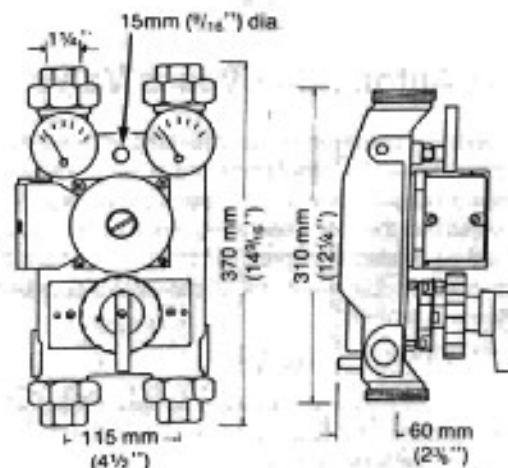
Type 111 for 1" pipes



Type 112 for 1 1/4" pipes



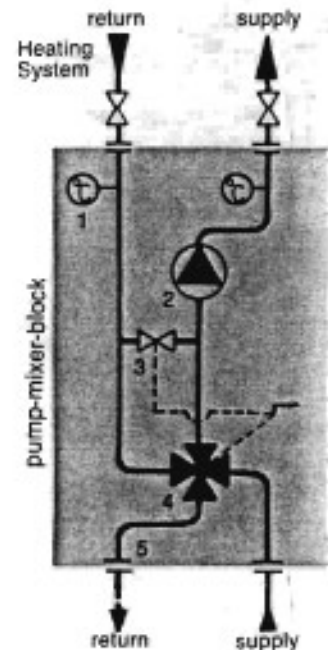
Types 109 to 111



Type 112

Scope of Supply:

1. Thermometers
2. Grundfos® circulation pump
3. Automatic bypass valve
4. Four-way mixing valve
5. Malleable iron pipe unions (4 in all)



Plumbing

Facing the front of the control unit the pipe connections are as follows:

- Top right — Regulated water supplied to the heating system
- Top left — Water returning from the heating system
- Bottom right — Hot water supplied by the heat source
- Bottom left — Water returning to the heat source

The pipes should be fitted with isolation valves and adequately

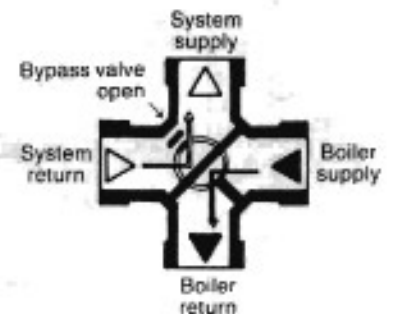
supported to reduce thermal and mechanical stresses on the unit. Generally only types 111 and 112 will need to be attached to the wall; all other models will have enough support from the pipes. To attach the unit to the wall a hole in the casting has been provided above the pump. A lag bolt through this hole and into a solid mounting surface is sufficient support for the unit.

The Automatic Bypass Valve

All tekmar control units are delivered with an automatic bypass valve for low-temperature (e.g. radiant floor) heating systems. tekmar developed the automatic bypass valve so that the entire operating range of the mixing valve would be available for precise temperature control of the supply water. The automatic bypass valve operates in the following manner:

When the four-way mixing valve is closed (no hot water is being added to the heating system) then the bypass valve is open. The water returning from the heating system is pumped back into the heating system with no hot water being added from the boiler.

Mixing valve closed



As the mixing valve moves to 70% open the bypass remains open so that only 35% hot boiler water enters the heating system. (If the bypass were closed or non-existent, then 70% hot boiler water and 30% cool return water would enter the heating system). Consider a 55°C (130°F) radiant floor heating system combined with a 70°C (160°F) heat source. During most of the heating season less than 50% of the heating system's capacity is used; the supply water temperature remains below 40°C (105°F). A mixing valve without a bypass would only operate in the small range from 0 to 35% open, but with a bypass 70% of the adjustment range of the mixing valve is available; i.e. by employing a bypass valve the tekmar control unit can more precisely regulate the temperature of the water entering the heating system.

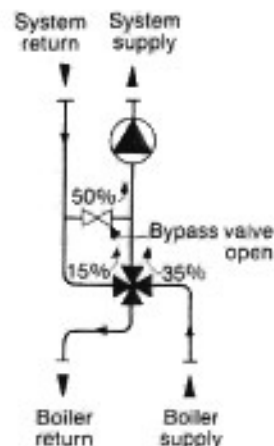
However, when design conditions are approached in mid-winter, a heating system may require unmixed boiler water. If the bypass valve always remained open then the cool return water would be mixing with the hot boiler water; the system supply water may not be warm enough. With the tekmar automatic bypass valve this problem is solved. As the mixing valve moves from 70% to 100% open, the bypass valve moves from open to closed so that full boiler water temperature is provided when the heating system needs it.

The Fixed Bypass Valve

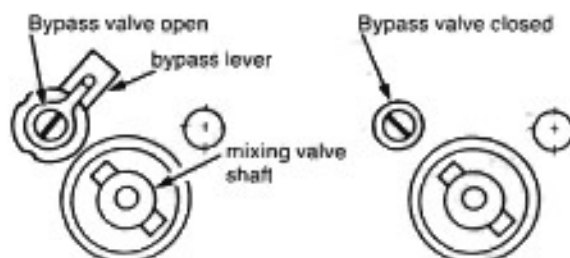
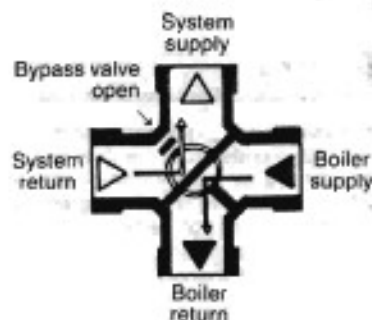
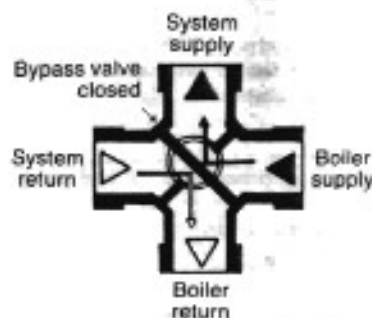
In some heating systems which use medium and high temperature radiators/convectors the system functions better when the bypass valve is always closed. In other applications, such as a high temperature heat source combined with a low temperature heating system (e.g. radiant floor), the designer may want the bypass to always be open so that unmixed hot boiler water never enters the heating system. (However, notice that overheating can still occur because after a period of time the system return water will also be hot). The following procedure is used to set the bypass valve in a fixed position:

1. Close the mixing valve by turning the large, black disc fully clockwise. Remove the large screw from the centre of the handle. Notice the position of the disc and then pull it off the mixing valve shaft.
2. With a 2 mm hex-key loosen the two set screws on the bypass lever. Remove the bypass lever.
3. To close the bypass valve, turn its shaft until the slot points towards the mixing valve shaft. To fix the bypass in an open position, rotate the shaft ¼ turn from the closed position.
4. Reinstall the disc and handle onto the mixing valve shaft. Be sure that the disc seats properly on the valve shaft. Tighten the large screw in the center of the handle.

Mixing valve 70% open



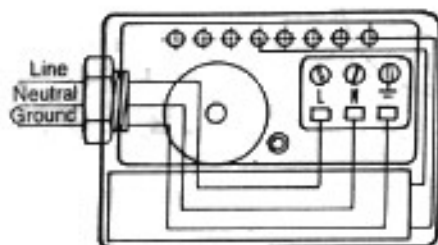
Mixing valve 100% open



Electrical

The Pump

The circulation pump requires 115V AC, 60 Hz. All wires must be suitable for use at 90°C (195°F) and the ground wire must be at least 1.55 mm diameter (14 AWG). Check the latest edition of the Electric Code and local regulations when choosing the wire sizes.



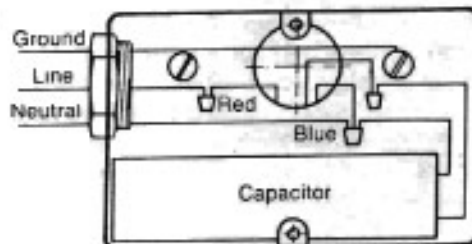
Multi-speed pump (UPS 15-42F)

Connect 'line' to terminal "L", 'neutral' to "N", and 'ground' to the grounding terminal "⊥".

Start-up procedure for the pump

1. Fill the heating system and boiler circuit with water (and optionally glycol, etc.). Vent the system and open the isolation valves.
2. Remove the indicator plug which is in the middle of the pump's name plate. Insert a small slot screwdriver into the end of the shaft and gently rotate it until the shaft turns freely. When water begins to dribble out, replace and tighten the plug.

Note: Units which have a mixing valve & boiler control. If a 24V AC relay of suitable capacity is wired in the power line to the pump, then the pump can be automatically switched off whenever the outdoor air temperature is above 20°C (70°F). (See the mixing valve and boiler control wiring diagram on the following page.)



Single-speed pump (UP 26-64F or UP 43-75F)

Connect 'line' to the red wire, 'neutral' to the blue wire, and 'ground' to the green grounding screw.

3. The electrical supply can now be switched on and the pump started. (If the pump does not run, check that 115V AC is being supplied to it!) On a variable speed pump select the rotation speed which gives the correct pump performance curve for the system.

Under no circumstances should the pump be operated without system circulation or against a closed isolation valve for a prolonged period of time: the motor and pump may be damaged due to overheating.

Warranty

tekmar Control Systems Ltd., (tekmar) warrants, to the original purchaser for twelve (12) months from the date of purchase, each tekmar product against defects in workmanship and materials, when the product is installed and used in compliance with tekmar's instructions. This warranty covers the cost of parts and labor provided by tekmar to correct defects in material and/or workmanship, but does not cover parts or labor to remove, transport or reinstall the defective product. tekmar will not be liable for any damage other than repair or replacement of the defective part or parts and such repair or replacement shall be deemed to be the sole remedy from tekmar.

This warranty shall not apply to any defects caused or repairs required as a result of unreasonable or negligent use, neglect, accident, im-

proper installation, or unauthorized repair or alterations.

Any express or implied warranty which the purchaser may have, including merchantability and fitness for a particular purpose, shall not extend beyond twelve (12) months from the date of purchase.

Warranty Procedure

The installer or other qualified service person must, at the owner's expense, determine which component has failed. If an actuating motor, electronic control, pump, or other tekmar component requires repair, only that component, together with dated proof of purchase, is required to be returned to tekmar by the service person, transportation prepaid. tekmar strongly recommends that you insure the product for its value prior to mailing. Please enclose your name and return address.

In North America: tekmar Control Systems Ltd.
Site 15, Comp. 27, R.R. #6
Vernon, B.C., CANADA V1T 6Y5
Tel. (604) 545-7749 • Telex 048-85384

In Europe: tekmar Angewandte Elektronik GmbH & Co. KG
Duckerstrasse 4
D-4300 Essen 16, WEST GERMANY
Tel. (0201) 49841 • Telex 8579935