

# ***STREBEL***

## ***S-DW-I Indirect Water Cylinders***

***Models: 260 – 400 – 600 - 1000***

**Installation, Operating & Maintenance Manual**



Please read and understand before commencing installation and leave the manual with the customer for future reference.



**CONTENTS PAGE**

|                                                             |    |
|-------------------------------------------------------------|----|
| 1. GENERAL WARNINGS .....                                   | 4  |
| 2. INTRODUCTION .....                                       | 5  |
| 3. SPECIFIERS GUIDE .....                                   | 5  |
| 4. STANDARD EQUIPMENT .....                                 | 5  |
| 5. DIMENSIONS & TECHNICAL DATA ON THE S-DW-I CYLINDERS..... | 6  |
| 6. PERFORMANCE DATA .....                                   | 8  |
| 7. SUPPLIED IMMERSION HEATERS.....                          | 8  |
| 8. RECOMMENDED INSTALLATION SCHEMATIC .....                 | 9  |
| Safety Group .....                                          | 9  |
| Temperature & Pressure Relief Valve Kit .....               | 10 |
| Non-Return Valve .....                                      | 10 |
| Primary Pump .....                                          | 10 |
| Recirculation Pump .....                                    | 10 |
| Shut Off / Isolation Valves .....                           | 10 |
| Draining / Discharge Pipework .....                         | 10 |
| Expansion Tank / Vessel .....                               | 10 |
| Motorised Valve .....                                       | 11 |
| 9. TUNDISH.....                                             | 11 |
| 10. DISCHARGE PIPEWORK .....                                | 12 |
| G3 Requirement .....                                        | 12 |
| G3 Guidance Section 3.5 .....                               | 12 |
| The Discharge Pipe (D2) .....                               | 12 |
| Termination of discharge pipe.....                          | 12 |
| Worked Example of Discharge Pipe Sizing.....                | 12 |
| 11. WIRING INSTRUCTIONS .....                               | 14 |
| Fitting the Immersion Heaters.....                          | 15 |
| To Reset the S-DW-I High Limit Stat.....                    | 15 |
| 12. FILLING & EMPTYING OF S-DW-I TANKS .....                | 16 |
| Filling the S-DW-I Tank .....                               | 16 |
| Emptying the S-DW-I Tank .....                              | 16 |
| 13. MAINTENANCE.....                                        | 17 |
| 14. FAULT FINDING .....                                     | 18 |
| 15. DISPOSAL .....                                          | 18 |

## 1. GENERAL WARNINGS

- ! The S-DW-I tanks are manufactured to operate with drinking water of characteristics (conductivity, chemical composition etc.) within the limits legally established according to the European directive 98/83/CE, with additional clauses and exceptions mentioned in the instruction manuals of the tanks.
- ! This manual is an integral part of the appliance and is essential therefore it must be kept with care in the vicinity of the appliance itself for future consultation. It contains important information regarding safety, installation, operation, and maintenance.
- ! If the appliance should be sold or transferred to another owner, make sure that this manual stays with the unit, so as to be consulted by the new owner and / or installer.
- ! Installation must be carried out by professionally qualified personnel responsible for compliance with the current safety standards. Incorrect installation, without following the instructions given by the manufacturer may cause damage to persons, animals, or things, for which the manufacturer is not responsible.
- ! Install the tank in a place protected from ice and inclement weather.
- ! The tank is not designed to be installed outside, nor should it be installed in a damp location.
- ! Do not install the tanks in rooms intended for habitation such as bedroom, living rooms etc.
- ! The tank must be installed in a space to allow correct handling and maintenance.
- ! In the event where the tank is not heated for a long period, it is recommended that the tank is completely drained to avoid risk of damage due to frost.
- ! The manufacturer is not responsible for failure or broken parts due to frost and release of water in the system.
- ! This tank is not designed for usage by any person (children included) whose mental or sensorial abilities are any now diminished, neither by whom have not enough experience or knowledge to use it.
- ! Children should be supervised and not allowed to play with the appliance.
- ! Parts of the packaging (plastic bags, polystyrene, wood, clips, etc.) must not be left to the reach of children as this would be dangerous.
- ! To get the best results and recognition of warranties we recommend you follow the instructions below and only use original spare parts and kit provided by the manufacturer.
- ! Absolutely no tampering with any device settings and factory sealed by the manufacturer.
- ! Risk of Corrosion: The heating circuit is made if carbon steel and thus re-oxygenation of the closed primary circuit is not permitted.
- ! In combined systems, those parts of the installation that may provide oxygen must be physically isolated from the primary circuit, or materials that prevent this from occurring must be used (for example in houses with under floor heating or in the cases of swimming pool heating).
- ! The equipment should be periodically checked and verified by a qualified person according to the law of the country where the unit is installed.
- ! When replacing components, Strebel original spares parts must be used.

## 2. INTRODUCTION

The S-DW-I range of calorifiers is a “tank in tank” style water storage cylinder which comes with a 3 phase immersion heater as standard to be used as either a backup or top up.

The water contained in the surrounding tank / primary tank is heated by an external energy source (such as a gas fired boiler or heat pump) that passes through this vessel and transfers its thermal energy to the water contained in the inner tank / DHW storage tank.

The advantages of this type of calorifier as listed below:

- **Long Lasting Product:** The DHW storage tanks is made up of AISI 316 stainless steel.
- **Large Primary Surface Area:** To transfer as much heat as possible even at low primary temperatures.
- **Insulation:** Extra thick, rigid PU mould injected insulation to minimize standing heat losses stored within the DHW tank.
- **Self-Cleaning Effect:** The corrugated design of the DHW storage tank, in constant vertical movement depending on the fluctuations on the internal pressure, which assists to detach any limescale for the wall.
- **Anti-Legionella Design:** The complete surrounding of the DHW tank allows for an equal temperature thus no cold zones inside.

## 3. SPECIFIERS GUIDE

### THE LAW & UNVENTED

It is legal to fit an unvented unit into any property.

There is no longer a requirement to have an old-fashioned ‘tank in the roof’ system.

### THE BENEFITS OF THE S-DW-I CYLINDER

AISI 316 stainless steel.

High quality finish.

Low heat loss for maximum economy.

No sacrificial anode - low maintenance.

### THE BENEFITS OF UNVENTED SYSTEMS

The S-DW-I fills a bath in minutes and can run two at the same time.

The S-DW-I can work off electricity (Economy 7).

A power shower without the noisy pump.

No tanks in the roof.

No ball cocks to jam or leak.

All your water, hot and cold, direct from the mains.

Site the S-DW-I unvented water heater wherever convenient.

## 4. STANDARD EQUIPMENT

Check that all the components of your S-DW-I cylinder are contained in the kit prior to installation.

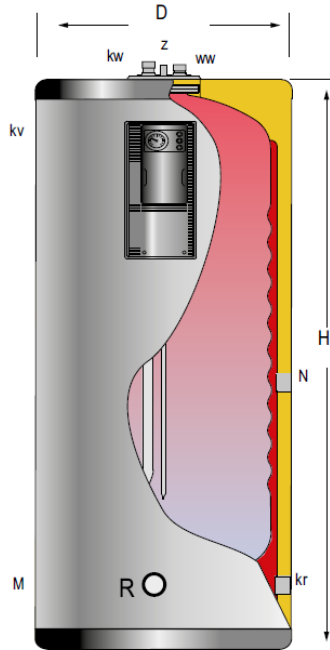
### THE S-DW-I 260 TO 1000

- **1 x 3PH Immersion Heater** – Supplied loose & requires installation onsite.
- **Temperature/Pressure Relief Valve** - Set at 95°C and 7 bar, along with 1 x s/s equal tee and 1" to 3/4" reducer which requires installation onsite.
- **K Control Panel which includes:**
  - i) **Cylinder Thermostat** - Temperature control setting 0-75°C.
  - ii) **Thermal Cut-Out** - Set to operate at 90°C +/-5°C.
  - iii) **Thermometer** – Temperature ranging from 0-120°C.
  - iv) **Summer / Winter Switch** – To activate / deactivate the immersion heater.
- **Secondary Return** – On all models.

## 5. DIMENSIONS & TECHNICAL DATA ON THE S-DW-I CYLINDERS

### S-DW-I 260

PLEASE NOTE: ALLOW 300MM CLEARANCE ABOVE S-DW-I FOR INSTALLATION OF T&P KIT - SEE CHAPETR 8.



#### MAIN CHARACTERISTICS

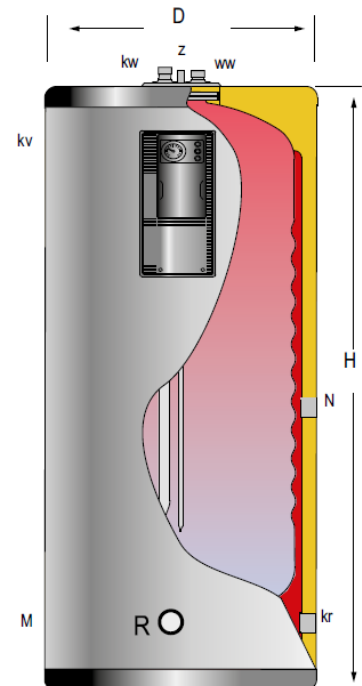
|                              |                                    |            |     |
|------------------------------|------------------------------------|------------|-----|
| Total capacity:              | Total / DHW Tank                   | 252 / 196  | L   |
| Maximum working pressure:    | Primary / Secondary                | 3 / 8      | bar |
| Maximum working temperature: | Primary / Secondary                | 110 / 90   | °C  |
| Exchange surface:            | DHW tank wall                      | 1.9        | m²  |
| Connections:                 | kv: primary inlet                  | 1          | " F |
|                              | kr: primary outlet                 | 1          | " F |
|                              | ww: DHW outlet                     | ¾          | " M |
|                              | kw: cold water inlet / drain       | ¾          | " M |
|                              | z: recirculation                   | ¾          | " M |
|                              | R: connection for electric element | 2          | " F |
|                              | N: primary side connection         | 1          | " F |
|                              | M: primary side connection         | 1          | " F |
| Energy efficiency:           | ErP Class                          | B          |     |
|                              | Static heat losses acc. to EN12897 | 61         | W   |
| External dimensions:         | D: Diameter                        | 560        | mm  |
|                              | H: Height (without connections)    | 1780       | mm  |
|                              | Diagonal (without connections)     | 1867       | mm  |
| Packaging dimensions:        | Width / Height                     | 575 / 1925 | mm  |
| Weight:                      | Without packaging / With packaging | 80 / 91    | kg  |

### S-DW-I 400

PLEASE NOTE: ALLOW 300MM CLEARANCE ABOVE S-DW-I FOR INSTALLATION OF T&P KIT - SEE CHAPETR 8.

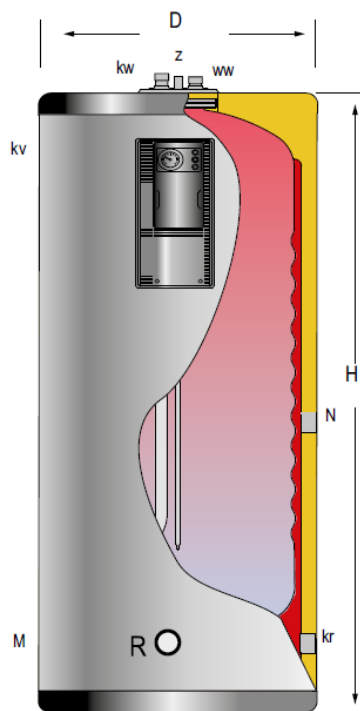
#### MAIN CHARACTERISTICS

|                              |                                    |            |     |
|------------------------------|------------------------------------|------------|-----|
| Total capacity:              | Total / DHW Tank                   | 365 / 265  | L   |
| Maximum working pressure:    | Primary / Secondary                | 3 / 8      | bar |
| Maximum working temperature: | Primary / Secondary                | 110 / 90   | °C  |
| Exchange surface:            | DHW tank wall                      | 2.2        | m²  |
| Connections:                 | kv: primary inlet                  | 1 ½        | " F |
|                              | kr: primary outlet                 | 1 ½        | " F |
|                              | ww: DHW outlet                     | 1          | " M |
|                              | kw: cold water inlet / drain       | 1          | " M |
|                              | z: recirculation                   | 1          | " M |
|                              | R: connection for electric element | 2          | " F |
|                              | N: primary side connection         | 1 ½        | " F |
|                              | M: primary side connection         | 1 ½        | " F |
| Energy efficiency:           | ErP Class                          | B          |     |
|                              | Static heat losses acc. to EN12897 | 99         | W   |
| External dimensions:         | D: Diameter                        | 620        | mm  |
|                              | H: Height (without connections)    | 1725       | mm  |
|                              | Diagonal (without connections)     | 1833       | mm  |
| Packaging dimensions:        | Width / Height                     | 640 / 1900 | mm  |
| Weight:                      | Without packaging / With packaging | 90 / 98    | kg  |



### S-DW-I 600

**PLEASE NOTE: ALLOW 300MM CLEARANCE ABOVE S-DW-I FOR INSTALLATION OF T&P KIT - SEE CHAPETR 8.**



#### MAIN CHARACTERISTICS

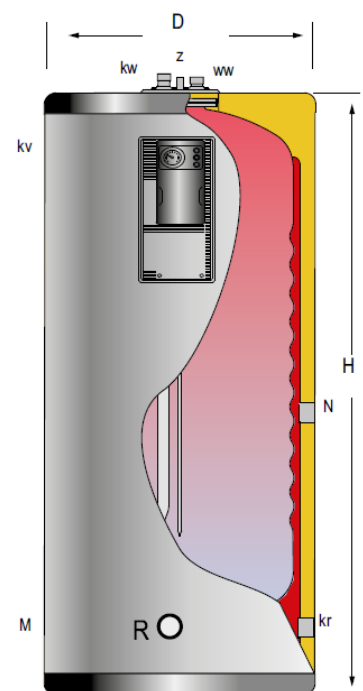
|                              |                                    |            |     |
|------------------------------|------------------------------------|------------|-----|
| Total capacity:              | Total / DHW Tank                   | 608 / 433  | L   |
| Maximum working pressure:    | Primary / Secondary                | 3 / 8      | bar |
| Maximum working temperature: | Primary / Secondary                | 110 / 90   | °C  |
| Exchange surface:            | DHW tank wall                      | 2.8        | m²  |
| Connections:                 | kv: primary inlet                  | 1 ½        | " F |
|                              | kr: primary outlet                 | 1 ½        | " F |
|                              | ww: DHW outlet                     | 1          | " M |
|                              | kw: cold water inlet / drain       | 1          | " M |
|                              | z: recirculation                   | 1          | " M |
|                              | R: connection for electric element | 2          | " F |
|                              | N: primary side connection         | 1 ½        | " F |
|                              | M: primary side connection         | 1 ½        | " F |
| Energy efficiency:           | ErP Class                          | C          |     |
|                              | Static heat losses acc. to EN12897 | 103        | W   |
| External dimensions:         | D: Diameter                        | 770        | mm  |
|                              | H: Height (without connections)    | 1730       | mm  |
|                              | Diagonal (without connections)     | 1894       | mm  |
| Packaging dimensions:        | Width / Height                     | 790 / 2000 | mm  |
| Weight:                      | Without packaging / With packaging | 90 / 98    | kg  |

### S-DW-I 1000

**PLEASE NOTE: ALLOW 300MM CLEARANCE ABOVE S-DW-I FOR INSTALLATION OF T&P KIT - SEE CHAPETR 8.**

#### MAIN CHARACTERISTICS

|                              |                                    |                    |     |
|------------------------------|------------------------------------|--------------------|-----|
| Total capacity:              | Total / DHW Tank                   | 955 / 712          | L   |
| Maximum working pressure:    | Primary / Secondary                | 3 / 8              | bar |
| Maximum working temperature: | Primary / Secondary                | 110 / 90           | °C  |
| Exchange surface:            | DHW tank wall                      | 4.0                | m²  |
| Connections:                 | kv: primary inlet                  | 1 ½                | " F |
|                              | kr: primary outlet                 | 1 ½                | " F |
|                              | ww: DHW outlet                     | 1                  | " M |
|                              | kw: cold water inlet / drain       | 1                  | " M |
|                              | z: recirculation                   | 1                  | " M |
|                              | R: connection for electric element | 2                  | " F |
|                              | N: primary side connection         | -                  | " F |
|                              | M: primary side connection         | 1 ½                | " F |
| Energy efficiency:           | ErP Class                          | C                  |     |
|                              | Static heat losses acc. to EN12897 | 113                | W   |
| External dimensions:         | D: Diameter                        | 950                | mm  |
|                              | H: Height (without connections)    | 2250               | mm  |
|                              | Diagonal (without connections)     | 2442               | mm  |
| Packaging dimensions:        | Width / Height                     | 1030 X 1000 / 2460 | mm  |
| Weight:                      | Without packaging / With packaging | 239 / 288          | kg  |



## 6. PERFORMANCE DATA

### 45°C DHW Flow Temperature

| Continuous flow DHW production<br>(l/hour) 10°C - 45°C | PRIMARY INPUT TEMPERATURE °C |                          | 55 °C |           | 70 °C |           | 80 °C |           | 90 °C |           |
|--------------------------------------------------------|------------------------------|--------------------------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|
|                                                        | tank model                   | primary pump flow (m³/h) | KW    | DHW (l/h) | KW    | DHW (l/h) | KW    | DHW (l/h) | KW    | DHW (l/h) |
|                                                        | S-DW-I 260                   | 3                        | 16    | 400       | 31    | 790       | 44    | 1070      | 54    | 1305      |
|                                                        |                              | 5                        | 18    | 420       | 35    | 870       | 49    | 1180      | 59    | 1405      |
|                                                        |                              | 8                        | 19    | 440       | 38    | 925       | 51    | 1270      | 65    | 1600      |
|                                                        | S-DW-I 400                   | 3                        | 19    | 450       | 36    | 900       | 50    | 1210      | 61    | 1510      |
|                                                        |                              | 5                        | 20    | 495       | 41    | 1010      | 55    | 1350      | 66    | 1670      |
|                                                        |                              | 8                        | 21    | 510       | 44    | 1050      | 60    | 1505      | 75    | 1860      |
|                                                        | S-DW-I 600                   | 3                        | 21    | 550       | 41    | 1005      | 56    | 1370      | 71    | 1800      |
|                                                        |                              | 5                        | 22    | 580       | 45    | 1120      | 61    | 1510      | 81    | 2000      |
| 8                                                      |                              | 24                       | 600   | 50        | 1210  | 68        | 1660  | 90        | 2200  |           |
| S-DW-I 1000                                            | 2                            | 25                       | 625   | 45        | 1100  | 65        | 1600  | 95        | 2330  |           |
|                                                        | 4                            | 37                       | 900   | 58        | 1400  | 85        | 2075  | 118       | 2900  |           |
|                                                        | 6                            | 40                       | 1000  | 65        | 1600  | 93        | 2300  | 132       | 3250  |           |

### 60°C DHW Flow Temperature

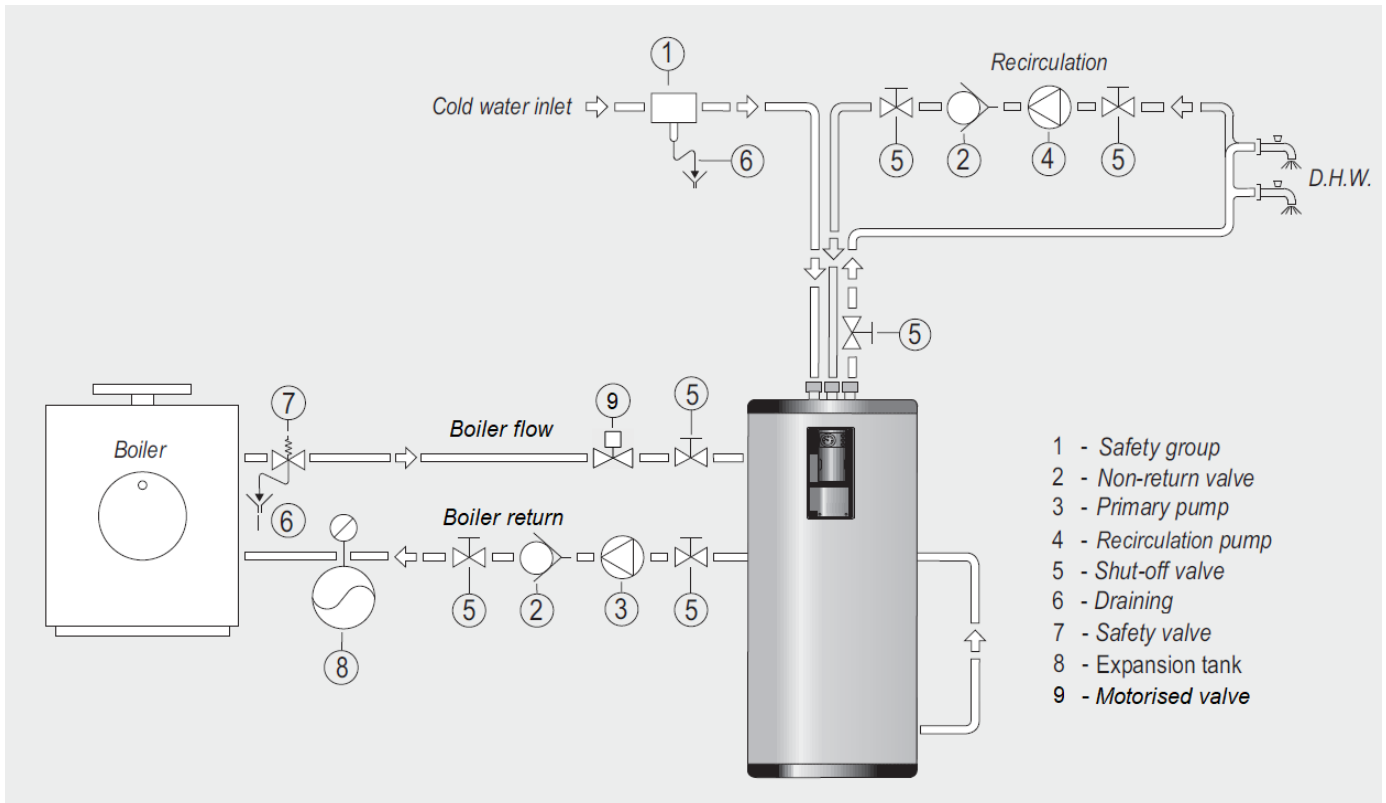
| [Continuous flow DHW production<br>(l/hour) 10°C - 60°C] | PRIMARY INPUT TEMPERATURE °C |                          | 70 °C |           | 80 °C |           | 90 °C |           |
|----------------------------------------------------------|------------------------------|--------------------------|-------|-----------|-------|-----------|-------|-----------|
|                                                          | tank model                   | primary pump flow (m³/h) | KW    | DHW (l/h) | KW    | DHW (l/h) | KW    | DHW (l/h) |
|                                                          | S-DW-I 260                   | 3                        | 22    | 345       | 34    | 600       | 45    | 760       |
|                                                          |                              | 5                        | 25    | 430       | 37    | 650       | 50    | 855       |
|                                                          |                              | 8                        | 26    | 455       | 40    | 700       | 55    | 950       |
|                                                          | S-DW-I 400                   | 3                        | 25    | 440       | 40    | 695       | 51    | 890       |
|                                                          |                              | 5                        | 28    | 490       | 44    | 750       | 57    | 1000      |
|                                                          |                              | 8                        | 30    | 505       | 47    | 805       | 61    | 1055      |
|                                                          | S-DW-I 600                   | 3                        | 29    | 500       | 45    | 780       | 61    | 1070      |
|                                                          |                              | 5                        | 32    | 550       | 50    | 860       | 70    | 1200      |
| 8                                                        |                              | 35                       | 600   | 55        | 910   | 76        | 1300  |           |
| S-DW-I 1000                                              | 2                            | 32                       | 580   | 55        | 950   | 82        | 1400  |           |
|                                                          | 4                            | 41                       | 700   | 68        | 1180  | 105       | 1740  |           |
|                                                          | 6                            | 46                       | 800   | 75        | 1300  | 112       | 1910  |           |

## 7. SUPPLIED IMMERSION HEATERS

The 3PH immersion heaters for the S-DW-I 260 to 1000 models are supplied as loose as standard.

| Threaded immersion electric heating, specific for primary heating circuit. |      |             |        |                   |
|----------------------------------------------------------------------------|------|-------------|--------|-------------------|
| electric element model                                                     | KW   | V           | length | tank models       |
| RI 4/2-72                                                                  | 7,2  | 230 / 3-400 | 445    | S-DW-I 260        |
| RI 4/2-90                                                                  | 9,0  | 230 / 3-400 | 505    | S-DW-I 400        |
| RI 4/2-120                                                                 | 12,0 | 230 / 3-400 | 680    | S-DW-I 600 & 1000 |

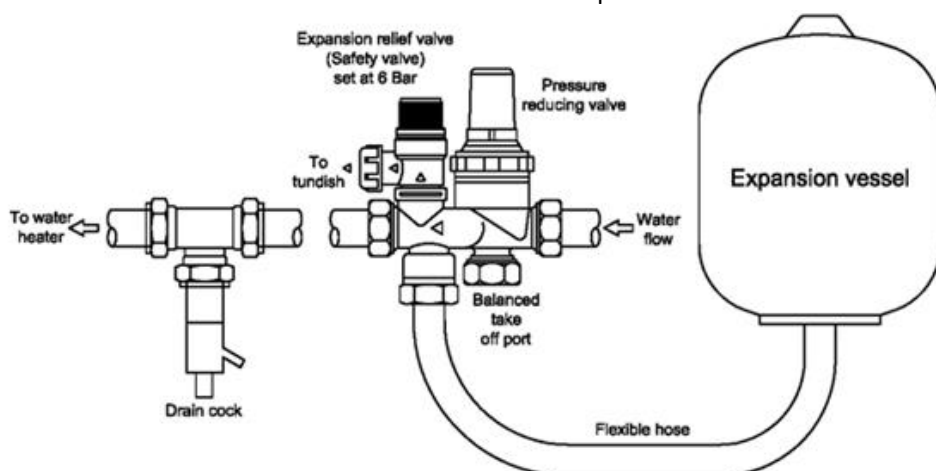
## 8. RECOMMENDED INSTALLATION SCHEMATIC



### Safety Group

The safety group (commonly known as an unvented kit) is to be connected on the cold water in before the S-DW-I tank to allow the tank to operate from the cold-water mains. This safety group is to consist of:

- 1 x Pressure reducing valve with integral strainer.
- 1 x Check valve core assembly with integral balanced cold water take off connection (blanked) and expansion vessel connection.
- 1 x Potable expansion relief valve – setting 6 bar.
- 1 x Potable expansion vessel – volume sized to 10% of DHW storage tank.
- 1 x Aluminium braided hose for connection between the expansion vessel and check valve core assembly.



**DO NOT INSTALL A NON-RETURN VALVE IN BETWEEN THE ABOVE KIT AND THE S-DW-I TANK!**  
**RECOMMEND INSTALLING A STOP COCK BEFORE SAFETY KIT TO ALLOW DRAIN DOWN OF THE S-DW-I & SAFTEY GROUP**

### Temperature & Pressure Relief Valve Kit

The S-DW-I temperature & pressure relief valve kit consists of:

- 1 x ¾" Temperature and pressure relief valve set to 7 bar & 95°C.
- 1 x Stainless steel equal tee (F x F x F)
  - i) ¾" stainless steel tee for the S-DW-I 260
  - ii) 1" stainless steel tee for the S-DW-I 400 to 1000.
- 1 x 1" to ¾" stainless steel reducer for S-DW-I 400 to 1000.

The temperature and pressure relief valve kit is required to be fitted onsite to the DHW outlet connection on top of the S-DW-I tank. The order of installation for this kit must be that the tee piece is fitted first, in an orientation where there is an open end of the tee piece vertically and an open end horizontally.

The temperature and pressure relief valve is then fitted to the vertical open end (combined with the reducer on S-DW-I 400 to 1000) so that the sensing probe on this valve inserts into the top of the S-DW-I cylinder.

The DHW outlet pipework is connected to the horizontal open end.

### Non-Return Valve

A non-return valve must be installed on the primary circuit and the secondary return to prevent back flow.

### Primary Pump

If the primary heat source (such as a boiler or a heat pump) either does not have a shunt pump or has a shunt pump but is not sized to match the S-DW-I primary circuit requirements, then an external primary pump will be required between the heat source and the S-DW-I tank.

With the schematic on the previous page, this shows that the boiler does not have an internal shunt pump. With this type of setup please ensure the primary pump is sized correctly to match the flow rates of both the boiler and the S-DW-I, as well as being sized to overcome the total resistance of the boiler, S-DW-I and the primary pipework, including all valves installed on the primary pipework.

In cases where the heat source does have a primary pump but is unable to meet the S-DW-I primary requirements (flow rate & resistance) then a correctly sized hydraulic diverter would be required (such as a low loss header or SMH boiler guard) after the heat source. This will allow for the heat source shunt pump to flow around the hydraulic diverter and back to the heat source, thus allowing for the heat source to operate at its own flow rate and reduce the resistance the shunt pump has to overcome. A primary pump can then be installed after the hydraulic diverter sized to match the S-DW-I primary requirements.

### Recirculation Pump

A bronze pump will be required to circulate the secondary hot water around the DHW system.

### Shut Off / Isolation Valves

Shut off / isolation valves are required so that the S-DW-I tank can be isolated from the system and allow a drain down of both the primary tank and secondary tank for maintenance purposes.

**Please note: The isolation valves shown on the secondary flow out and the secondary return (as shown within the schematic on the previous page) is a must, otherwise the inner secondary tank will not be able to be drained down.**

### Draining / Discharge Pipework

See chapter 10 = Discharge Pipework.

### Expansion Tank / Vessel

There are two types of expansion vessels required:

- i) Heating Expansion Vessel: This expansion vessel is to be sized to cover the expansion of water between the heat source and the primary tank of the S-DW-I.
- ii) Potable Expansion Vessel: This expansion vessel is to be sized to cover the expansion of water within the DHW secondary circuit.

**Please note: Although there is commonly a potable expansion vessel within the unvented kit (safety group), a second potable expansion vessel may be required on large DHW circuits to cover the large water volume within DHW pipework.**

### Motorised Valve

To comply with regulations and to prevent the temperature reaching 100°C the thermal cut-out supplied must be fitted. The thermal cut-out is wired in series to the cylinder thermostat. When the thermal cut-out senses an abnormal rise in temperature in the primary flow the electrical supply to the motorised valve will be cut and the valve will return to the closed position. This will cut-off the primary water from the heat source to the primary tank within the S-DW-I. If the S-DW-I high limit cut-out operates, it must be reset manually. Check the cylinder stat and/or boiler stat.

## **9. TUNDISH**

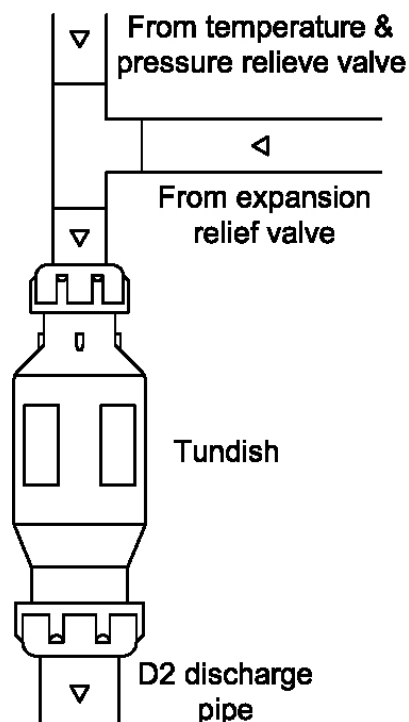
A tundish (not supplied) must be fitted so it is visible to the occupier. Regulations do not permit more than 3 x 90-degree bends between the S-DW-I unit and the outflow.

Between the temperature & pressure relief valve and the first 90-degree bend there must be a fall of at least 300mm. The fall of the pipework must be continuous, and the pipe should terminate in the gully or be bent backwards onto an outside wall, in a place where discharge cannot be injurious to persons.

As an example, using a 22mm copper pipe, if you need to site the S-DW-I unit in the middle of the house your discharge pipe to the tundish can be as far away as 9m, which in most cases is enough to run the final discharge point. After 9m, increase the pipe size to a greater diameter than 22mm and accordingly for subsequent 9m lengths, (see table 1 under chapter 10 – Discharge pipework).

### Tundish Installation

**IMPORTANT: REGULAR CHECKS SHOULD BE CARRIED OUT TO ENSURE THAT THE EXPANSION VESSEL IS ALWAYS CORRECTLY PRESSURISED TO 3.5 BAR.**



## 10. DISCHARGE PIPEWORK

### G3 Requirement

'...there shall be precautions...to ensure that the hot water discharged from safety devices is safely conveyed to where it is visible but will not cause danger to persons in or about the building.'

### G3 Guidance Section 3.5

The discharge pipe (D1) from the vessel up to and including tundish is generally supplied by the manufacturer of the hot water storage system. Where otherwise the installation should include the discharge pipe(s) (D1) from the safety device(s). In either case the tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible to, and lower than, the safety device, with no more than 600mm of pipe between the valve outlet and the tundish (See Figure 13).

### The Discharge Pipe (D2)

The discharge pipe (D2) from the tundish should:

- Have a vertical section of pipe at least 300mm long below the tundish before any elbows or bends in the pipework (see Figure13).
- Be installed with a continuous fall of at least 1 in 200 thereafter.

The discharge pipe (D2) should be made of metal or other material that has been demonstrated to be capable of safely withstanding temperatures of the water discharged and is clearly and permanently marked to identify the product and performance standard (e.g., as specified in the relevant part of BS 7291-1:2006 Thermostatic pipes and fittings for hot and cold water for domestic purposes and heating installations in buildings, General Requirements).

### Termination of discharge pipe

The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge.

Examples of acceptable discharge arrangements are:

- To a trapped gully with the end of the pipe below a fixed grating and above the water seal.
- Downward discharges at low level, i.e., up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.

Discharges at high level: e.g., into a metal hopper and metal downpipe with the end of the discharge pipe clearly visible or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering system that would collect such discharges.

The discharge would consist of high temperature water and steam. Asphalt, roofing felt, and non-metallic rainwater goods may be damaged by such discharges

### Worked Example of Discharge Pipe Sizing

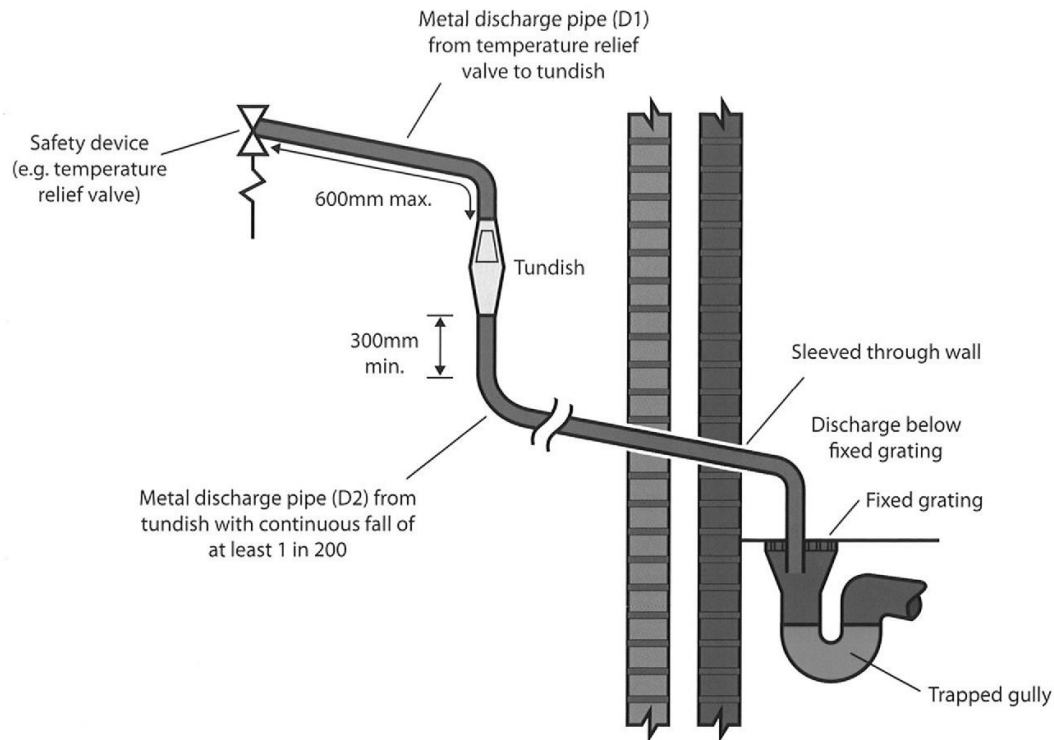
The example below is for a G ½" temperature relief valve with a discharge pipe (D2) having 4 No elbows and length of 7m from the tundish to the point of discharge. From table 1: (overleaf)

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from G1/2 temperature relief valve is 9m. Subtract the resistance for 4 No 22mm elbows at 0.8m each = 3.2m, therefore the permitted length equates to 5.8m. This is less than the actual length of 7m therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm pipe (D2) from a G1/2 temperature relief valve equates to 18m Subtract the resistance of 4 No 28mm elbows at 1m each = 4m.

Therefore, the maximum permitted length equates to 14m. As the actual length is 7m a 28mm (D2) copper pipe will be satisfactory.

**IMPORTANT: THE DISCHARGE WILL CONSIST OF SCALDING WATER AND STEAM. ASPHALT, ROOFING FELT AND NON-METALLIC RAINWATER GOODS MAY BE DAMAGED BY SUCH DISCHARGES.**

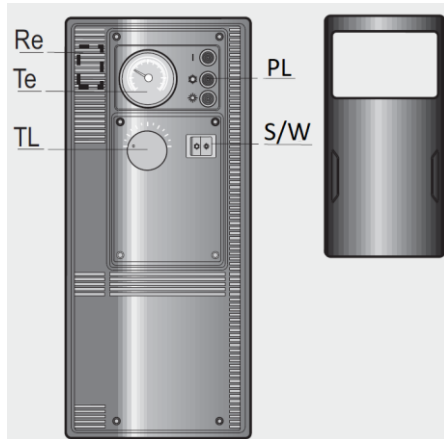


**Table 1.** Sizing of copper discharge pipe (D2) for common temperature & pressure relief valve sizes

| Valve outlet size | Minimum size of discharge pipe D1 | Minimum size of discharge pipe D2 | Minimum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends) | Resistance created by each elbow or bend |
|-------------------|-----------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------|
| G ½               | 15mm                              | 22mm                              | Up to 9m                                                                                     | 0.8m                                     |
|                   |                                   | 28mm                              | Up to 18m                                                                                    | 1.0m                                     |
|                   |                                   | 35mm                              | Up to 27m                                                                                    | 1.4m                                     |
| G ¾               | 22mm                              | 28mm                              | Up to 9m                                                                                     | 1.0m                                     |
|                   |                                   | 35mm                              | Up to 18m                                                                                    | 1.4m                                     |
|                   |                                   | 42mm                              | Up to 27m                                                                                    | 1.7m                                     |
| G 1               | 28mm                              | 35mm                              | Up to 9m                                                                                     | 1.4m                                     |
|                   |                                   | 42mm                              | Up to 18m                                                                                    | 1.7m                                     |
|                   |                                   | 54mm                              | Up to 27m                                                                                    | 2.3m                                     |

## 11. WIRING INSTRUCTIONS

**WARNING: ALL ELECTRICAL WIRING SHOULD BE CARRIED OUT BY A COMPETENT ELECTRICAL CONTRACTOR AND MUST CONFORM TO THE LATEST IEE WIRING REGULATIONS. DO NOT SWITCH THE POWER ON UNTIL THE UNIT HAS BEEN FILLED WITH WATER AND ALL WIRING HAS BEEN EARTHED.**



PL: Pilot Indicator Lights

S/W: Summer / Winter Switch

- i) Summer = Immersion heater activated.
- ii) Winter = Heat Source heating the S-DW-I.

TL: Control thermostat and High Limit Stat.

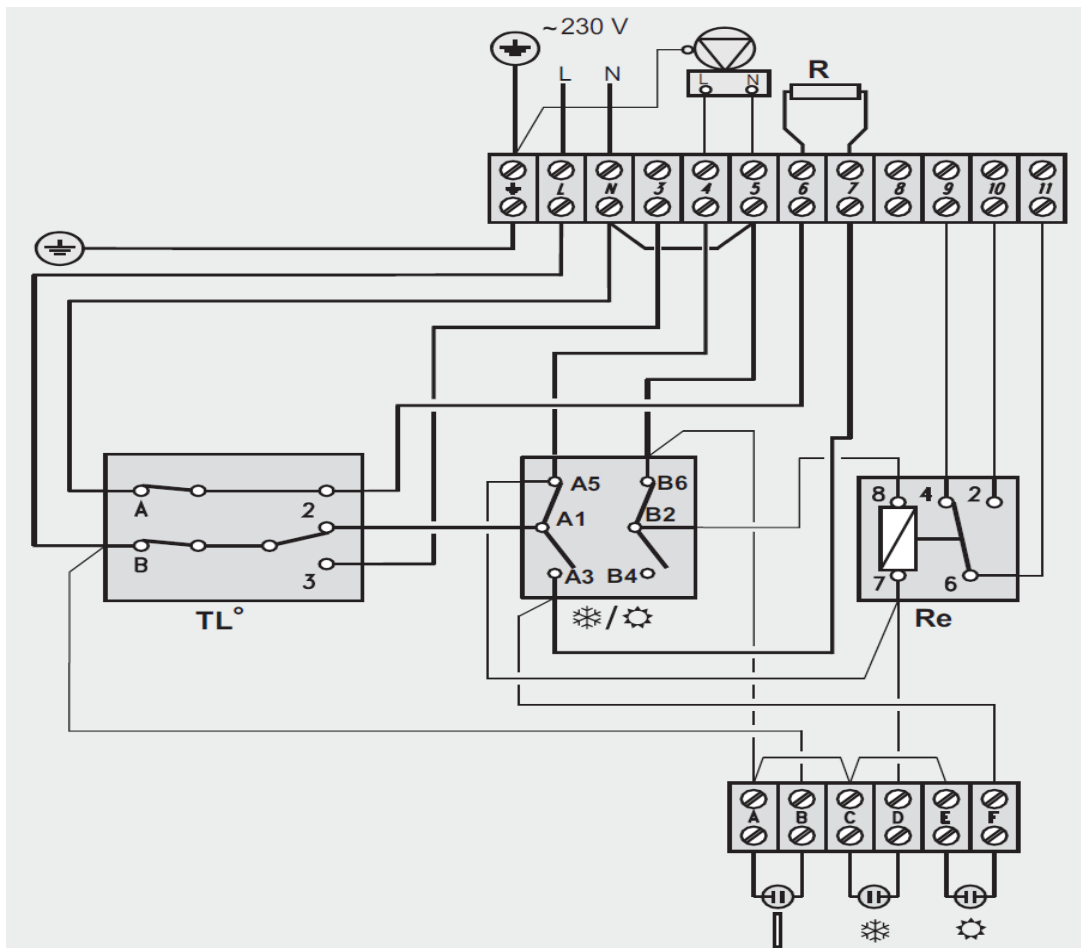
Te: DHW Thermometer.

Re: Internal relay.

R: 230v to Switch on relay for immersion heater.

K: External contactor (not supplied) for immersion heater.

Wiring Diagram of the K Type Control Panel



All the internal components within the K control panel come pre-wired.

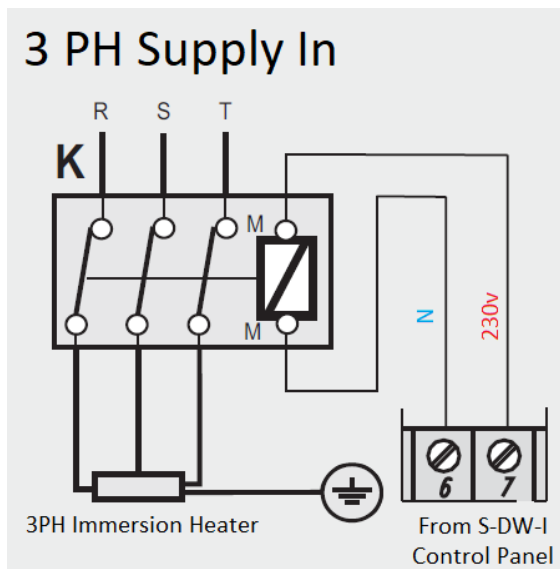
All external components such as a DHW primary pump and 230v supply to auxiliary switch on the external contactor for immersion heater will need to be wired up at installation stage onsite.

### Fitting the Immersion Heaters

The supplied 3 phase immersion heaters are designed to screw into the 2" threaded fitting to the S-DW-I tank. **Take care not to cross thread and please ensure both the inner and outer tank are empty.**

The heating element is **NOT** fitted with a control thermostat or a thermal cut-out for safety.

To use the control thermostat and the high limit thermostat within the S-DW-I control panel, an external contactor must be used with a 230v live switch relay.



With the DHW temperature below the control thermostat setting and the immersion heater activated, a 230v live supply will flow from terminal 7 into the 230v switch within the external contactor. With the 230v switch made, this will close the 3ph switch thus allowing the 3ph supply to flow through the external contactor and turn on the immersion heater.

Once the S-DW-I control thermostat reads the DHW is up to temperature, the 230v supply will disappear from terminal 7, which will cause the 230v switch on the external contactor to open thus preventing the 3ph supply to flow through the external contactor and turn off the immersion heater.

If the S-DW-I high limit stat trips, the supply from terminals 6 & 7 will also open the 230v switch on the external contactor until the manual reset button is pressed.

### To Reset the S-DW-I High Limit Stat

1. Electrically isolate the calorifier.
2. Remove the control panel from the S-DW-I (remove the 4 fixing screws retaining the control panel and carefully rotate the control panel to expose electrical connections and thermostat).
3. Remove the thermostat knob by pulling off the control thermostat spindle.
4. Remove thermostat fixing screwed and allow the thermostat to move away from inside face of control panel.
5. Press reset pin marked "S" on thermostat body (adjacent to control spindle).
6. Reassemble control panel by completing the above procedure in reverse.

If the S-DW-I control thermostat & high limit stat is not used to control the immersion heater then please ensure you install the appropriate safety devices, such as control thermostat and a manual reset high limit stat in line with the 3ph supply to the immersion heaters to prevent overheating within the S-DW-I cylinder.

Further recommendations with installing the immersion heaters:

- Installation, configuration, start up and maintenance of heating elements must be carried out by an authorised electrical fitter. All current standards and regulations must be observed.
- We recommend installing appropriate safety devices (temperature safety device, safety level for heating liquids by natural convection, flow safety device for liquids in circulation, etc.)
- The installation must have an all-pole cut off device, with a separation of 3 mm or more between contacts as well as automatic protection systems.
- The user is responsible for ensuring that the essential requirements of the European Low Voltage Directive are respected.
- Electric heating elements generate high temperatures. Precautions should be taken to protect goods and persons from the risk of fire and accidental burns during operation and after the equipment has been disconnected or installed.

## 12. FILLING & EMPTYING OF S-DW-I TANKS

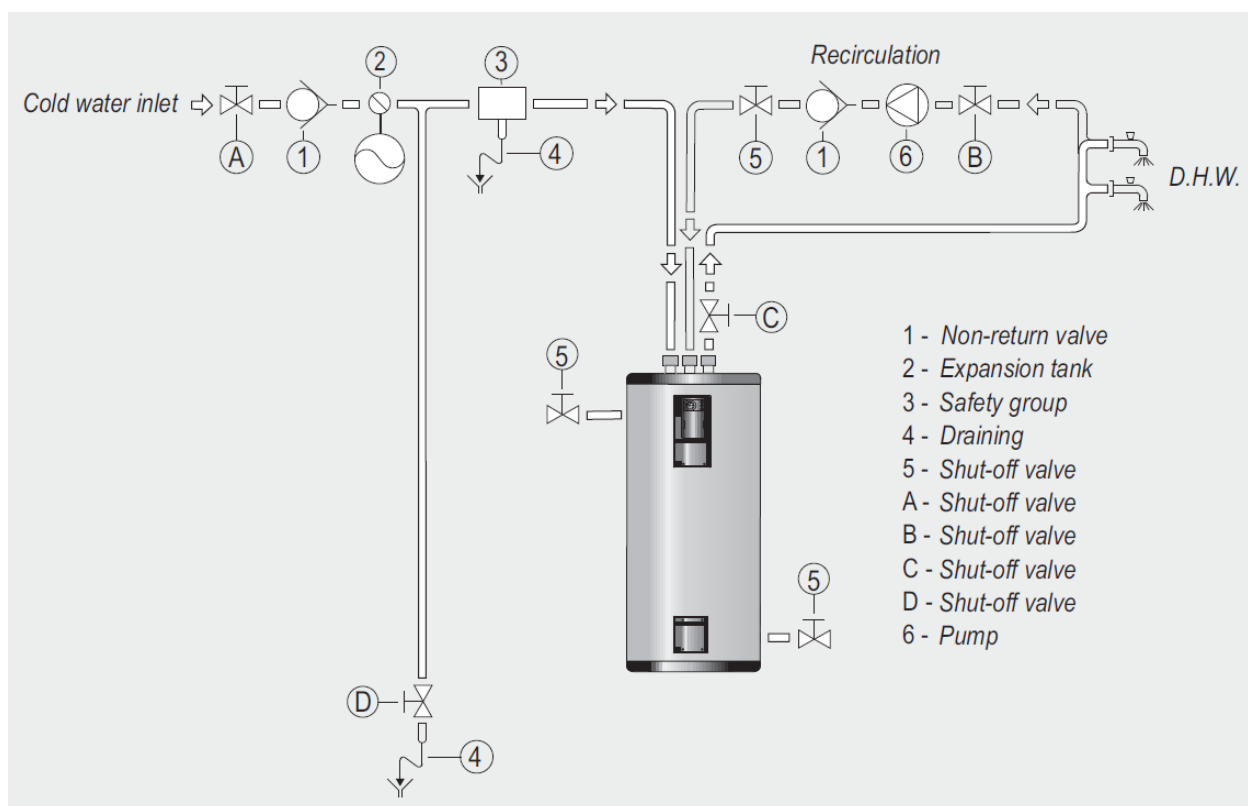
### Filling the S-DW-I Tank

Once all hydraulic pipework (primary & secondary) has been connected and all electrics have been isolated, the tank can be filled. To prevent damage, ensure the tank is filled by completing the following process:

1. Before turning on the mains supply to the cylinder, a hot water tap should be opened, preferably on the same floor or the floor below where the cylinder is located.
2. Turn on the DHW cold supply to the domestic water tank (inner tank) and fill until water runs from the open hot water tap.
3. Close the hot water taps and bring the domestic water tank up to working pressure.
4. Once the domestic water tank is up to pressure, fill the primary tank (maximum allowed pressure is 3 bar).
5. Once the primary tank is up to design pressure, open the manual air vent on the primary tank to remove any trapped air.

### Emptying the S-DW-I Tank

To prevent damage, ensure the tank is emptied by completing the following process



1. Depressurize completely the primary circuit of the tank.
2. Close the A and B isolation valves.
3. Keep the C isolation valve open.
4. Open the D isolation valve key.
5. Open one of the hot water taps.
6. Allow the emptying of the tank by pressure differences.
7. Once the tank has emptied, leave the mentioned isolation valves in their initial position.
8. To completely empty the secondary tank, a plastic pipe connected to a vacuum pump (decanting pump) should be connected, So the rest of the stored water is pumped out. This pipe should reach and be in contact with the tank lower part.

**Please Note:** It is important for the complete emptying of the S-DW-I tank that the isolation valve with drain is placed lower than the storage tank.

## 13. MAINTENANCE

Servicing and maintenance should only be carried out once a year by a competent unvented hot water installer or Strebel Ltd authorised personnel.

Before any work is carried out on the installation, it must be isolated from the electricity supply.

Both the primary and secondary systems will contain very hot water that will scald; therefore, care should be taken when opening any joints, seals, or valves.

Periodic cleaning of the DHW tank must be carried out, independently from any thermal treatments demanded for the legionella bacterium elimination. To perform this cleaning, double-wall S-DW-I tanks have a hole for inspection and top cleanliness by means of which, and after previous withdraw of their connection plate (inlet of cold water and DHW's outlet), there is access to cleaning the secondary tank (DHW).

Recommended cleaning procedure:

1. Perform emptying following above mentioned procedure.
2. Remove top part of the tank connection pipes (cold water inlet and DHW's outlet and, in case of having one, recirculation)
3. Remove plastic hubs as well as the plastic lids and top cover, remembering their placement and order to correctly assemble them afterwards.
4. Introduce a pressure water lance from top hole of the tank to avoid throbbing or striping the inner surface of the tank with the lance.
5. To get rid of water in the secondary tank (from cleaning) a plastic pipe attached to a pump should be used. Reaching the mentioned pipe, the very bottom of the tank.

Only use spare parts authorised by Strebel Ltd. The use of other parts will invalidate the warranty.

### User Instructions

Your S-DW-I cylinder has been designed to give many years of trouble-free service and is made from hygienic, high grade stainless steel. It includes a 3ph electric immersion heater which heats the water to 75°C.

The flow temperature of the hot water can be set to your requirements using the control thermostat on the front of the control panel. Higher temperatures can cause tripping of the high limit thermostat and introduce more energy loss from the cylinder.

When a hot tap is turned on there may be a short surge of water, this is quite normal with unvented systems and does not mean there is a fault.

When you first fill a basin, the water may sometimes appear milky. This is due to very tiny air bubbles in the water which will clear very quickly.

**WARNING: IF COLD/WARM WATER EXITS FROM THE TEMPERATURE AND PRESSURE RELIEF VALVE (TPV) OR FROM THE PRESSURE RELIEF VALVE (PRV) CALL YOUR INSTALLER OR OUR CUSTOMER SERVICE CENTRE. IF VERY HOT WATER EXITS FROM EITHER VALVE SWITCH OFF THE HEAT SOURCE IMMEDIATELY AND ISOLATE THE ELECTRICITY SUPPLY TO THE CYLINDER AND SEPARATE HEAT SOURCE.**

**IF THE HOT WATER RUNS COOL IT MAY BE NECESSARY TO MANUALLY SWITCH ON THE IMMERSION TO HEAT THE WATER PLEASE SEE THE RELEVANT INSTRUCTIONS FOR YOUR ALTERNATIVE ENERGY DEVICE.**

## 14. FAULT FINDING

**WARNING: DISCONNECT ELECTRICAL SUPPLY BEFORE REMOVING ANY ELECTRICAL EQUIPMENT COVER.**

| Fault                                                                                                                                                              | Possible cause                                                                                                                                                                                                                                                                 | Remedy                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The cylinder cools down overnight                                                                                                                                  | One pipe circulation in the case of short pipe networks with low pressure Loss.                                                                                                                                                                                                | Install a non-return valve as close as possible to the cylinder.                                                                                                                                                                                                                                                   |
| Primary heating is not working. Boiler runs for a short period, goes off, then comes on again. This is repeated until the cylinder reaches its target temperature. | Air trapped in heat exchanger<br>Heat exchanger surface too small                                                                                                                                                                                                              | Vent air from heat exchanger circuit<br><br>Check data for boiler and cylinder. The problem may be solved by increasing the flow from boiler                                                                                                                                                                       |
| Only cold or lukewarm water comes out of taps                                                                                                                      | Programmer set to heating only or not switched on for hot water<br><br>Central heating boiler malfunction<br><br>High limit thermostat has tripped<br><br>Pump malfunction<br><br>If only cold water comes out of taps, hot and cold pipes may have been connected incorrectly | Set programmer to call for hot water on demand<br><br>Check boiler operation. If faulty consult manufacturers instruction manual<br><br>Check and re-set. The cause will need to be identified<br><br>Check wiring and/or plumbing connections to pump<br><br>Check connections and have them changed if necessary |
| Intermittent water discharge through tundish on warm up                                                                                                            | Expansion vessel has lost its charge pressure (vessels with external expansion only).                                                                                                                                                                                          | Follow steps listed in Service & maintenance section.                                                                                                                                                                                                                                                              |
| Continuous water discharge                                                                                                                                         | Pressure reducing valve (PRV) not functioning properly<br><br>Expansion relief valve not seating correctly<br><br>Temperature & pressure relief valve not seating correctly                                                                                                    | Check pressure from PRV. Replace cartridge if necessary<br><br>Manually lift the valve once or twice to clear debris from the seat. If this does not cure problem, replace valve<br><br>Manually lift the valve once or twice to clear debris from the seat. If this does not cure problem, replace valve          |

## 15. DISPOSAL

### Disposal of Packaging:

Those responsible for installing the cylinder are responsible for disposal of any transport packaging. Observe national regulations.

### Cylinder Disposal:

You must not dispose of the cylinder or any of its accessories in normal domestic rubbish. The cylinder and accessories must be disposed of in accordance with national regulations.

### Recycling used Parts:

Both the cylinder and transport packaging contain many recyclable parts.

(BLANK PAGE)

**Strebel Ltd**

Unit 10, Invincible Industrial Estate,  
Invincible Road, Farnborough,  
Hampshire, GU14 7QU.

|          |                                                                          |
|----------|--------------------------------------------------------------------------|
| <b>T</b> | 01276 685422                                                             |
| <b>F</b> | 01276 685405                                                             |
| <b>E</b> | <a href="mailto:salesoffice@strebel.co.uk">salesoffice@strebel.co.uk</a> |
| <b>I</b> | <a href="http://www.strebel.co.uk">www.strebel.co.uk</a>                 |



**STREBEL LTD RESERVE THE RIGHT TO CHANGE ANY SPECIFICATIONS ON THIS CYLINDER RANGE WITHOUT NOTICE**

Further information on our complete product range is available from our website.

CAST IRON – CONDENSING – STEEL SHELL – WATER HEATERS – RENEWABLES

FLUES – ACCESSORIES.