

# Etech<sup>s</sup>

## *Installation, Operating and Servicing Instructions*

**E-tech S 160 / 240 / 290 / 380**



*excellence in hot water*



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**PEOPLE WHO SHOULD READ THESE INSTRUCTIONS**

These instructions are intended for:

- specifying engineers
- the installing engineers
- end-users
- servicing engineers

**SYMBOLS**

The following symbols are used in these instructions:



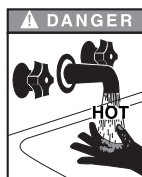
**Essential instruction for operating the system correctly.**



**Essential instruction for personal safety or environmental protection**



**Danger of electrocution.**



**Risk of scalding.**

**WARNINGS**

These instructions are an integral part of the equipment to which they refer and must be supplied to the user.

The product must be installed and serviced by qualified engineers, in compliance with the prevailing standards.

ACV accepts no liability for any damage resulting from incorrect installation or from the use of components or fittings not specified by ACV.



**Failure to observe instructions regarding tests and test procedures can result in personal injury or pollution risks.**

*Note:*

*ACV reserves the right to modify the technical specifications and components of its products without prior notice.*

## DESCRIPTION

### OVERVIEW

- Combination boiler (*central heating and domestic hot water*).
- TANK-IN-TANK indirect storage type domestic hot water production.
- The central heating connections are designed so that they can be connected in all three directions, this means that the boiler can be installed against a wall or in a corner without having to leave any free space (*see page 6*).
- Internal two-stage temperature control thermostat, which allows the power to be adapted according to actual heat requirements.
- The boiler is fitted with expansion tanks, a safety valve, a mano-thermometer, a water low safety device (*pressure switch*) and a circulation pump.

### OPERATING PRINCIPLE

#### The TANK-IN-TANK concept

The Etech's series differs from traditional hot water producers in that it has a tank immersed in the primary fluid contained in the outer body. When there is a temperature drop in the boiler because the central heating system or the domestic hot water circuit needs hot water, the internal thermostat starts up the power on the immersed electrical resistors. The heating elements quickly heat up the primary fluid, thus creating a natural circulation around the tank.

#### Indirectly heating domestic hot water

This circulation allows easier heat exchange between the primary fluid and the domestic water, all over the tank surface. The corrugations on the outer shell of the tank increase the area of heat exchange still further and thus speed up the process of heating the domestic water.

#### Easy to set

With a single command, the water temperature of both the primary circuit and the domestic hot water circuit can be set by the adjustable thermostat situated underneath the tank in the primary circuit.

### CONSTRUCTION FEATURES

#### Outer body

The outer body containing the primary fluid is made of thick STW 22 steel.

#### TANK-IN-TANK type exchanger accumulator

The ring-shaped inner tank with its large heating surface for producing domestic hot water is built of Chrome/Nickel 18/10 stainless steel. It is corrugated over its full height by an exclusive production process and entirely argon arc welded by the TIG (Tungsten Inert Gas) method.

#### Isulation

The boiler body is fully insulated by rigid polyurethane foam, with a thickness of 70mm, with a high thermal insulation coefficient. This is sprayed onto the tank without using any CFCs.

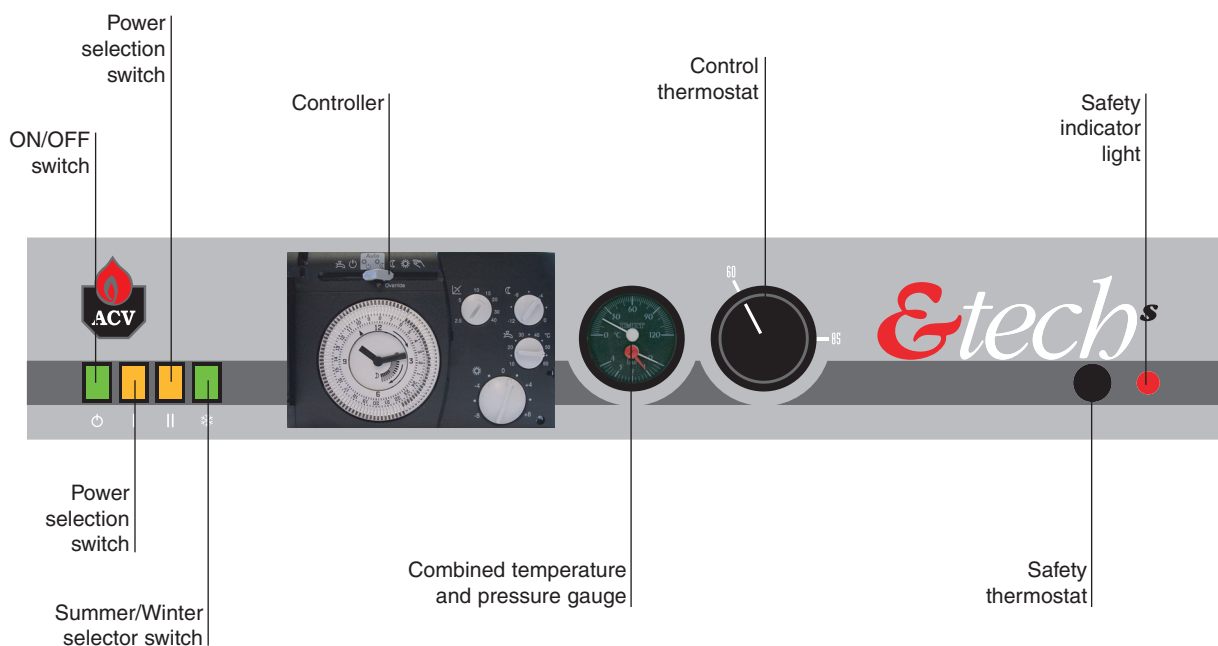
#### Casing

The boiler is covered by a steel jacket which has been scoured and phosphated before being stove enamelled at 220 °C.

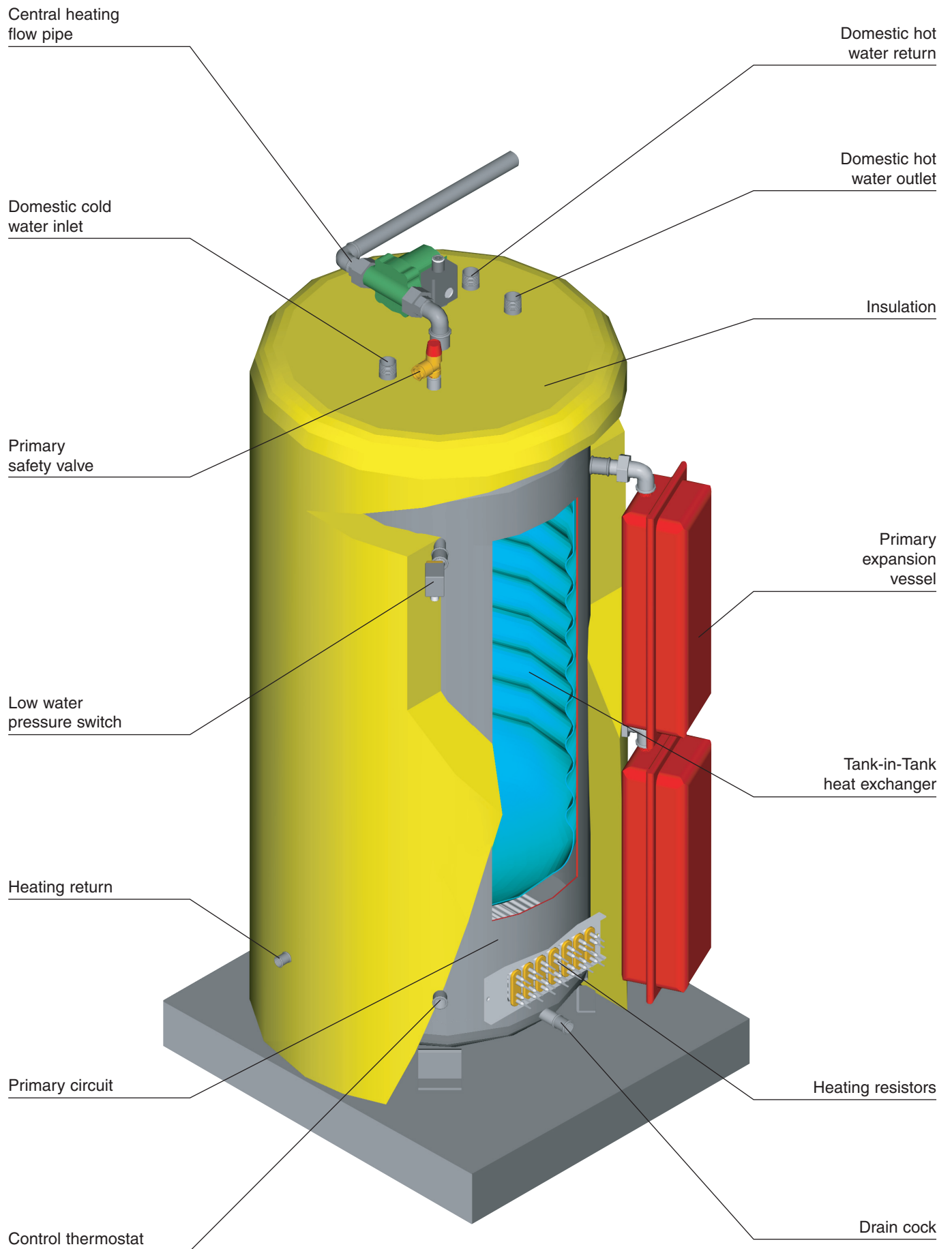
#### Heating elements

Depending on the model, the boiler is fitted with either six or seven detachable stainless steel AISI 304L immersion heaters.

### Control panel



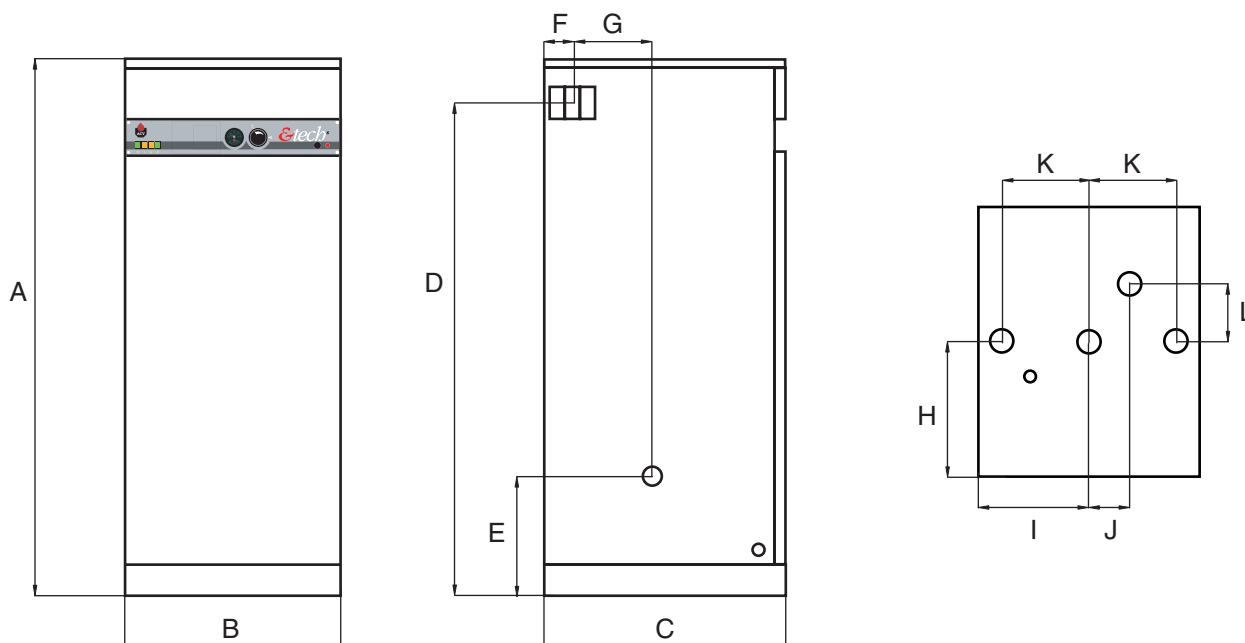
## DESCRIPTION



# TECHNICAL SPECIFICATIONS

## DIMENSIONS

The units are delivered fully assembled, tested and packed on a timber base with shockproof edges and protected by heat-shrunk plastic film. On reception and after unpacking, check the equipment for damage. For transport purposes, refer to the weight and dimensions give below.



	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm	K mm	L mm
<b>160</b>	1432	620	720	1282	290	43	265	405	310	127	180	126
<b>240</b>	1953	620	720	1800	290	43	265	405	310	127	180	126
<b>290</b>	1784	720	800	1627	300	92	265	435	360	94	135	96
<b>380</b>	2134	720	800	1985	300	92	265	435	360	94	135	96

## GENERAL FEATURES

		E-tech S 160	E-tech S 240	E-tech S 290 single phase	E-tech S 290 tri phase	E-tech S 380 mono phase	E-tech S 380 tri phase
Output	<b>kW</b>	14.4	14.4	14.4	28.8	14.4	28.8
Operating voltage	<b>Volt</b>	230	230	230	3 x 400 + N	230	3 x 400 + N
Total capacity	<b>L</b>	161	242	295	295	394	394
Primary circuit capacity	<b>L</b>	55	68	97	97	127	127
Central heating connections	<b>Ø</b>	1"	1"	1"	1"	1"	1"
Domestic hot water connections	<b>Ø</b>	3/4"	3/4"	1"	1"	1 1/2"	1 1/2"
Hot water tank exchange surface	<b>m²</b>	1.26	1.87	2.0	2.0	2.6	2.6
Weight when empty	<b>kg</b>	115	155	202	202	230	230
Domestic hot water max. pressure	<b>bar</b>	10	10	10	10	10	10
Central heating max. pressure	<b>bar</b>	3	3	3	3	3	3
Expansion tank		1 x 8 L	1 x 8 L	2 x 8 L	2 x 8 L	2 x 8 L	2 x 8 L
Max. T° setting	<b>°C</b>	85	85	85	85	85	85

## TECHNICAL SPECIFICATIONS

### MAXIMUM OPERATING CONDITIONS

**Maximum operating pressure** (tank full of water)

- Primary circuit: 3 bar
- Secondary circuit: 10 bar

**Test pressure** (tank full of water)

- Primary circuit: 4.5 bar
- Secondary circuit: 13 bar

**Operating temperature**

Maximum temperature: 90 °C

**Water quality**

- Chlorures: < 150 mg/l (304)  
< 2000 mg/l (Duplex)

- $8 \geq \text{ph} \geq 6$

### DOMESTIC HOT WATER PERFORMANCES

		E-tech S 160	E-tech S 240	E-tech S 290 single phase	E-tech S 290 tri phase	E-tech S 380 mono phase	E-tech S 380 tri phase
Peak delivery at 40 °C	L/10'	310	532	645	660	855	870
Peak delivery at 45 °C	L/10'	250	452	548	561	725	739
Peak delivery at 60 °C	L/10'	168	294	356	365	468	472
Peak delivery at 40 °C	L/60'	690	880	990	1305	1200	1516
Peak delivery at 45 °C	L/60'	570	750	845	1090	1021	1270
Peak delivery at 60 °C	L/60'	375	465	527	625	636	752
Continuous delivery at 40 °C	L/h	413	413	413	826	413	826
Continuous delivery at 45 °C	L/h	354	354	354	708	354	708
Continuous delivery at 60 °C	L/h	248	248	248	415	248	448
Start-up time [10-80°C]	min	61	93	113	91	150	120
Start-up time [15-65°C]	min	44	66	81	65	107	86

# INSTALLATION

## BOILER ROOM

### Important

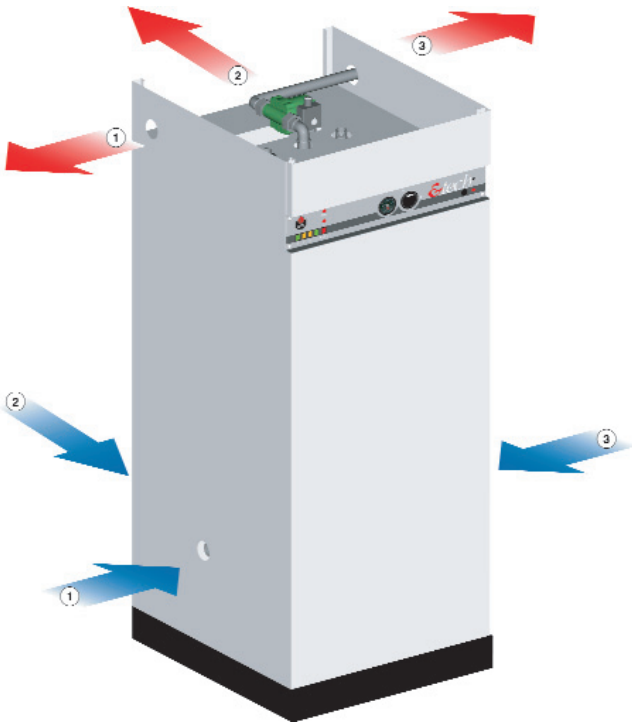
- Keep vents free at all times.
- Do not store inflammable products in the boiler room.
- Do not store corrosive products near the boiler, such as paints, solvents, chlorine, salt, soap and other cleaning products.

### Accessibility

The boiler room must be large enough to allow proper access to the boiler. The following minimum distances around the boiler are required:

- at the front: ..... 500 mm
- above: ..... 300 mm
- on the central heating connection side: .... 150 mm

This boiler can be connected to the central heating circuit in any one of three directions.



### Base

The boiler must be laid on a base made of non-combustible materials.

## HEATING CONNECTION

The drain cock (8) and safety valve (2) must be connected to the waste water disposal system.



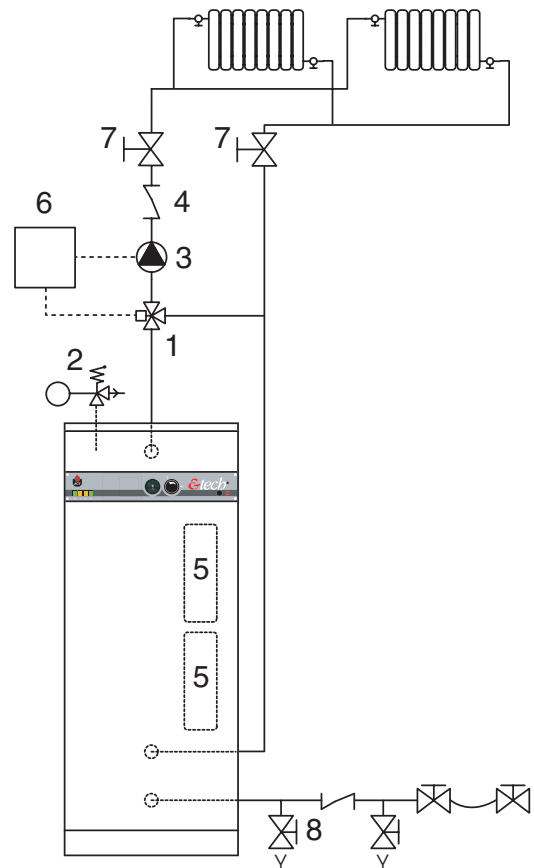
**The boiler is fitted with an expansion chamber with a capacity of:**

- 8 litres on Etech's 160 and 240 models.
- 16 litres on Etech's 290 and 380 models.

**If the expansion volume is not sufficient for your needs then it is possible to install an additional tank.**

**The boiler is fitted with a safety valve set to 3 bar.**

1. 3-way valve
2. Safety valve preset to 3 bar with pressure gauge
3. Heating pump
4. Non-return valve
5. Expansion vessel
6. Controller
7. Isolation valves
8. Drain cock





## DOMESTIC HOT WATER CONNECTION

### Pressure reducer

If the water mains pressure is greater than 6 bar, a pressure reducer calibrated to 4.5 bar must be fitted.

### Safety unit

The tank safety unit must be ACV approved and calibrated to 7 bar. The valve discharge must be connected to the waste water disposal system.

### Domestic hot water expansion tank

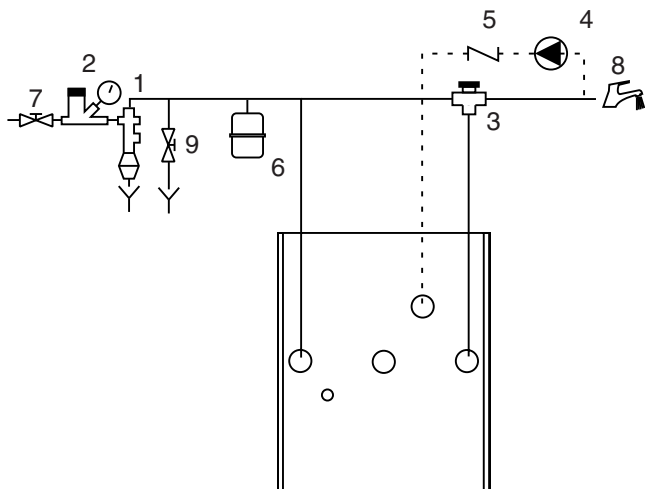
Installing a domestic hot water expansion tank avoids any risk of overpressure due to pressure surges and also makes sure that there is always water flowing through the safety unit when refilling the domestic hot water tank.

### Hot water circulation

If the tank is located a long way from the point of use, then installing a closed recirculation circuit ensures that a faster supply of hot water is always available.

### Descriptions

1. Expansion relief valve
2. Pressure reducing valve
3. Thermostatic mixing valve
4. Hot water secondary pump (if fitted)
5. Non-return valve
6. Hot water expansion vessel
7. Stop cock
8. Draw-off valve
9. Drain cock



### IMPORTANT

As a safety measure against burns, we strongly advise installing a thermostatic mixing valve (recommended temperature: 60° C).

### Optional fittings available

Groupe de sécurité	Ø 3/4"
Réducteur de pression	Ø 3/4"
Mitigeur thermostatique	Ø 3/4"
Vase d'expansion	5 litres

## CONTROLLER KITS

### KIT 1: ACV 13.00 / Basic

Basic kit for regulating initial flow temperature according to weather conditions. It comprises: a temperature regulator with analogue clock, wall-mounted water temperature sensor (-30/130 °C), external sensor (-30/50 °C), 3-pin servomotor SQY 31 230 V and an intermediate base.



### KIT 2: ACV 13.00 / Standard

Basic kit for regulating initial flow temperature according to weather conditions. It comprises: a temperature regulator with analogue clock, wall-mounted water temperature sensor (-30/130 °C), external sensor (-30/50 °C), 3-pin servomotor SQY 349,230 V and an intermediate base.



# INSTALLATION

## ELECTRICAL CONNECTIONS

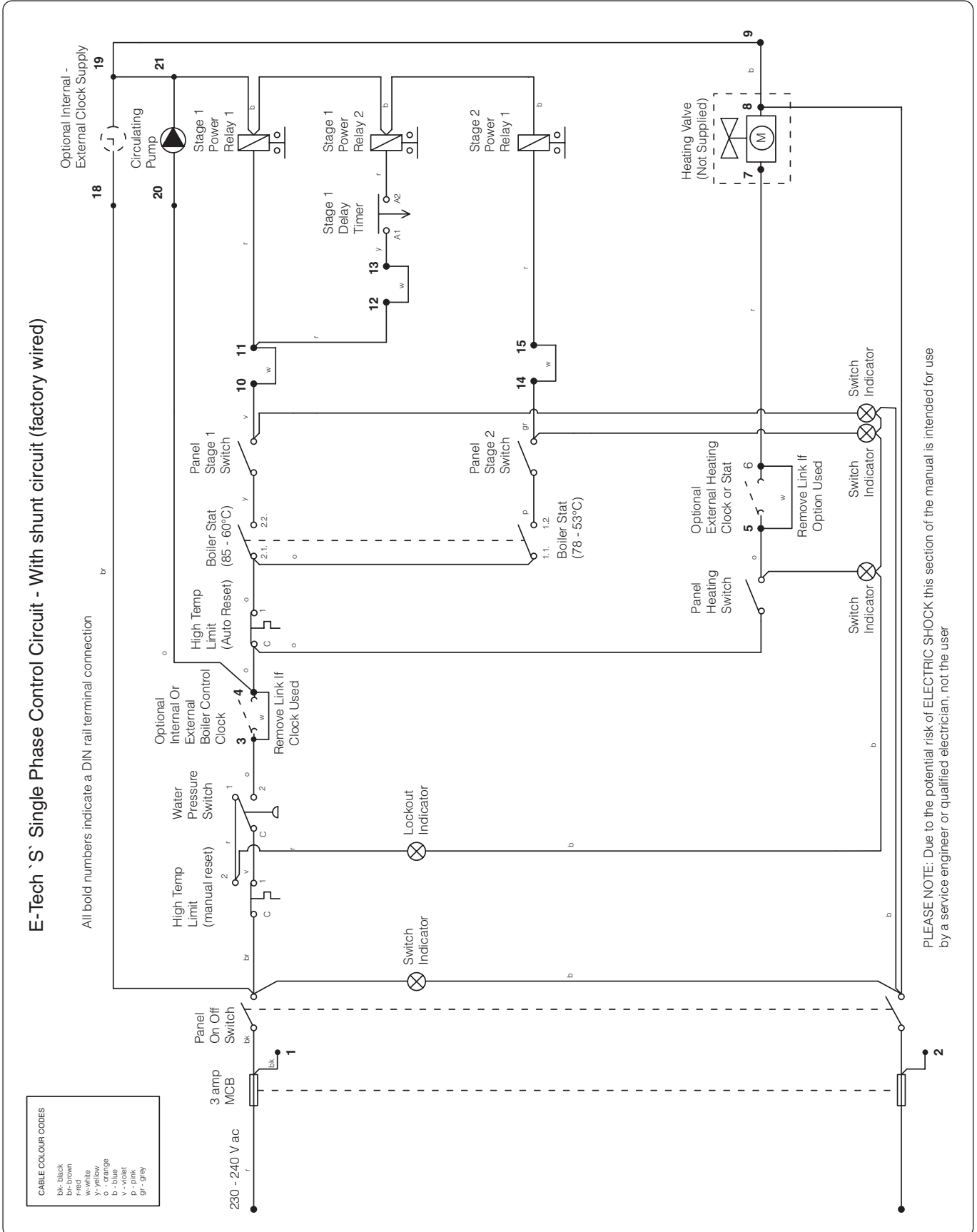
### Control circuit power supply

The control circuit is automatically powered from the power circuit. It is also protected by a magneto-thermal circuit breaker.

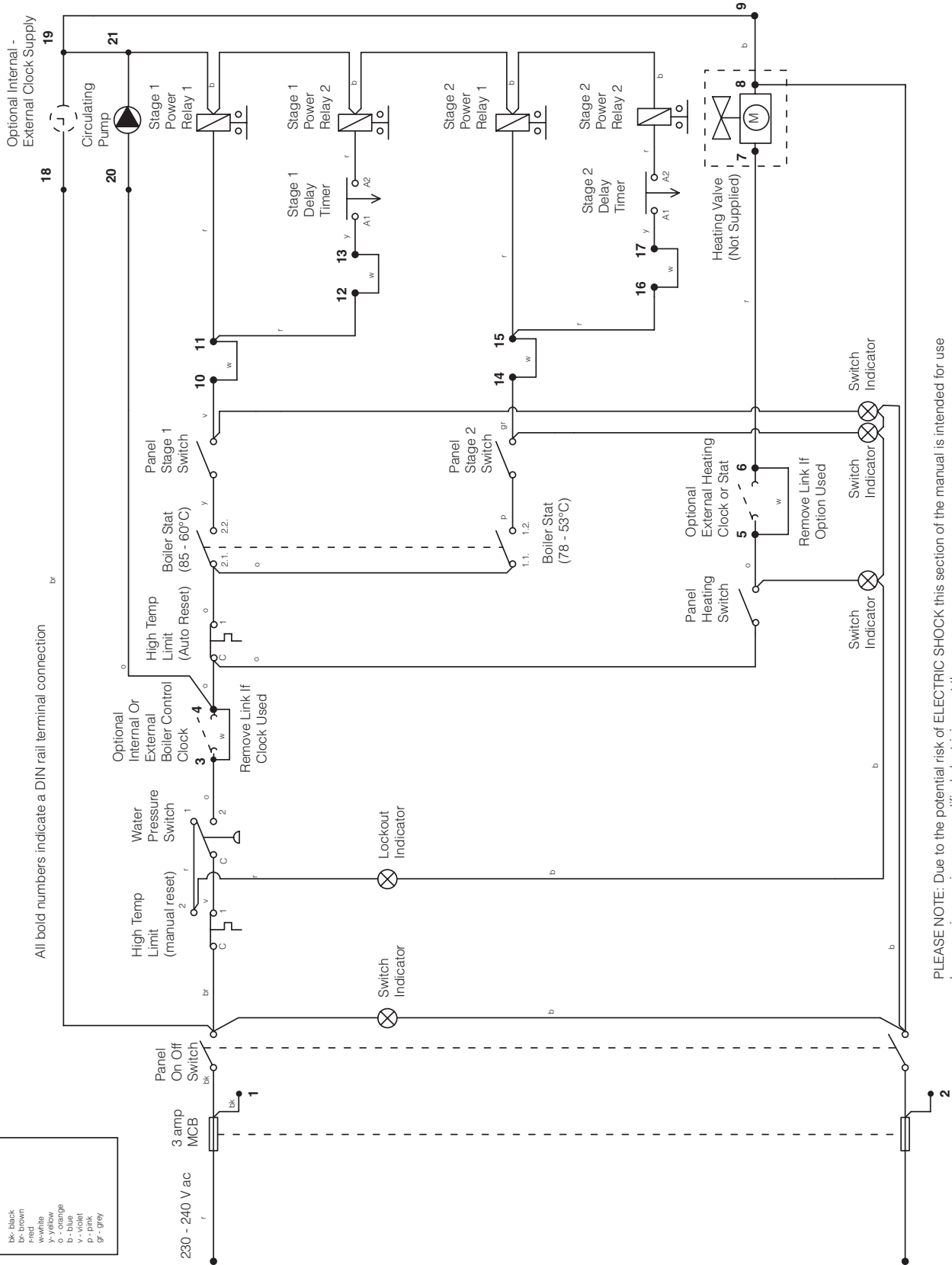


It is important to switch the boiler off before carrying out any work.

### Control wiring diagram



E-Tech 'S' Tri Phase Control Circuit - With shunt circuit (factory wired)



CABLE COLOUR CODES

bk - black
br - brown
ced - green
ww - white
yy - yellow
oo - orange
oo - olive
bb - black
pp - pink
gr - grey

PLEASE NOTE: Due to the potential risk of ELECTRIC SHOCK this section of the manual is intended for use by a service engineer or qualified electrician, not the user

## INSTALLATION

### Connecting the accessories

The electrical accessories are connected to the numbered terminals on the control terminal block as shown on the control wiring diagram.

### Power wiring diagram

- For the mono phase model *(In top of the page 11)*
- For the tri phase model *(In bottom of the page 11)*

### Electrical safety devices

- The boiler must be effectively earthed.
- A box fitted with a magneto-thermal circuit breaker must be fitted on the outside of the boiler. This is to protect the boiler and allow the power supply to be switched off during servicing or other work on the boiler.



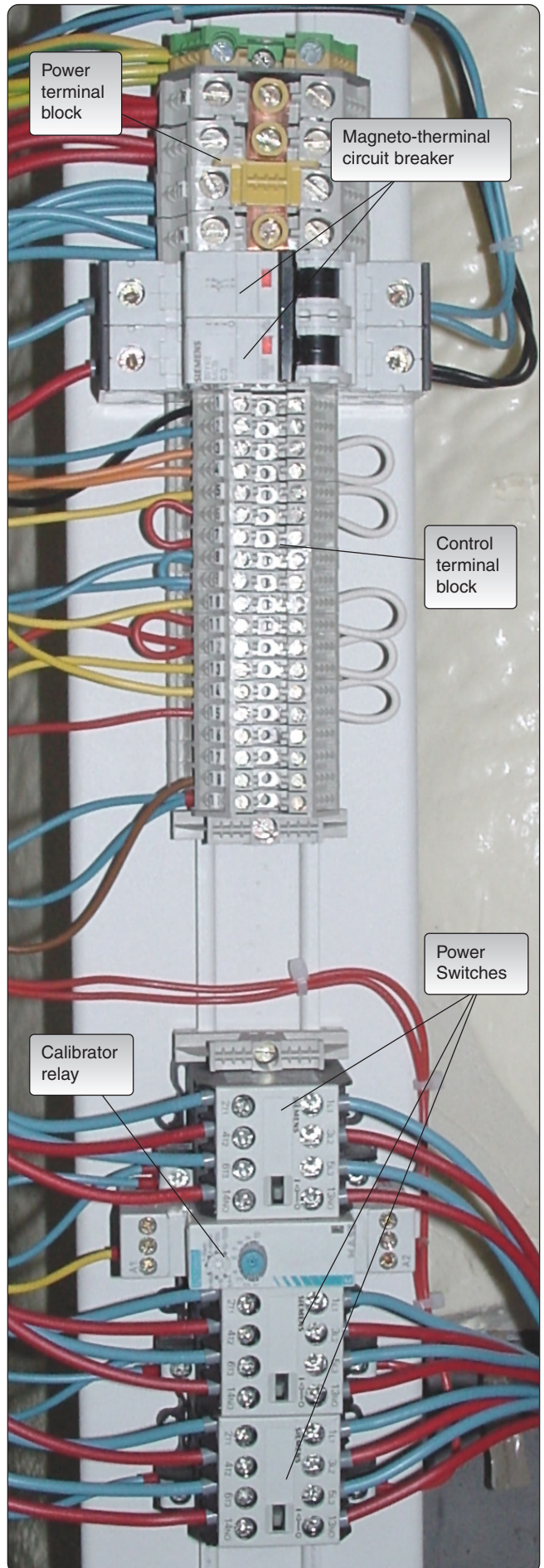
**First make sure that the system complies with all current standards.**

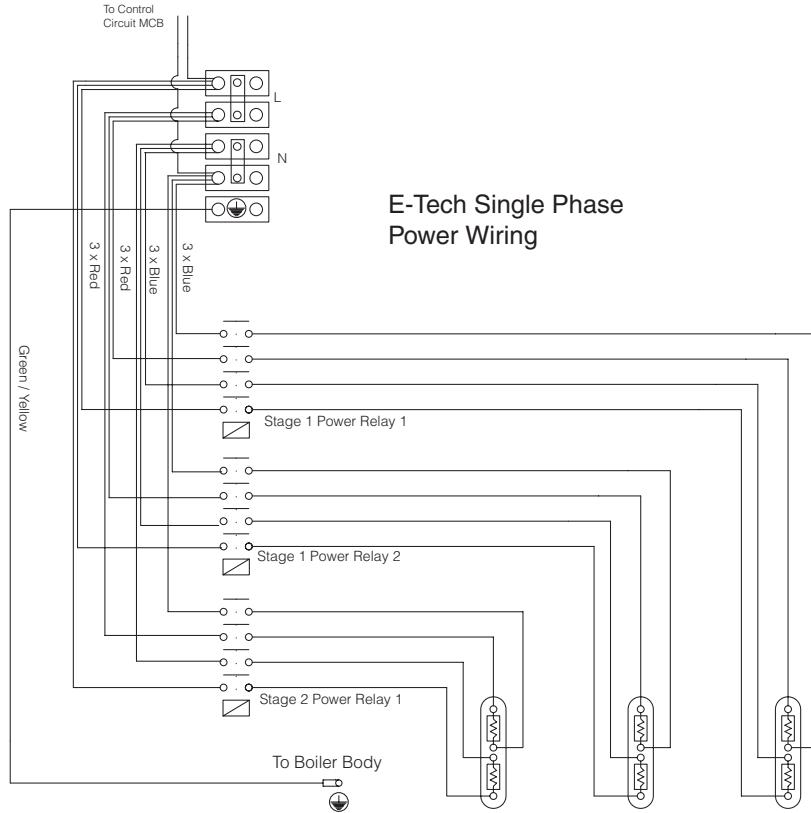
- To avoid any risk of electrocution, the electrical circuit must be fitted with a differential circuit breaker.
- The control circuit is protected by a magneto-thermal circuit breaker.

### Compliance

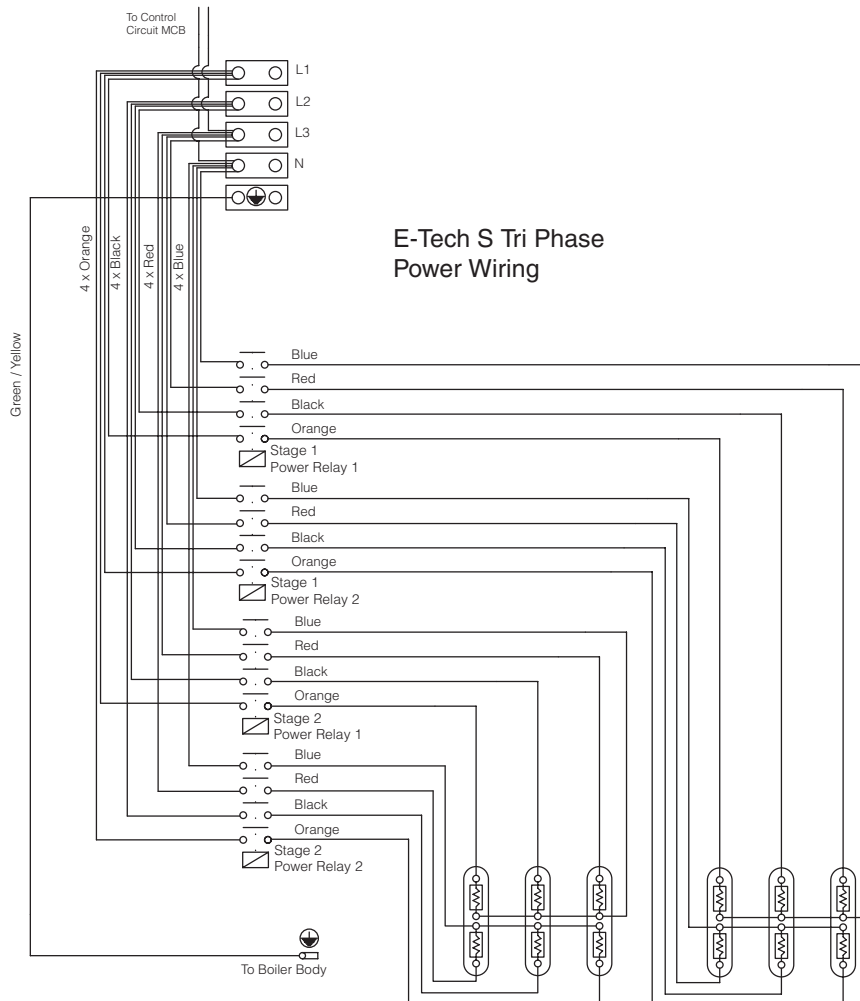
The installation must be carried out in accordance with the current local technical standards and legislation.

### Electrical terminal block





E-Tech Single Phase Power Wiring



E-Tech S Tri Phase Power Wiring

## COMMISSIONING

### FILLING THE DOMESTIC HOT WATER AND HEATING CIRCUITS

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1. Fill the domestic hot water circuit and bring it up to pressure



#### **IMPORTANT**

**The hot water tank must be pressurised before the heating circuit is filled.**

2. Fill the central heating circuit making sure that any air in the upper part of the boiler and any air in the system is bled.
3. Remove the front of the boiler.
4. Check the electrical connections paying particular attention to the quality of the connections on the power circuit terminals.
5. Set all the switches on the control panel to the OFF position and set the internal magneto-thermal circuit breaker to ON. Replace the front of the boiler.
6. Switch the boiler on from the external box.
7. Set the on/off switch to the ON position and the summer/winter selector switch to the winter position.
8. After allowing the circulator to work for a few minutes, set the on/off switch to the OFF position, bleed the circulation pump and make sure that both the boiler and the system are properly bled. Adjust the pressure to the static pressure ( $1 \text{ bar} = 10 \text{ m} - 1.5 \text{ bar} = 15 \text{ m}$ ) + 0.5 bar.
9. The boiler is now ready to operate. Set the on/off switch to the ON position, the summer/winter selector, the half and full power switches and the control thermostat all to the desired positions



**After a few days in operation check for any leaks the quality of the electrical connections and also make sure there is no air in either the boiler or the system.**



**Switch the power supply off from the outside box before carrying out any work.**

**SERVICE INTERVALS**

ACV recommend that boilers should be serviced at least once a year. This servicing work should be carried out by a competent technician.

**SERVICING THE BOILER**

1. Set the on/off switch on the control panel to the OFF position and switch the power off from the external box.
2. Remove the top panel and the front and carry out a visual inspection of the boiler looking out for any leaking water.
3. Inspect the wiring looking for any sign of overheating.
4. Check that the screws on the connection terminal block are properly tightened.
5. Replace the front and the top panel.
6. Switch the boiler back on again.

**SERVICING THE SAFETY DEVICES**

- Check that the thermostats and safety devices are working properly.
- Check the safety valves on both the central heating and the hot water circuits.

**DRAINING THE BOILER**



Water flowing out of the drain cock may be extremely hot and could cause severe scalding. Keep people away from discharges of hot water.

**Draining the heating circuit**

1. Switch the power to the boiler "OFF" at the mains switch installed by the electrician.
2. Close the boiler system's isolating valves (1).
3. Connect a hose to the drain cock (2) and make sure that it is properly connected.
4. Open the drain cock and allow hot water to flow out into the waste water disposal system, check that air is being taken into the system, by opening the air vent, for instance.
5. Once you have finished, put the drain cocks back into their original positions and adjust the pressure to the static pressure + 0.5 bar.

**Draining the domestic hot water circuit**

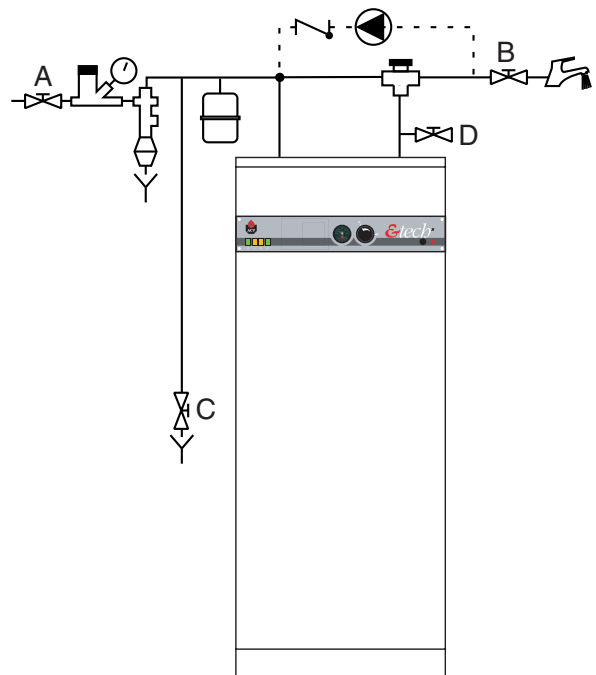
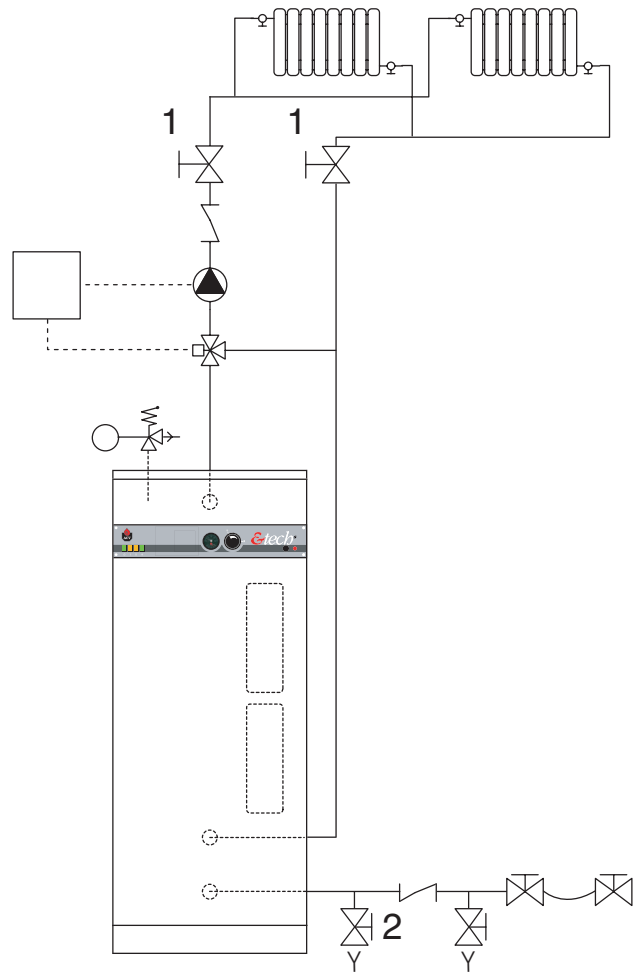
1. Switch the mains power to the boiler off at the external switch installed by the electrician.
2. Close valves (A) and (B).
3. Open valves (C) and (D) (first C then D).
4. Let the water drain away.
5. When you have finished, return the valves to their initial positions.



To allow the tank to be emptied, valve (C) must be situated at ground level.

**SPARE PARTS**

Please refer to the specific document available from ACV or your distributor.





## USING THE BOILER



Your system should be serviced at least once year by a qualified engineer.  
If the boiler is subject to heavy use, it may require servicing more than once a year - consult your service engineer for advice.



Before carrying out any work on the boiler, switch the power off at the mains switch fitted in the boiler room by the electrician.

### Understanding the control panel



There are no user parts inside the control panel.

#### 1 - ON/OFF switch

This must be used to switch the boiler off before carrying out any work on it.

#### 2 - Power selection switches

The control panel is fitted with two switches allowing the user to select the boiler power according to his needs. When only the first switch is pressed down, the boiler power is limited to the first stage using +/- half of the power (ideal in summer). In order for the boiler to run at full power, both of the switches must be pressed down.

#### 3 - Summer/Winter selector switch

"Winter" position: provides both domestic hot water and central heating functions. "Summer" position: The central heating circulator is switched off. Only the domestic hot water function is provided. If there is not enough hot water available, we recommend setting the thermostat (9) to a higher value. When the weather turns cold again, simply select "Winter" to reactivate the heating system.

#### 4 - Controller

Please see the enclosed instructions if you have chosen this option.

#### 5 - Mano-thermometer

Reads the boiler primary circuit (central heating) temperature and pressure directly.

#### 6 - Thermostat adjustable between 60 and 85° C

Central heating systems are generally designed to operate at a maximum of 80° C. When used at lower temperatures, a 3-way mixer valve installed on the heating flow pipe (see Fig. 2b on page 3) allows the temperature to be set manually or, if you decide to install a regulator (§ 2.2.4), automatically. We recommend that you set the thermostat to the maximum values to get the best out of the domestic hot water system.



There is a risk of burns from hot water!

The water stored in the domestic hot water tank in the boiler can be at a very high temperature.  
In all cases, install the thermostatic mixer (Fig. 3b on page 4) on the domestic hot water flow pipe which must not exceed 60° C.  
A mixer or mixing valve at each point of use is recommended.

#### 7 - Safety thermostat

When the temperature in the boiler exceeds 103 °C, the manually reset safety thermostat is started up.

#### 8 - Boiler shutdown indicator light

This light is lit when the safety thermostat starts up or when the water pressure in the boiler is too low.

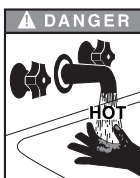
### Central heating system gauge pressure

Your boiler is fitted with a central heating safety valve, set to 3 bar, and with a pressure gauge.

First make sure that the water in the system is still pressurised. When cold and after the air in the system has been bled, the pressure gauge should show a pressure of between 1 and 2, depending on the height of the building: (1 bar = 5m / 1.5 bar = 10 m and 2 bar = 15 m). To add water, open the filling valve (Fig. 2a and 2b on page 3). Make sure that the drain cock is properly closed after filling and isolate the filling circuit from the central heating circuits. Bleed the air in the system to get an accurate water pressure reading.

### Safety valve (central heating)

A monthly inspection is recommended:  
Lift the lever on the emptying device for a few seconds to ensure that the safety valve is working properly



The water which may flow out of the safety valve is very hot and may cause serious burns. The pipe discharging into the waste water disposal system should be open to the atmosphere.  
Make sure there is nobody near the flow of hot water.



If you notice anything unusual after this short trial, please inform the installing engineer.

### Safety unit (domestic hot water)

A monthly inspection is recommended:  
Lift the lever on the emptying device for a few seconds to ensure that the safety valve is working properly.



The water flowing out of the safety unit may be extremely hot. The pipe discharging into the waste water disposal system should be open to the atmosphere.  
Make sure there is nobody near the flow of hot water.



If you notice anything unusual after this short trial, please inform the installing engineer.



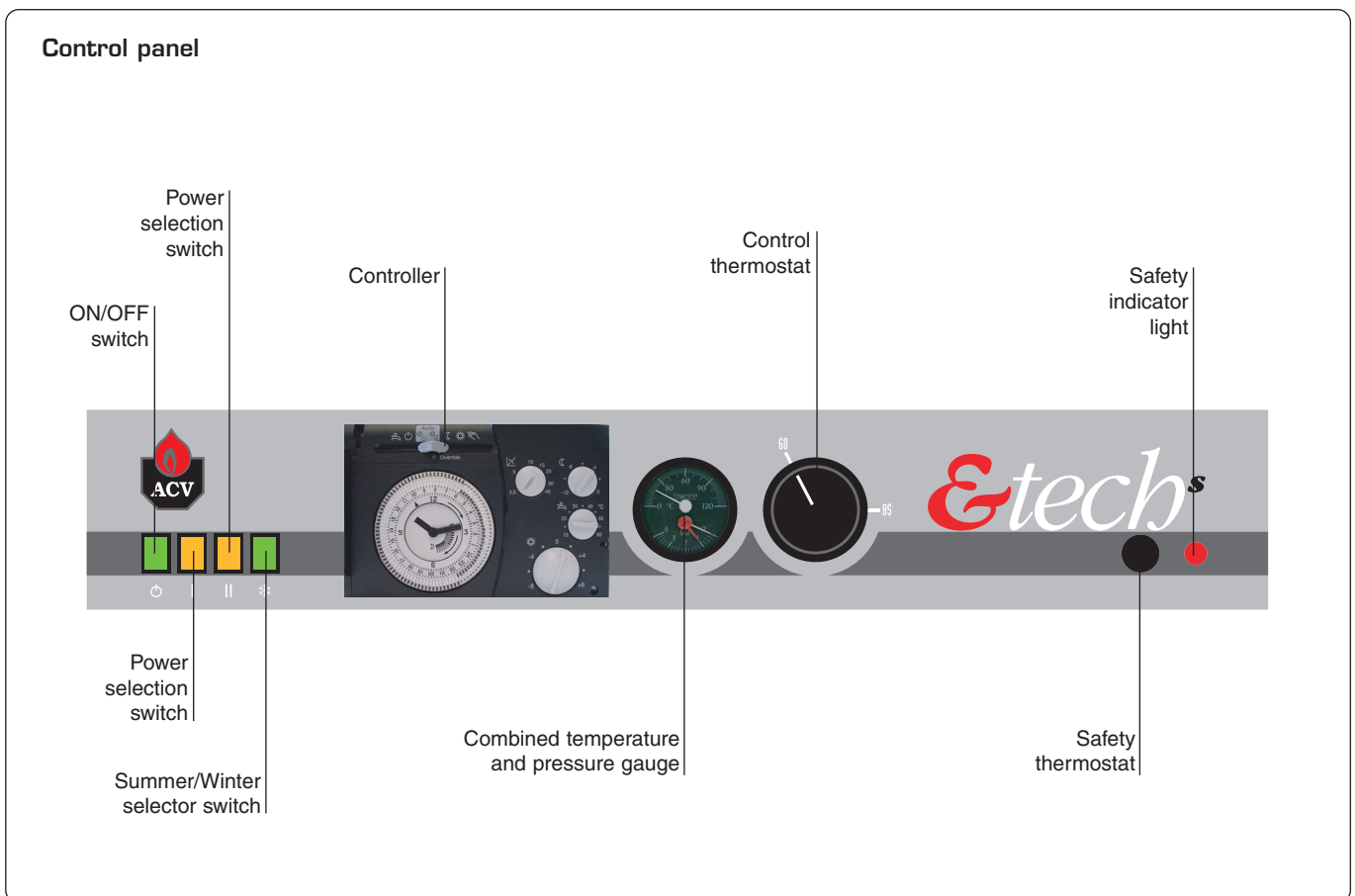
## BOILER SHUTDOWN

If the red light on the control panel lights up, this indicates an operating fault.

1. Check the boiler pressure, it should be between 1 and 2 bar depending on the height of the building.
2. Once you have checked the pressure, wait until the boiler has cooled down before resetting the safety thermostat.
3. Unscrew the safety thermostat's protective cap.
4. Restart the thermostat using a blade end.
5. If the system shuts down again, please inform the installing engineer.



**To ensure your system operates properly, have it professionally serviced once a year before the cold weather starts.**









excellence in hot water

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