



## ELECTRIC WATER HEATER

# ARISTON BRAVO UNVENTED WATER STORAGE HEATER

## Installation and Users Guide

### IMPORTANT

Please read these instructions carefully  
before installing the water heater.  
Failure to do so may invalidate the Warranty

### WATER BYE-LAWS

These bye-laws ensure a good supply of wholesome water, that the wastage of water is prevented as far as is practical and that only approved materials, pipes and fittings are used to convey water.

### BUILDING REGULATIONS

These are a statutory document and take priority over all other regulations and recommendations. The installation of an unvented hot water storage heater is classified as a "Controlled Service" and Regulation G3 applies. To meet the requirements of the Regulation, installation of an unvented system should be undertaken by a "competent installer".

All installations of unvented hot water storage systems having a capacity of more than 15 litres should be notified to the relevant Local Authority by means of building notice or by the submission of full plans. It is important to note that it is a criminal offense to install an unvented hot water storage system without notifying the Local Authority.

### HOW THE HEATER WORKS

The Heating Element(s) are connected through capillary type Thermostats which sense the water temperature. The operating temperature can be pre-set by adjusting the spindle in the head of the Thermostat. In addition to the Thermostat there is a Thermal Cut-Out incorporated if the Thermostat fails and the water temperature rises too high. Once the Cut-Out operates it can only be re-set manually after the fault has been rectified.

Indirect models have dual thermostatic control systems. In addition to the above there is a separate Cylinder Thermostat and Thermal Cut-Out. Again the Thermal Cut-Out operates if the Cylinder Thermostat is to fail by disconnecting the live (call for hot water) from the Time Clock.

There is a Magnesium Anode provided to prevent corrosion of the water container.

The factory fitted Pressure & Temperature Relief Valve on the top of the cylinder is a safety device to back-up the Thermostat(s) and Thermal Cut-Out(s). It works by sensing an excess in water pressure or temperature and releasing the hot water into a Discharge Tundish and drain.

The water heater will only work in the vertical position. The inlet pipe needs to deliver cold water to the bottom of the tank. When water is heated it expands. To accommodate this increase in volume an Expansion Vessel is provided. A Cold Water Combination Valve is also provided in two pieces, loose jointed for ease of installation. These comprise of a Combined Line Strainer/Pressure Reducing Valve and Core Non Return Valve/Expansion Relief Valve.

The Strainer prevents any debris entering the other controls. The Pressure Reducer ensures the correct operation of the Expansion Vessel (making sure that water is always drawn from the vessel first).

The Non-Return Valve ensures the water expansion is forced into the Expansion Vessel and not the mains cold water supply. The Expansion Relief Valve will discharge expanded water to the Discharge Tundish if the Expansion Vessel fails.

# INSTALLATION

## **COLD WATER SUPPLY**

It is important to ensure that the cold water main is capable of supplying the increased demand which will be imposed on it. Hot and cold water are both drawn off the same source of supply. Remember, there will not be a storage tank to help compensate for variations in the demand on the system.

A minimum pressure of approximately 2.0 bar and 24 litres per minute for satisfactory operation. 85% of UK dwellings have a mains pressure above 2.0 bar.

THE MAINS WATER SUPPLY MUST NOT EXCEED 16 BAR

## **SITING AND FIXING**

The water heater may be installed at any convenient position, as it is connected to the mains cold water supply, it is equally effective on any floor.

However, do not install the unit in premises which may be subject to freezing. Ensure that the floor and wall load bearing strength are adequate to take the weight of the water heater when full of water (see table 1).

The ST50, ST80 and ST100 models are wall mounted. All other models are free standing. These are supplied with feet which are attached to the heater via self tapping screws which are also supplied. All units must be installed in the VERTICAL POSITION.

For maintenance purposes leave at least 60cm free space in front of the Immersion Heater cover for access to the electrical components.

A 240V, 3kW single phase electrical supply is needed plus an Economy 7 control unit for the night element on the STDI 125, STDI 150 and STDI 210 models.

## **CONNECTION OF MAINS WATER SUPPLY**

On all of the range the mains cold water inlet is marked 'Blue' and the hot water outlet is marked 'Red'. On the wall mounted units these are at the base of the water heater. On free standing models the inlet and outlet port are at the top of the unit and a drain down point is also provided.

With indirect units the heat exchange ports for the primary flow and return are on the side of the unit. The inlet and outlet ports are the same as for direct units.

It is recommended that all mains cold water supply pipework is a minimum of 22mm with the exception of model ST50 where 15mm can be used. An Isolating Valve should be installed between the cold water supply and the water heater for servicing. ALL PIPEWORK MUST BE FLUSHED TO AVOID DAMAGE TO THE CONTROL VALVES.

Please refer to figs 1,2,3 for a suggested installation layout.

## **COLD WATER COMBINATION VALVE**

The Cold Water Combination Valve can be connected either close by the unit or alternatively it may be installed in a remote position from the unit as there is no requirement to site it in close proximity to the water heater. This allows a flexible and convenient installation. However, it is important to note allowances for the discharge pipework from the Expansion Relief Valve must be accounted for.

A Balancing Port is supplied on the 22mm valve (for units 75 litre and above) allowing balanced cold water supply to the rest of the building giving excellent results with mixer and shower valves. If the facility is not needed a plug is supplied. Refer to fig 4.

Although this facility is not built into the 15mm valve (supplied with model ST 50) a Tee Piece may be inserted between the two components giving the same results. Refer to fig 5.

## **CONNECTION TO SERVICES**

Again it is recommended that a 22mm pipe run should supply the outlets throughout the building, especially to baths and showers. Short runs of 15mm pipe may be used to connect basins and sinks.

## **SECONDARY RETURN**

A Secondary Return may be fitted to floor standing models via the drain down port. This is done by removing the drain valve and inserting a Swept Tee (not supplied). Refer to fig 6. A Non Return Valve (not supplied) must be fitted to prevent backflow and a Bronze Pump will be needed in conjunction with a Pipe Thermostat to circulate the hot water (both not supplied).

## **DISCHARGE PIPEWORK**

The Pressure/Temperature Relief Valve and Expansion Relief Valve are both designed to discharge water if a fault occurs in the system.

To make sure the user is aware of the fault the discharge pipe must discharge water into the Tundish in a visible and safe position, refer to fig 7. The following points must be observed as in accordance with Guidance Notes to Building Regulation G3.

- 1) The Tundish must be vertical and fitted within 500mm of the Pressure/Temperature Relief Valve and must be located with the water heater.
- 2) Discharge pipes from the Pressure/Temperature Relief and Expansion Relief Valves may be joined together.
- 3) Pipe diameter must not be smaller than the diameter of valve outlet.
- 4) Minimum discharge pipe size should be one pipe size larger than the Pressure/Temperature Relief Valve discharge.
- 5) Discharge pipe must be heat resistant.

6) Discharge pipe must not exceed 9m in straight length or equivalent resistance with bends, without forming an air break.

7) Discharge pipe must fall continuously throughout its length.

8) Discharge pipe should terminate in a safe, visible position.

### **WARNINGS**

The outlet from the Pressure/Temperature Relief Valve must not be used for any other purpose. This also applies to the Expansion Relief Valve. No other valve is to be fitted between the Cold Water Combination Valve and the water heater.

The Pressure/Temperature Relief Valve must not be removed in any circumstances. Any of the above will totally invalidate the warranty.

### **ELECTRICAL**

The electrical installation must be in accordance with the current I.E.E. wiring regulations.

### **DIRECT SYSTEMS**

A mains supply of 240V, 3kW (13 amps) is required. Heat resistant cable, round 3 or 4 core 2.5mm<sup>2</sup> (to BS6141 table 8) must be used to connect the electrical supply through the Economy 7 time control switch using either system 'A' or 'B' as illustrated in fig 8.

Should the Economy 7 system not be used, a separate 13 amp supply to each element will be required. Through a double pole fused isolating switch having a contact separation of at least 3mm on each pole.

To gain access to the appliance terminal block, the bottom element cover must be removed. The multi core cable from the isolating switch should then be passed through the grommet hole in the plastic cover. After having made the connection to the terminal block, as per figs 9, 10 the mains cable must be fixed securely in the clamp provided before replacing the cover. The clamp can be turned over to suit different cable sizes.

The Thermostat(s) on the element(s) should be adjusted to trip at 60°C. This is the ideal temperature to prolong element life in hard water areas. Scale on the sheath builds up more rapidly at temperatures above this causing the element to overheat and premature failure can occur.

Thermal control of the Immersion Heater is through a capillary type Thermostat which senses the water temperature. The operating temperature can be adjusted by the spindle projecting from the thermostat.

In addition to the thermostat the Thermal High Temperature Cut-Out will switch power off to the element should the thermostat malfunction, causing an excessive rise in water temperature. The cut-out can be reset manually after the fault has been corrected.

### **INDIRECT SYSTEMS**

Again a mains supply of 240V, 3kW (13 amps) will be required for the direct Immersion Heater. Heat resistant cable, round 3 core 2.5mm<sup>2</sup> (to BS6141 table 8) must be used. For indirect controls a 240V, 3amp supply is required.

To gain access to the terminal blocks the element cover at the bottom of the unit must be removed. The cables must be clamped in position (as previously stated) and both thermostat should be set at 60°C for the reasons above. Refer to figs 11, 12 for full wiring instructions.

**WARNING : THIS APPLIANCE MUST BE EARTHED.**

The earth continuity conductor of the electrical installation must be effectively connected to all exposed parts of other appliances and services in the room in which the water heater is to be installed, conformity with the I.E.E. wiring regulations.

**NOTE:** Do not switch the Immersion Heater(s) or fire the boiler until the water heater is full of water.

### **COMMISSIONING**

Check for obvious signs of damage to the water heater and controls and also that the controls fitted correspond with the reference quoted in these instructions.

Ensure that the Drain Cock at the base of the water heater (floor standing only) is closed before commencing.

1) Open all outlet taps.

2) Turn on mains water supply and allow the water heater to fill.

3) Close taps in turn after having purged the system of air.

4) Check for leaks around the controls and immersion Heaters and again after the unit has heated up.

5) Check that no water is passing to waste through the relief valves.

6) Test the operation of the Temperature/Pressure Relief and Expansion Valves by lifting/turning the manually operated test lever/cap and observing that water flows through freely and safely to waste.

7) Check that the discharge pipe is plumbed so that it falls continuously and that no taps, valves or other shut off devices are installed in the pipe.

8) Check that all thermostats are set at 60°C.

9) **DIRECT UNITS.** Switch on Immersion Heater(s) and allow unit to heat up. Check operation of thermostat(s).

instructions. Move the lever on the motorized valve to the manual position. When full return the lever to auto position. Switch on the boiler, ensure that the programmer is to Domestic Hot Water. Allow unit to heat up and check operation of indirect thermostat on motorised valve(s).

11) Demonstrate operation to user, including operation of Pressure/Temperature Relief Valve and what to do if it operates.

12) Give this book to the user to retain for future reference and make the customer aware that periodic checks of the equipment are essential for safety.

## MAINTENANCE FOR THE USER.

Periodically, no longer than every 12 months, ask your installer to check the Magnesium Anti-corrosion Anode. If the heating element is heavily coated with scale we recommend descaling at the time of this inspection. The Expansion Vessel may need to be recharged periodically by your installer.

FOR THE INSTALLER.

**WARNING: SWITCH OFF THE POWER SUPPLY BEFORE WORKING ON THE APPLIANCE.**

If the Thermal Cut-Out has operated the cause must be found before resetting.

To drain down the cylinder:-

- 1) Close the mains supply service valve.
- 2) Open hot water taps.
- 3) Attach a drain hose to the Drain Cock.
- 4) Open the Drain Cock and allow the system to empty

Remove thermostat(s) retaining screws/nuts and remove vials from the element. Remove the nuts holding the element flange plate in position and withdraw the assembly from the water heater.

EXAMINE THE ANODE AND REPLACE IF THE DIAMETER IS LESS THAN 10mm.

Descale the element and remove any lime deposit from the water heater. Replace in reverse order.

Check controls as per the following:-

- 1) Check and clean the Line Strainer before refilling the system.
- 2) Check pressure in Expansion Vessel and top up as necessary.
- 3) Check manually by lifting the test lever, the Pressure/Temperature Relief Valve.
- 4) Check manually by turning the test knob the Expansion Relief Valve.
- 5) Check discharge pipes from both Pressure/Temperature Relief and Expansion Relief Valve for obstructions.

| FAULT                                            | POSSIBLE CAUSES                                                                                                | REMEDY                                                                                                         |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| NO HOT WATER FLOW                                | 1) Mains Cold Water supply shut off                                                                            | Check and open Isolating and/or Stop Valve. Check water, Local Water Authority                                 |
|                                                  | 2) Line Strainer blocked                                                                                       | Turn off mains water supply, remove Line Strainer and clean                                                    |
|                                                  | 3) Cold Water Combination valve fitted incorrectly                                                             | Check direction of flow arrows on valve, refit in correct position if necessary                                |
| REDUCED FLOW RATE                                | 1) Low Mains Water Pressure                                                                                    | Check pressure, consult Local Water Authority if necessary                                                     |
|                                                  | 2) Line Strainer partially blocked                                                                             | Turn off mains water supply, remove Line Strainer and clean                                                    |
|                                                  | 3) Size of Service Pipe too small                                                                              | Increase to size stated on page 4                                                                              |
| WATER FROM HOT TAPS IS COLD                      | 1) Direct Immersion Heater is not switched on                                                                  | Check Immersion Heater, switch on if necessary                                                                 |
|                                                  | 2) Direct Thermal Cut-Out has operated                                                                         | Test Thermostat operation and wiring, if faulty, correct/replace. Reset Cut-Out                                |
|                                                  | 3) Boiler Programmer set to Central Heating only (Indirect models)                                             | Check switch on Domestic Hot Water if necessary                                                                |
|                                                  | 4) Boiler is not functioning (Indirect models)                                                                 | Check boiler operation, if fault suspected consult Manufacturer's Instructions                                 |
|                                                  | 5) Indirect Thermal Cut-Out has operated                                                                       | Test Thermostat operation and wiring, if faulty, correct/replace. Reset Cut-Out                                |
|                                                  | 6) Motorized valve jammed or not wired correctly (Indirect models)                                             | Check wiring and operation of Motorized Valve correct/replace as necessary                                     |
| DISCHARGE FROM PRESSURE/TEMPERATURE RELIEF VALVE | 1) Pressure above 7 bar, failure of Pressure Reducing Valve. Temperature above 90 C failure of thermal control | Shut down boiler or immersion heater. Check pressure Reducing Valve and Thermal Controls. Replace if necessary |
| DISCHARGE FROM EXPANSION VALVE                   | 1) Continually. Pressure Reducing Valve faulty                                                                 | Check pressure from valve. Replace if over 3.5 bar                                                             |
|                                                  | When heater is heating Faulty Expansion Vessel or lost charge                                                  | Check charge of vessel. Re-charge vessel to 3.5 bar or replace if necessary                                    |

**TABLE 1**

**TECHNICAL DATA**

|                                         |                 |
|-----------------------------------------|-----------------|
| Max Water supply Pressure               | 6.0 bar         |
| Operating Pressure                      | 3.5 bar         |
| Expansion Vessel Charge Pressure        | 3.5 bar         |
| Expansion Valve Setting                 | 6.0 bar         |
| Pressure And temperature relief valve   | 7.0 bar / 90° C |
| Immersion Heater Rating for Each Heater | 3000 W - 240 V  |
| Pressure Reducing valve set pressure    | 3.5 bar         |

| MODEL N° | STORAGE CAPACITY | UNITS PIPES SIZE |        | DIMENSIONS IN CM |      |     |    |    |      | WEIGHT WHEN FULL KG |
|----------|------------------|------------------|--------|------------------|------|-----|----|----|------|---------------------|
|          |                  | INLET            | OUTLET | A                | B    | C   | D  | E  | F    |                     |
| ST 50    | 50 L             | 1/2"             | 1/2"   | 41               | 12   | 58  | 16 | 47 | 46   | 77                  |
| ST 80    | 75 L             | 3/4"             | 3/4"   | 59               | 17.5 | 74  | 23 | 47 | 46   | 115                 |
| ST 100   | 100 L            | 3/4"             | 3/4"   | 55               | 17.5 | 70  | 23 | 57 | 56   | 141                 |
| STDI 100 | 100 L            | 3/4"             | 3/4"   | -                | -    | 73  | -  | -  | 56   | 142                 |
| STDI 125 | 125 L            | 3/4"             | 3/4"   | -                | -    | 87  | -  | -  | 56   | 171                 |
| STDI 150 | 150 L            | 3/4"             | 3/4"   | -                | -    | 100 | -  | -  | 56   | 200                 |
| STDI 210 | 200 L            | 3/4"             | 3/4"   | -                | -    | 127 | -  | -  | 56   | 259                 |
| STDI 300 | 300 L            | 3/4"             | 3/4"   | -                | -    | 182 | -  | -  | 56   | 375                 |
| STT 125  | 125 L            | 3/4"             | 3/4"   | -                | -    | 87  | -  | -  | 56   | 181                 |
| STT 150  | 150 L            | 3/4"             | 3/4"   | -                | -    | 100 | -  | -  | 56   | 210                 |
| STT 210  | 200 L            | 3/4"             | 3/4"   | -                | -    | 127 | -  | -  | 56   | 269                 |
| STT 300  | 300 L            | 3/4"             | 3/4"   | -                | -    | 182 | -  | -  | 56   | 385                 |
| 500 ST6  | 500 L            | 1"               | 1"     | -                | -    | 187 | -  | -  | 71.4 | 635                 |

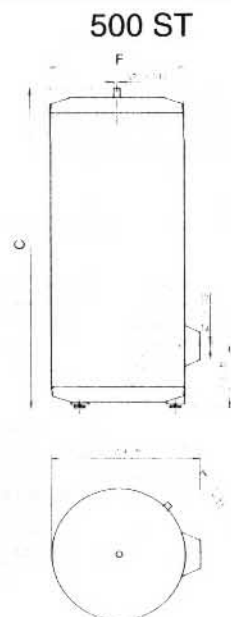
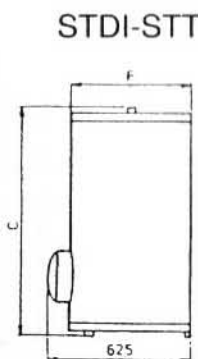
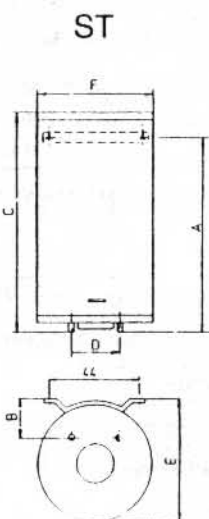


**FIG. 1**  
**MODELS STDI 100 - 210**

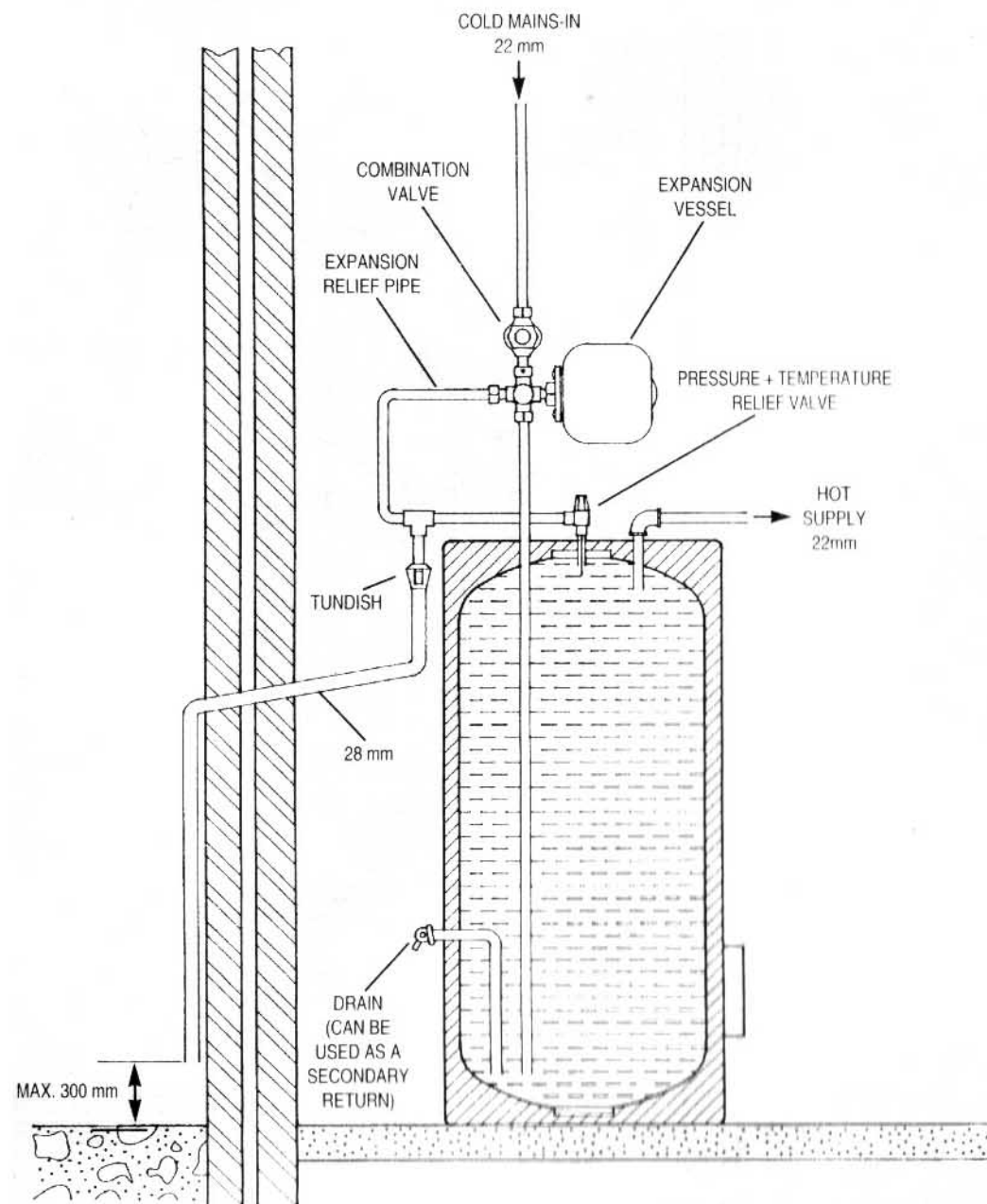


**FIG. 2**  
**MODELS STT 125 - 210**

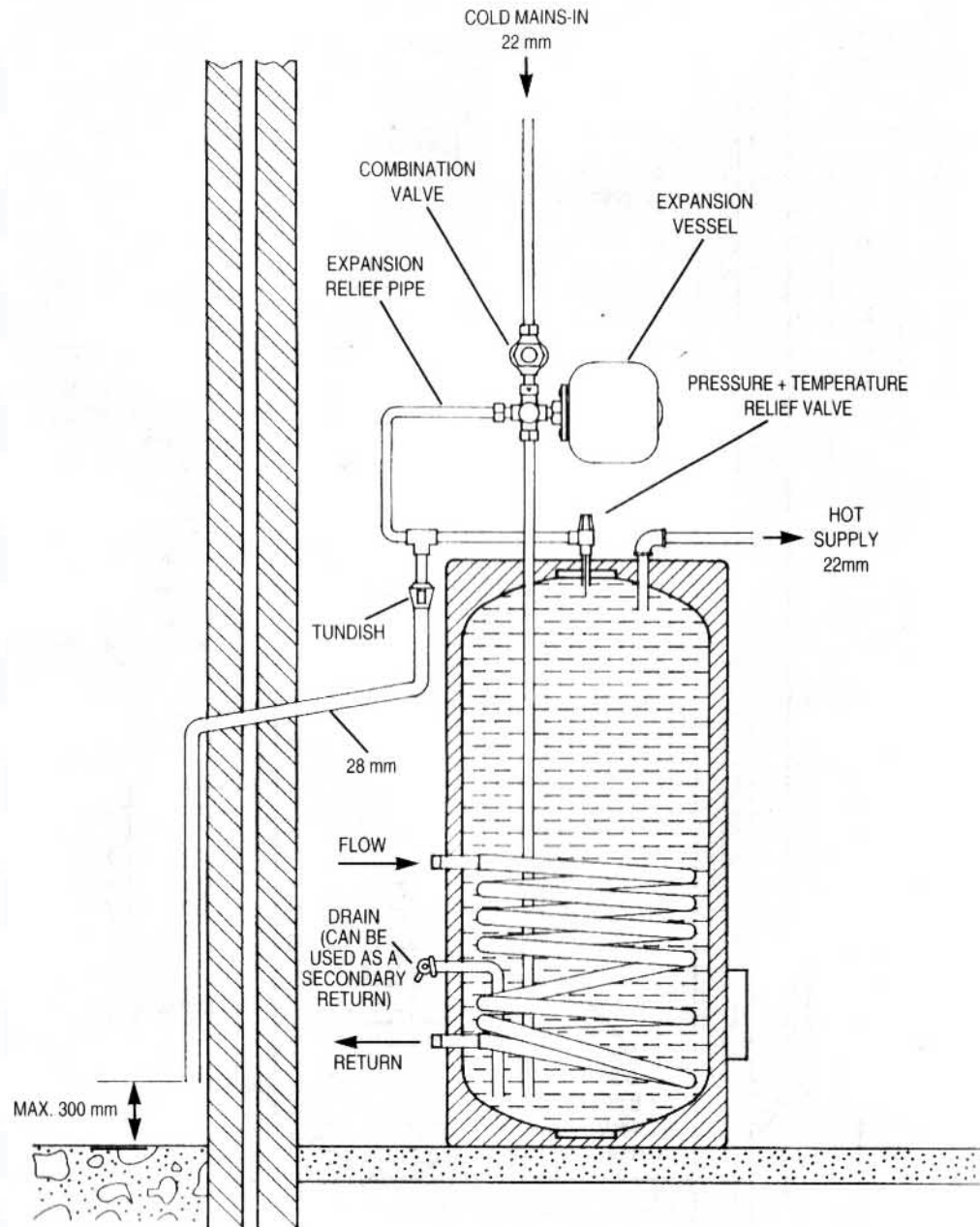


**FIG. 3**  
**MODELS ST 50 - 100**

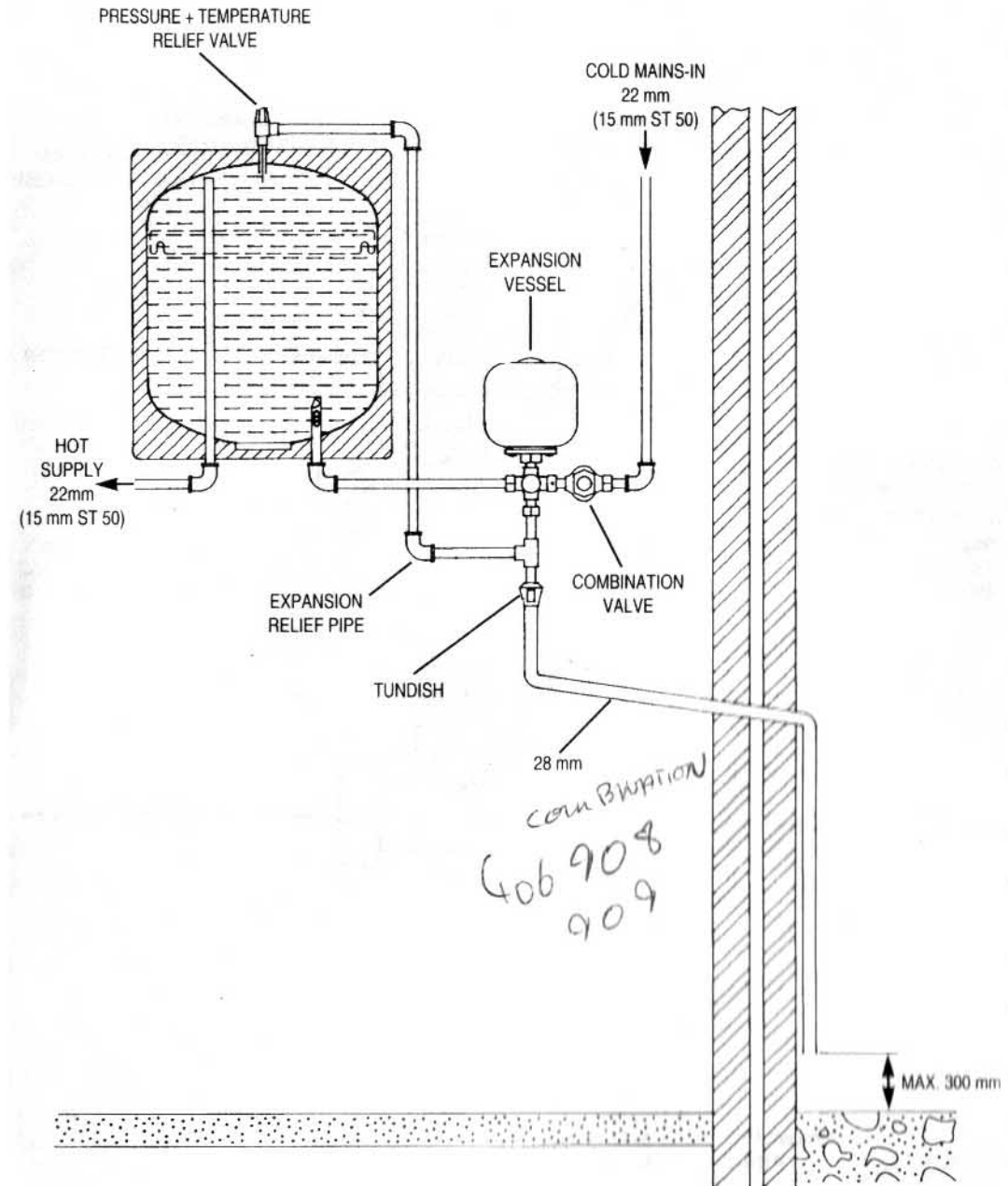


**FIG. 4**  
**COLD WATER COMBINATION VALVE 3/4"**

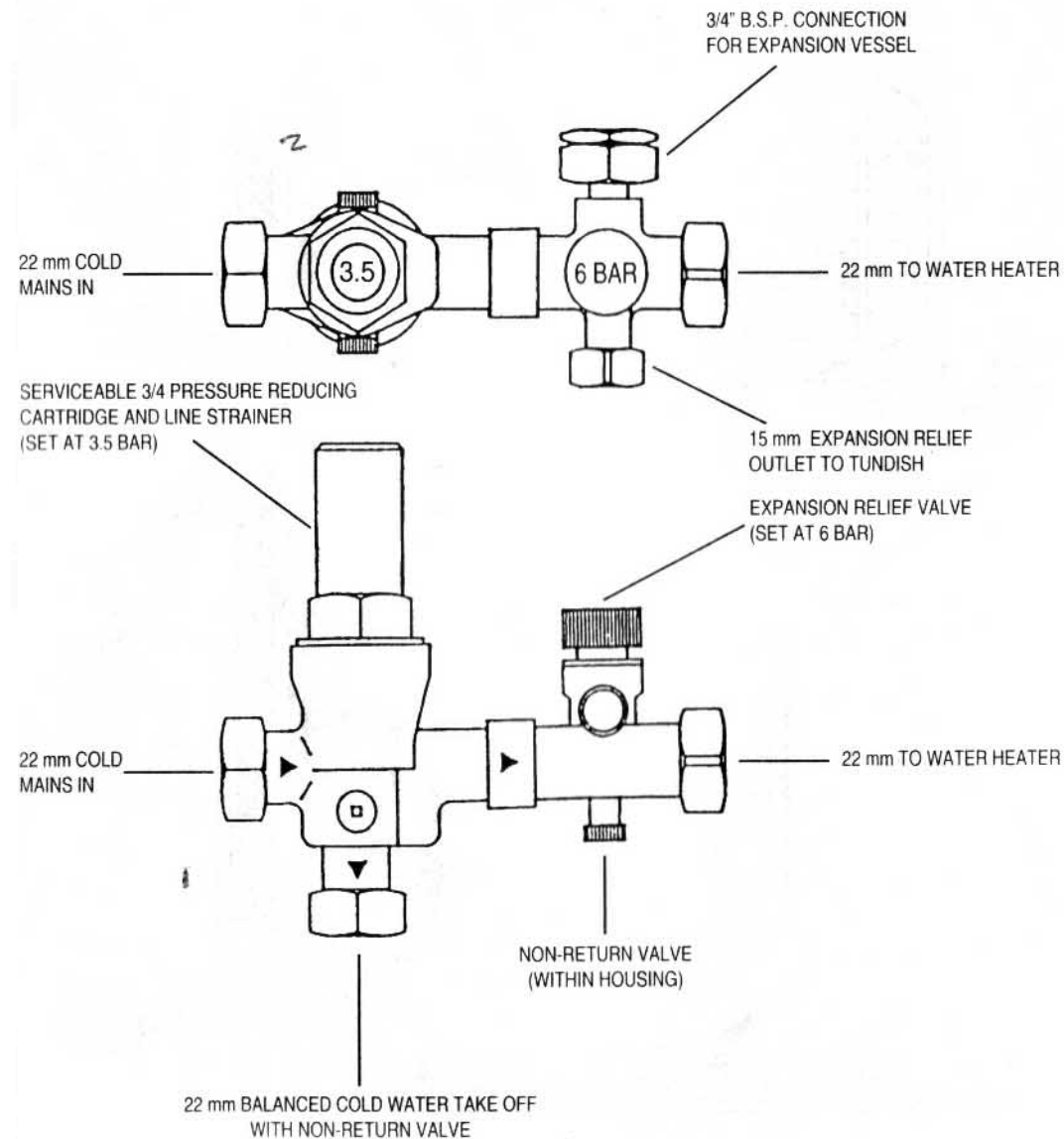


**FIG. 5**  
**COLD WATER COMBINATION VALVE 1/2"**

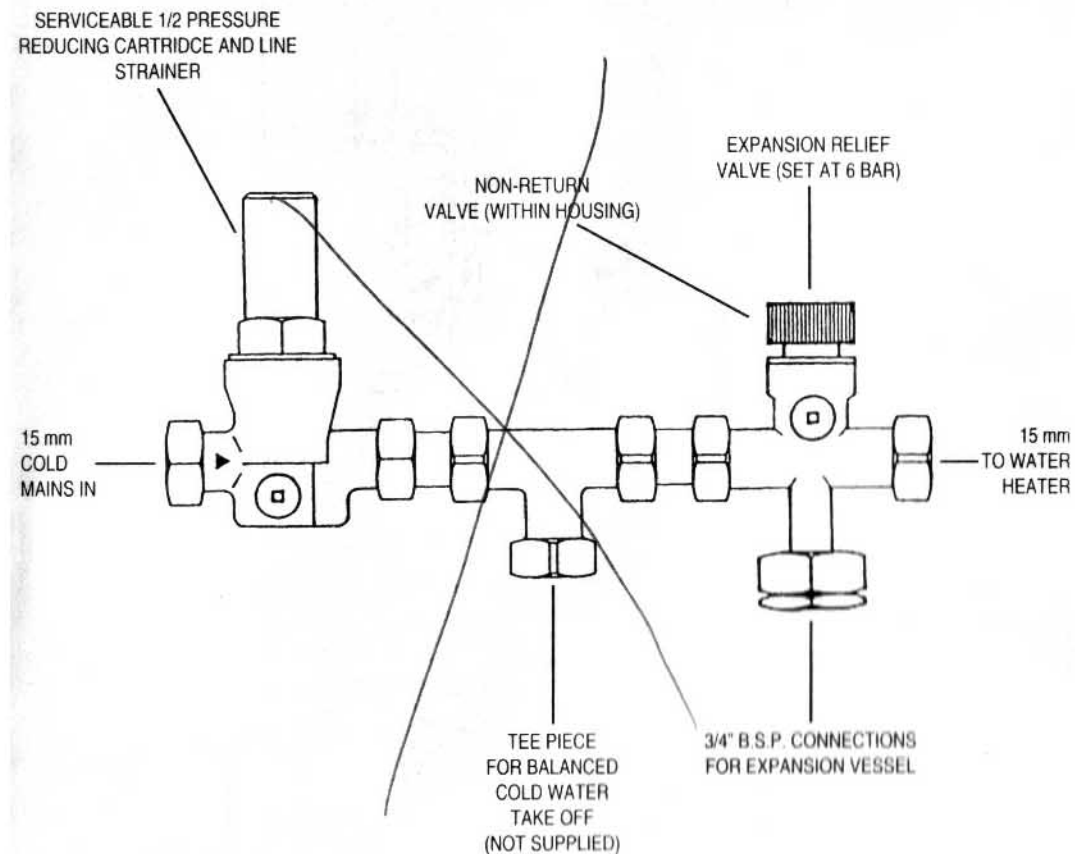


FIG. 6

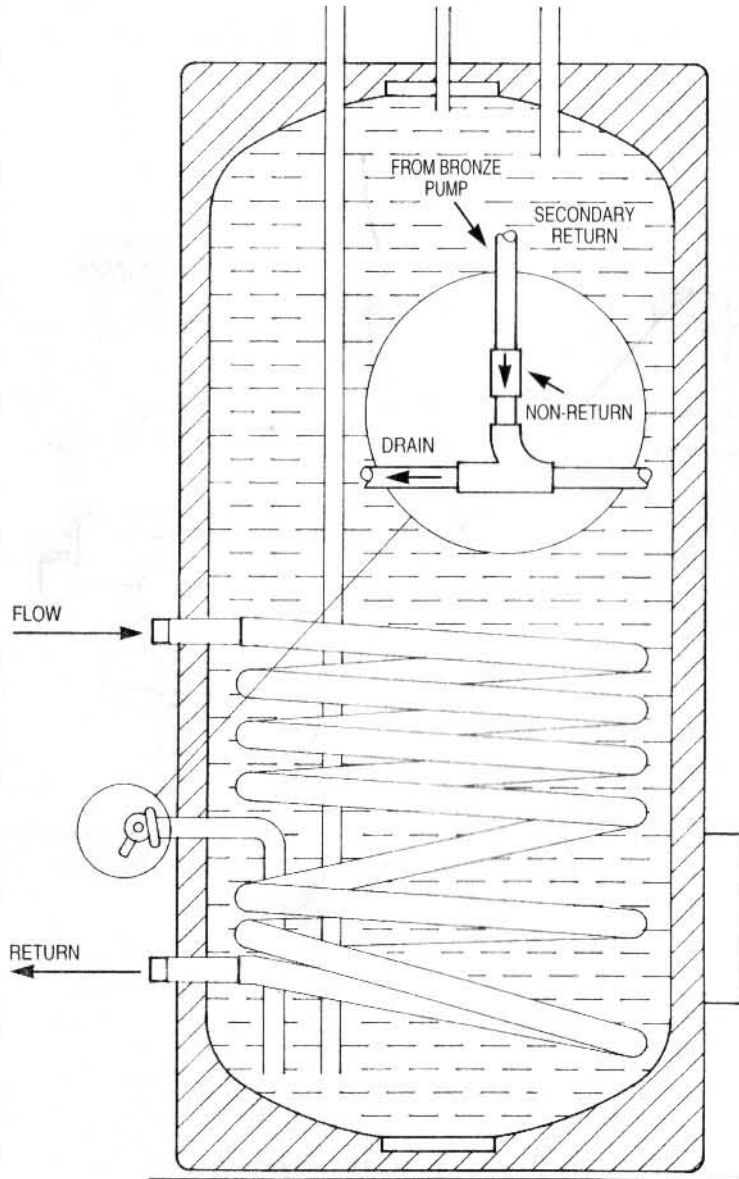


FIG. 7  
SUGGESTED WAYS OF TERMINATING  
DISCHARGING PIPES SAFETY

Fig. A

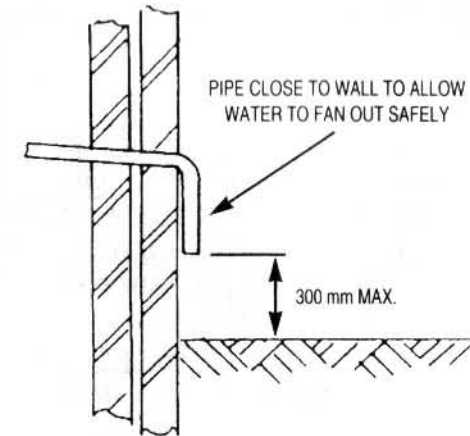
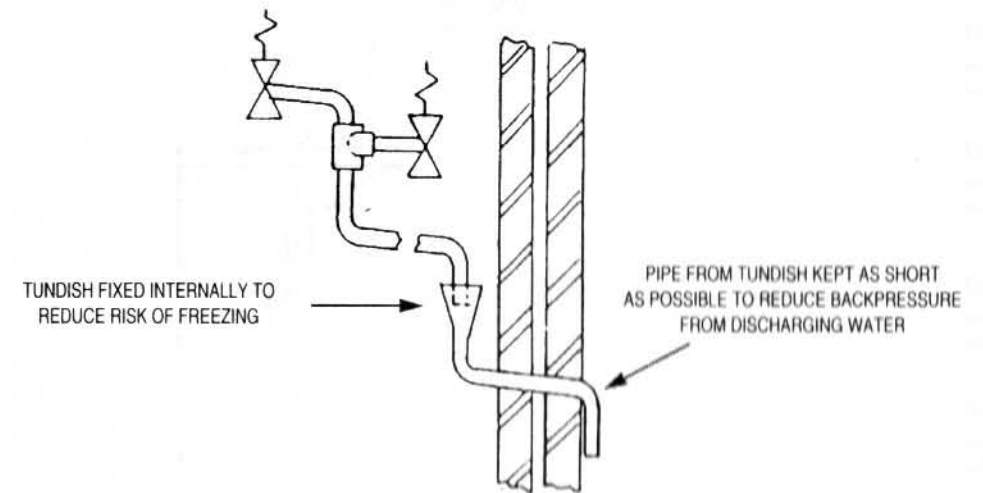
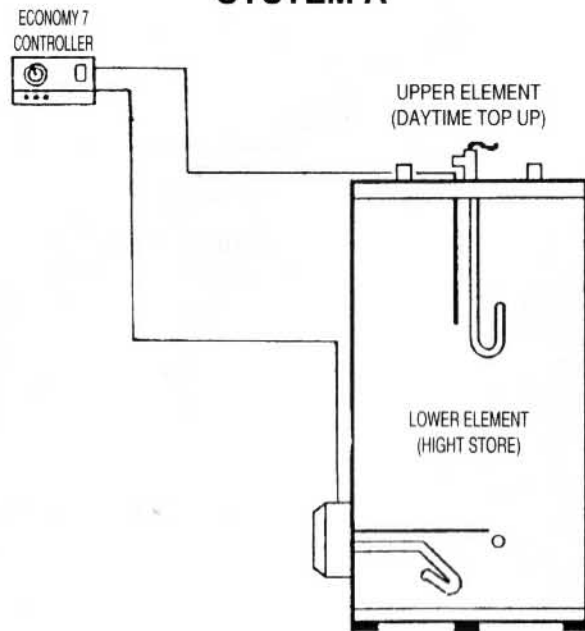


Fig. B



DIAG. 2

**FIG. 8**  
**RECOMMENDED ECONOMY 7 SYSTEMS**  
**SYSTEM A**



**SYSTEM B**

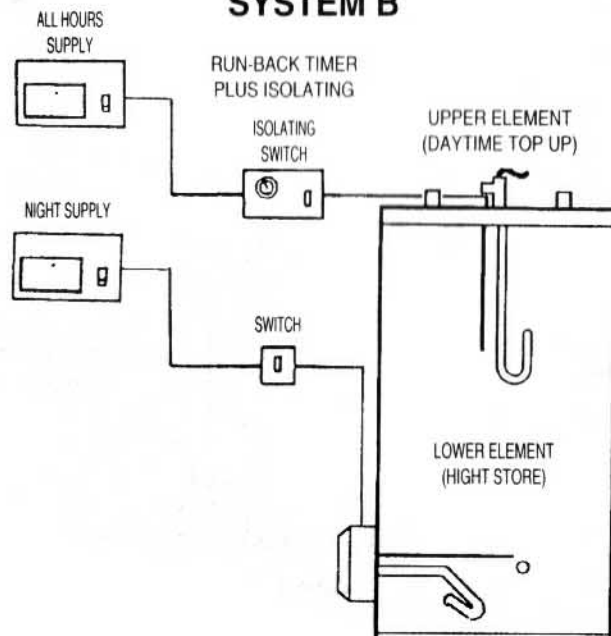
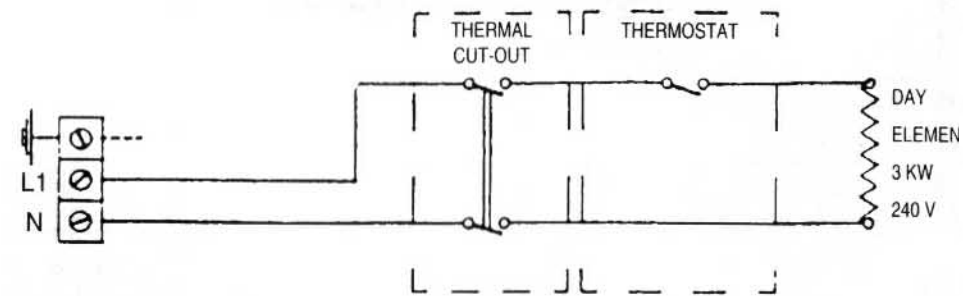
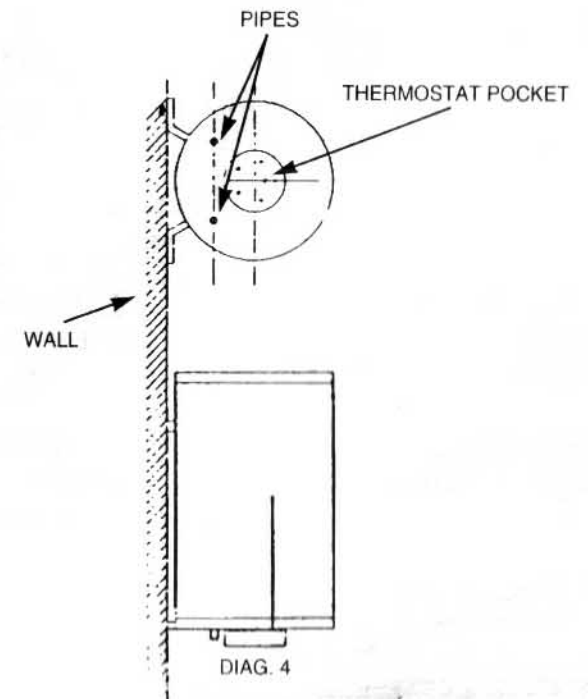


**FIG. 9**  
**a) SINGLE ELEMENT**  
**RECOMMENDED ECONOMY 7 SYSTEMS**



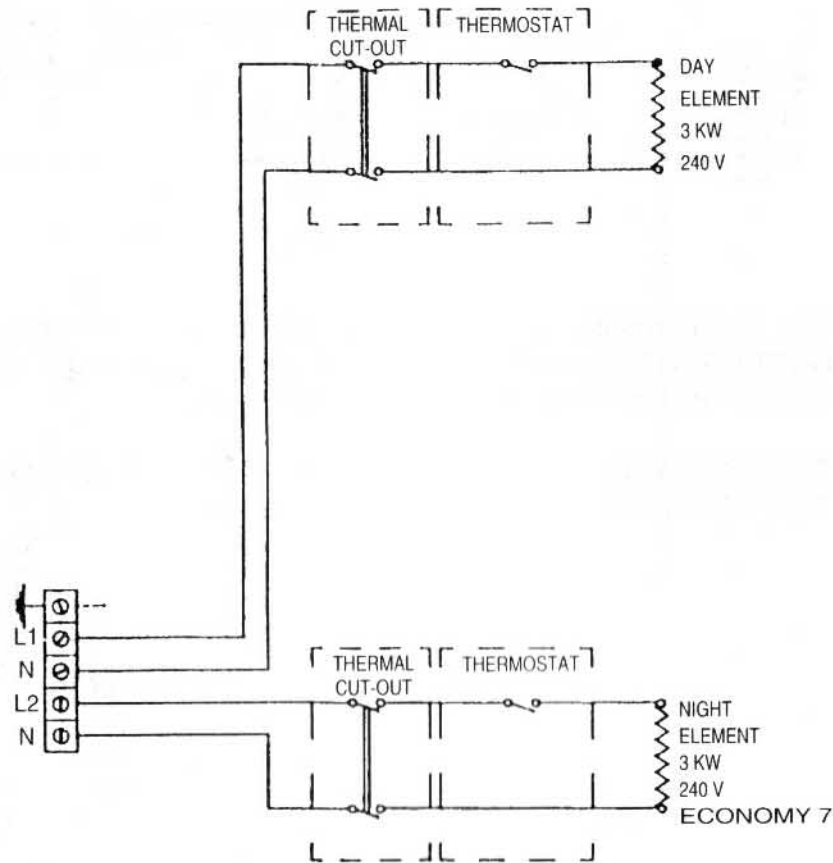
THE IMMERSION HEATER SHALL BE INSTALLED WITH 85°C RUBBER INSULATED HOFR-SHEATHED FLEXIBLE CORDS COMPLYING WITH TABLE 8 OF BS 6141 : 1981

THE FOLLOWING DRAWING MUST BE REFERRED TO BEFORE THE SIDE MOUNTED IMMERSION HEATER IS REPLACED.



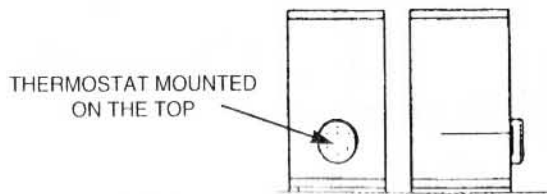
a) SINGLE ELEMENT

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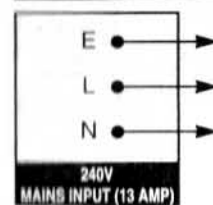
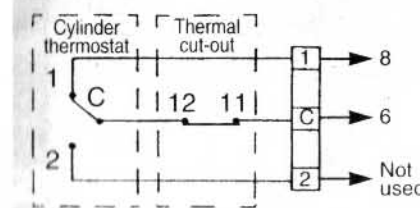
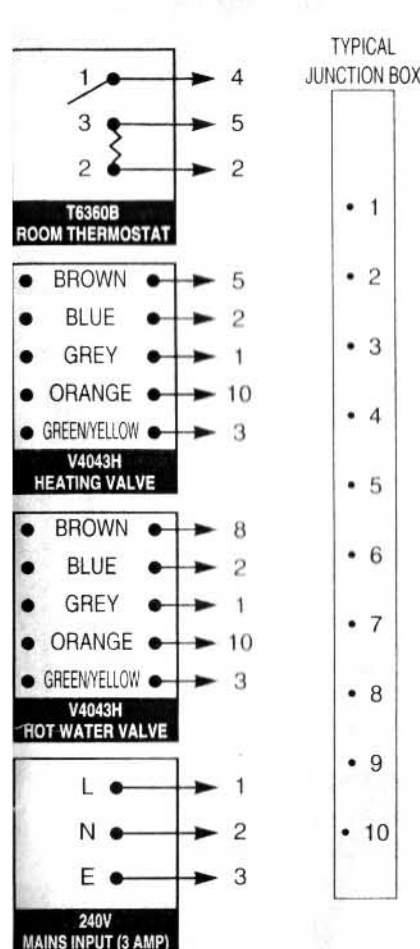


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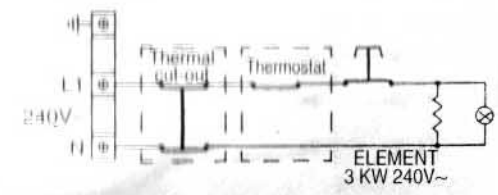
THE FOLLOWING DRAWING MUST BE REFERRED TO BEFORE  
THE SIDE MOUNTED IMMERSION HEATER IS REPLACED.



### SCHEME OF ELECTRICAL CONNECTIONS WITH 2 MOTORIZED VALVES 2 WAY

[illegible][illegible]

| 6 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| 6 | 3 | N | N | L |
| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
| 2 | 4 | N | N | L |
| 1 | 4 | N | N | - |
| 6 | 3 | N | N | L |
| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
| 2 | 4 | N | N | - |
| 1 | 4 | N | N | - |
| 6 | 3 | N | N | L |
| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
| 2 | 4 | N | N | - |
| 1 | 4 | N | N | - |
| 6 | 3 | N | N | L |
| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
| 2 | 4 | N | N | - |
| 1 | 4 | N | N | - |
| 6 | 3 | N | N | L |
| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
| 2 | 4 | N | N | - |
| 1 | 4 | N | N | - |
| 6 | 3 | N | N | L |
| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
| 2 | 4 | N | N | - |
| 1 | 4 | N | N | - |
| 6 | 3 | N | N | L |
| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
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| 5 | 3 | N | N | L |
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| 1 | 4 | N | N | - |
| 6 | 3 | N | N | L |
| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
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| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
| 2 | 4 | N | N | - |
| 1 | 4 | N | N | - |
| 6 | 3 | N | N | L |
| 5 | 3 | N | N | L |
| 4 | 4 | N | N | - |
| 3 | 4 | N | N | L |
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# Guarantee

We, MTS, guarantee that should this water heater prove to be defective by reason of faulty workmanship or material during the periods stated below, we will replace the defective parts (or product) free of charge on the condition that :

- The appliance has been correctly installed by a competent installer and used only on the supply voltage stamped on the rating plate.
- The appliance has been used and maintained in accordance with these instructions and has not been tampered with or otherwise subjected to misuse neglect or accident.
- The appliance has not been taken apart, modified or repaired except by a MTS authorised Service Engineer\*.
- Evidence of the date of purchase in the form of an invoice receipt (or hire purchase documents) is not included with the appliance returned under guarantee.

The guarantee will be applicable from the date of purchase or commencement of hire purchase for the following periods :

- 12 months on electrical parts and components
- 5 years on the cylinder tank

\* **Important** : the 5 years guarantee period on the tank will apply only if the annual inspection will have been carried out by a MTS authorised Service Engineer.

\* A MTS authorised Service Engineer is :

1. the installer of the appliance.
2. a MTS approved Service Centre
3. an engineer who has attended a MTS training course in unvented storage water heaters.

## Manufactured by

**MTS** s.a.

Zone industrielle  
5020 MALONNE (BELGIQUE)  
Tél. : (81) 448 311  
Fax : (81) 448 400  
Télex : 59345 Thorfa B

## Commercial subsidiary

### MTS (GB) LIMITED

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Hughenden Avenue  
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Bucks HP 13 5 FT  
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REF. N° 928 043/06