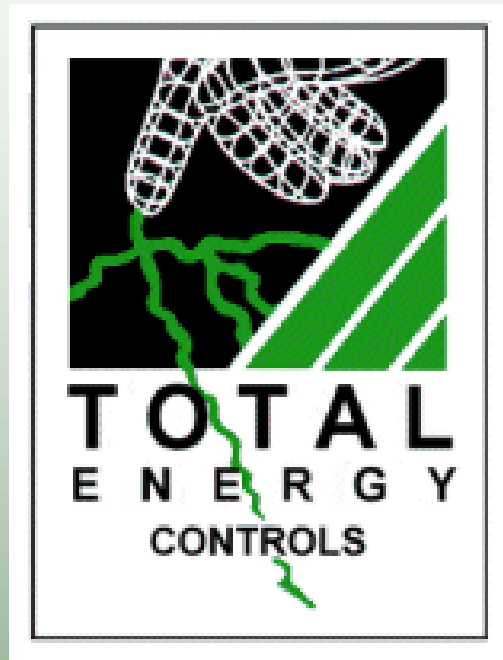


Total Energy Controls



TEC 500 Installation & Programming Manual

As of software v7.4

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Installation

General Notes

The installation of all TEC units should be carried out by a qualified electrical engineer familiar with heating systems and control wiring.

All control circuits of TEC units are 'volt free' and may be used to switch 240V AC or low voltage control systems.

Extreme care must be taken to ensure that all wiring is correct before applying power, as irreparable damage to the PCB could result due to incorrect connections.

Mains Wiring

Unscrew the four screws of the TEC 500 and remove the lid to gain access to the PCB and wiring connections.

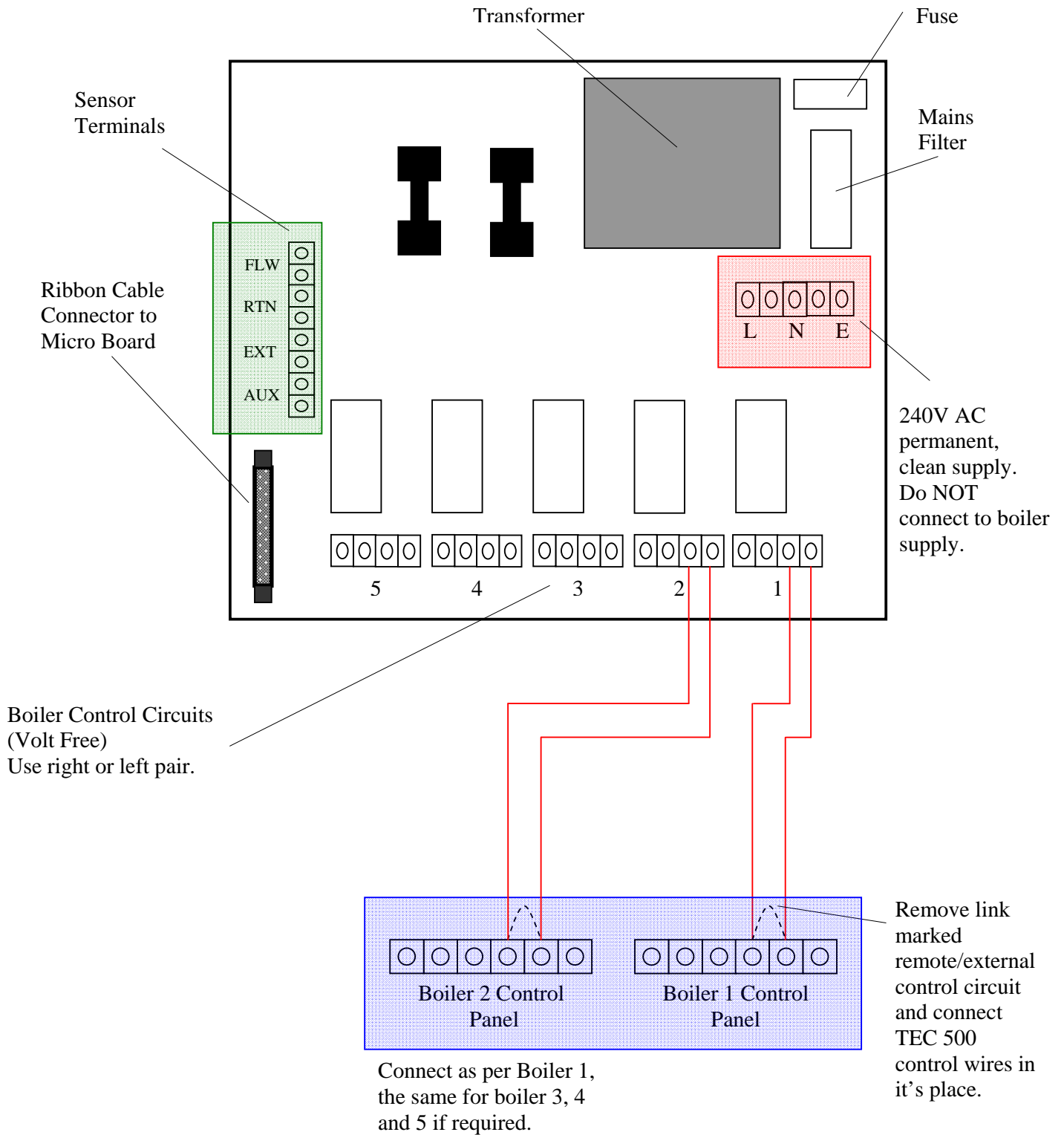
A 240V AC 1Ph 50Hz permanent, clean supply should be taken from the existing control panel and connected to the 240V connection (LNE) on the TEC 500 power supply PCB (right hand side of unit) as shown in the **red** section of Fig.1.

Control Wiring

Many boilers are provided with an accessible mains terminal block. Most have a pair of connections (usually unused) for use with external controls. These connections will have a link which needs to be removed so that the TEC 500 control wires can be connected as shown in **blue** section of Fig.1.

Where a terminal block arrangement within the boiler control panel is not available, the control wiring should be connected in series with the existing boiler thermostat wiring.

TEC 500 Power Supply V9 – Wiring Diagram



For boilers without a Control Panel connect the control wires in series with the existing boiler thermostat.
For installations with a Central Control Panel connect the control wires into the outgoing control circuits to the boilers, and wire the mains to the main control circuit.

Fig .1.

Fitting and Wiring Temperature Sensors

The TEC 500 has three temperature sensor inputs, these being **Flow**, **Return/Hot Water** and **External**. Connections are as shown in the green section of Fig.1.

Flow / Return Temperature Sensors (Cable Type)

Using **heat resistant** cloth tape, **tightly** strap the sensors to the relevant **flow** and **return** pipes, **close** to boiler, **before** any branching connections. Cover the sensors with heating pipe insulation and strap with ty-wraps or similar. See Fig.2.

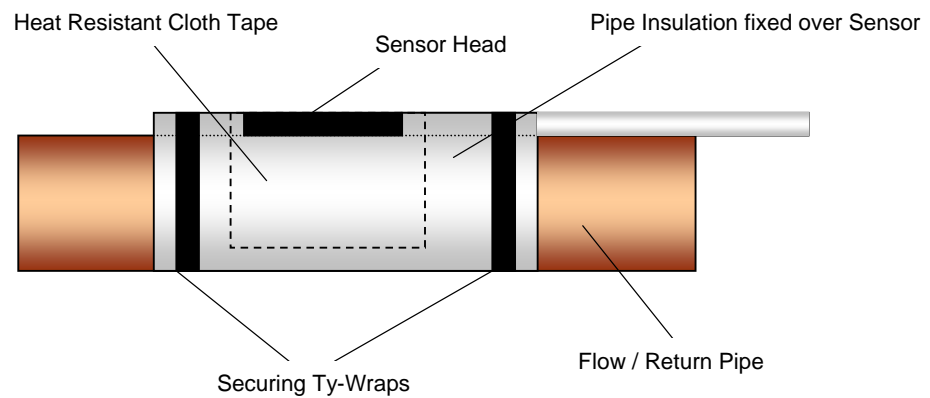


Fig. 2

Hot Water Tank Sensor connections are shown in Fig.3 (replaces Return Temperature Sensor and requires a spring type Flow/Return temperature sensor – available separately).

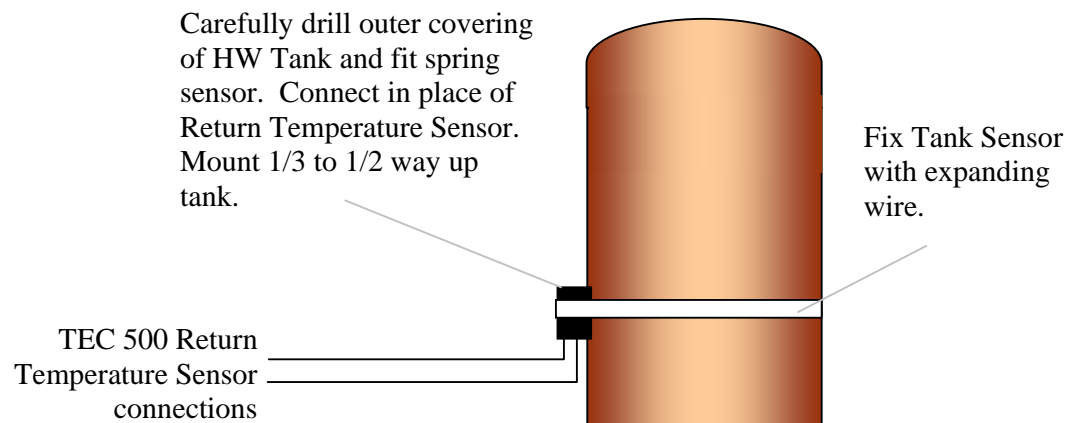


Fig. 3

If the hot water tank is a distance from the boiler, wiring to it may be impractical. If the hot water primary system (output to sinks etc) is pumped on a closed loop system then the sensor may be fitted to it, providing the flow is adequate to maintain the required temperature.

If hot water priority is important then the **Return Sensor** should be fitted to the **Hot Water Tank Return Pipe**. If this is also impractical, then fit as normal to the main **Return Pipe** and set the **Minimum Return Temperature** to provide an adequate level of hot water supply.

Where the tank option is used, set the **Minimum Return Temperature** to the stored water temperature requirement.

Flow / Return Temperature Sensors (Spring Type)

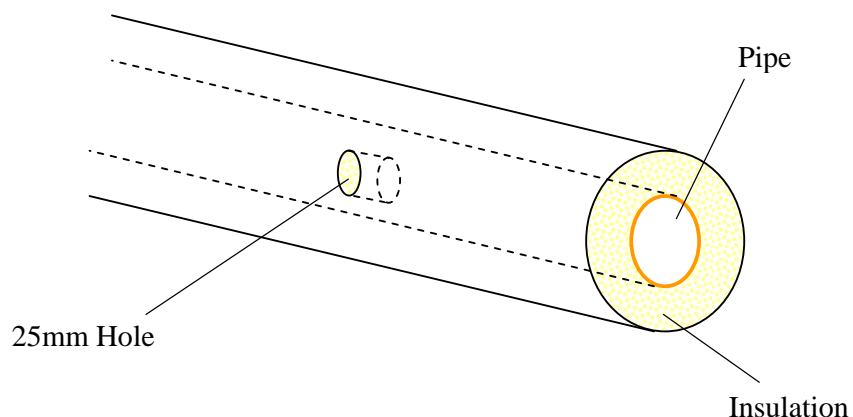
This type of temperature sensor provides a more convenient fixing and sensing method for flow and return heating pipe systems and hot water tanks, especially on the larger heating systems to which TEC 500s are fitted.

Installation – Insulated Pipework

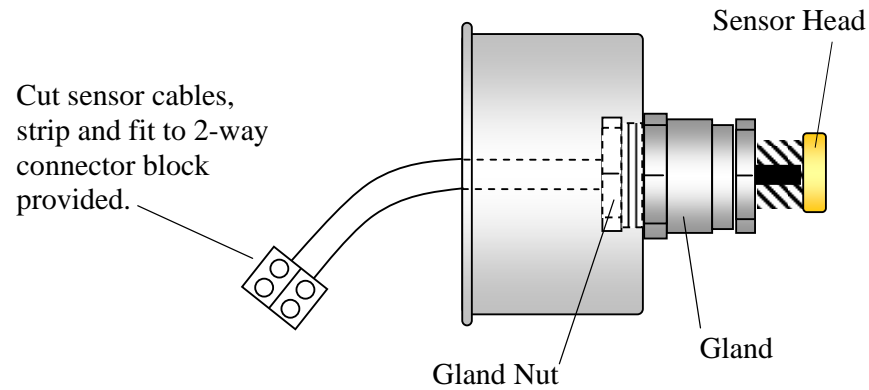
Select the correct position for the sensor according to the application.

Using a 25mm hole saw, carefully drill through the outer layer of insulation.

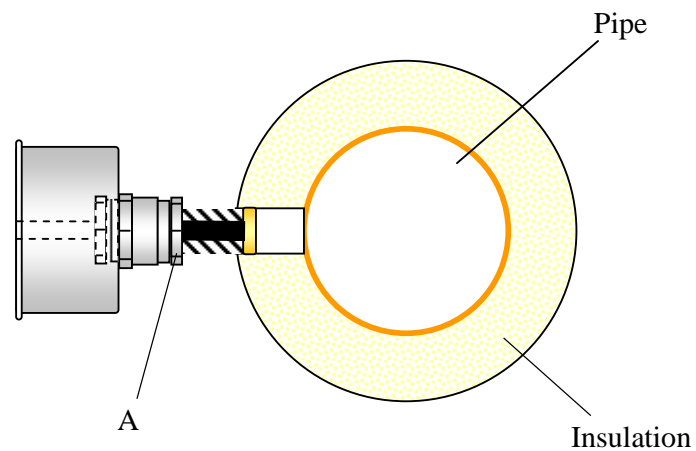
Clean out any insulation residue from the hole to reveal the bare steel/copper pipework.



Assemble the sensor with the cable gland and the sensor external to the enclosure. Tighten the gland nut inside the enclosure to secure.

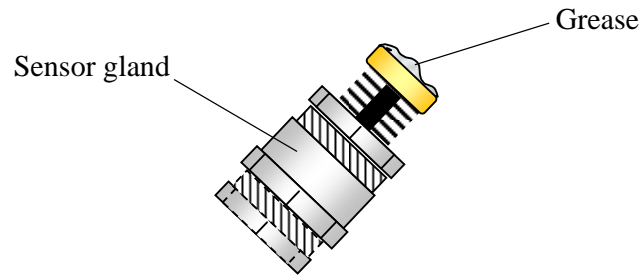


Check that the insulation thickness will accommodate the protruding cable gland on the sensor enclosure + 15mm. Set the sensor extension spring so that when inserted into the hole in the insulation, a positive sprung fitting is obtained, compressing the spring to ensure a good contact with the pipework.

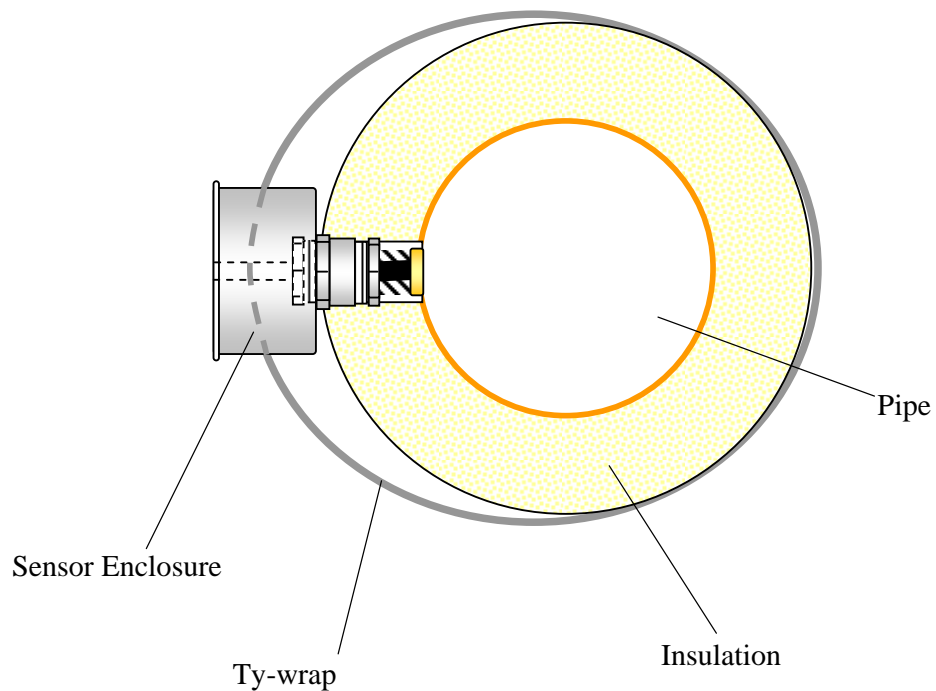


When the correct position for the spring is found, firmly tighten locknut 'A' to secure in position.

Apply an amount of heat conductive high temperature grease onto the main sensor head as shown below:



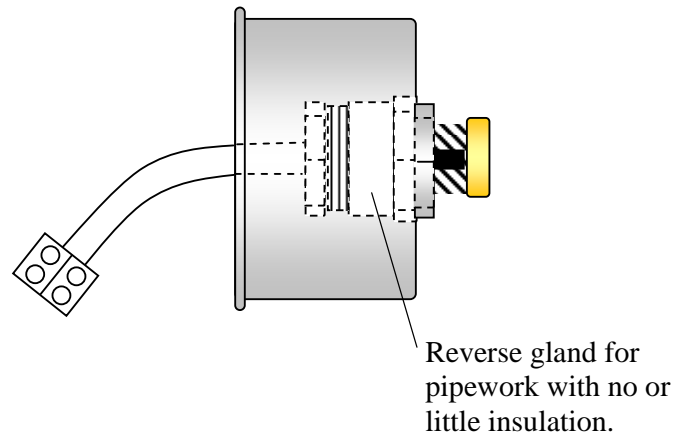
Re-check that the hole in the insulation is clear and insert the sensor until the sensor head is firmly compressed against the bare pipework. Secure the main sensor enclosure against the insulation with ty-wraps as shown below:



Ty-wraps may be coupled together to obtain the required length. Feed the ty-wrap through the holes in the side of the sensor enclosure, taking care not to trap/damage the sensor cables.

Connect flexible conduit / cable to sensor enclosure via enclosure grommets and wire to heating management system as normal.

For pipework with little or no insulation, reverse the cable gland to obtain a lower sensor profile and fix as previous.



External Sensor

The **External Sensor** should preferably be positioned on a north facing exterior wall, and connected to the appropriate terminals of the TEC 500. If it is not possible to mount the sensor on a north facing wall, then mount in a shaded position, under eaves, and away from boiler house vent grilles etc.

If a totally rainproof position can be assured then remove the unused grommets on the sensor to provide more ventilation. The blue and yellow wires should be used.

Temperature Display Calibration

When required, the temperatures as displayed on the TEC 500 may be adjusted to cater for heat losses on pipework, losses on external temperature sensor etc. Program 21 (see page 37) can be used to calibrate the temperature display by -10°C to $+20^{\circ}\text{C}$.

Main Program Menu

P1	Set CALENDAR .	(Year/Month/Date/Day/Time)
P2	Set OCCUPANCY times.	(Up to 2 per day)
P3	Set FREQUENCY .	(Once, Twice, 24hr)
P4	Set SELECT DAYS .	(Weekdays/Everyday/Weekends)
P5	Set PRE-HEAT time.	(0 – 240 minutes)
P6	Set OPTIMISE OFF time.	(0 – 240 minutes)
P7	Set MAX FLOW temperature.	(30 - 85°C)
P8	Set MIN FLOW temperature.	(25 - 85°C)
P9	Set RTN/HW temperature.	(20 - 85°C)
P10	Set MID temperature.	(0 - 85°C)
P11	Set NIGHT temperature.	(0 - 85°C)
P12	Set FROST temperature.	(0 - 35°C)
P13	Set EXT C/O temperature.	(0 - 35°C)
P14	Set COMPENSATION slope.	(0 - 3 in 0.5 steps)
P15	Set NO. OF BOILERS on system.	(1 - 5 boilers)
P16	Set NO. OF HW BOILERS required.	(1 - 5 boilers)
P17	Set DIFFERENTIAL .	(0.5 - 5 in 0.5 steps)
P18	Set HI/LO boiler.	(Yes/No)
P19	Set SEQUENCE mode.	(None/24hr/7 Day)
P20	Set TEST mode.	(Yes/No)
P21	Set CALIBRATION level.	(-10 /+20)
P22	Set HW PRIORITY .	(Yes/No)
P23	Set INT/EXT OPTIMISATION .	(Yes/No)
P24	Set BACK UP time.	(0 - 30 minutes)
P25	PLANT RELAY enable.	(Yes/No/Extn).
P26	Set AUTO BST .	(Yes/No)

Programming the TEC 500

Keypad and Running Mode Overview



PROGRAM

Used to enter Programming Mode from normal running mode, and to access Change Mode for the selected program.



SELECT

Used to cycle through the program list when in Programming Mode and to change program settings when in Change Mode.



RETURN

Used to cycle through the program list when in Programming Mode and to change program settings when in Change Mode.



ENTER

Used to confirm a programming change and to exit from the Programming Mode.

FIRING mode indicates that the boiler(s) are firing, indicating which boilers are firing at the bottom of the display.

```

FIRING Fr 14:42
F1 74.0 Rtn 62.0
SP 68.0 Ext 15.0
1 2 3 4 5 D
  
```

TEMP.SET indicates that the **actual Flow Temp** is above the **system set temperature****. The boilers will **not** be firing at this point.

```

TEMP.SET Fr 14:42
F1 74.0 Rtn 62.0
SP 68.0 Ext 15.0
BLRS OFF D
  
```

ECON indicates that the TEC 500 has entered self learning mode and is making economies. The boiler in economy mode will flash.

```

ECON Fr 14:42
F1 74.0 Rtn 62.0
SP 68.0 Ext 15.0
1 2 D
  
```

The **system set temperature as indicated in the display, represents the heating system aiming temperature based on current climatic conditions, as determined by the TEC 500's weather compensation circuitry.

Ext 'flashing' indicates that the external temp is above the level set in the **Ext Cut-Off** program.

FIRING	Fr 14:42
F1 74.0	Rtn 62.0
SP 68.0	Ext 15.0
1 2 3	D

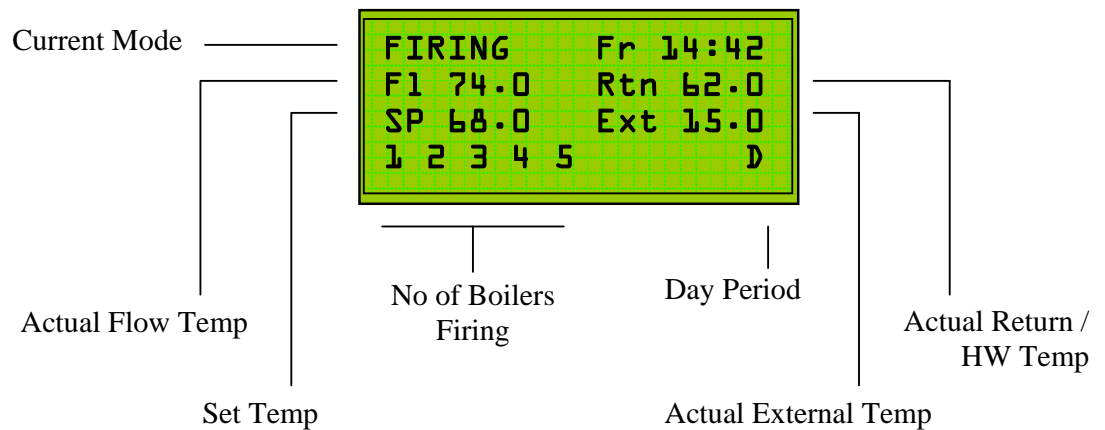


Establishing the System Maximum Flow Temp

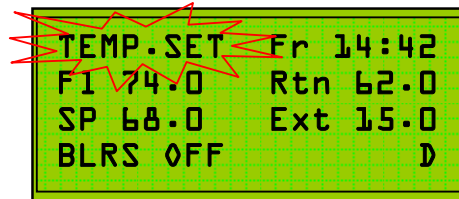
Switch on the power to the TEC 500.

1. Set the **Bypass Switch** to the bypass position.
Allow the heating system to cycle twice at the normal winter setting of the boiler thermostat (see plant engineer, caretaker, maintenance manger etc to establish winter thermostat position).

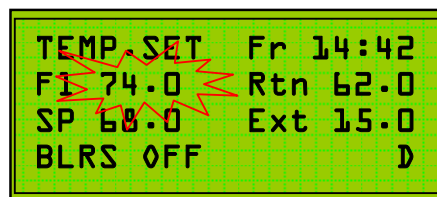
2. The display will show:



3. When the actual **Flow Temperature** exceeds the **Set Temperature**, the display will change:



4. When the boiler has cycled twice with the TEC 500 in **bypass**, observe the **actual flow temperature** as shown on the display:




In this example, the winter setting for the heating system (TEC 500 maximum flow setting) should be set to 74°C.

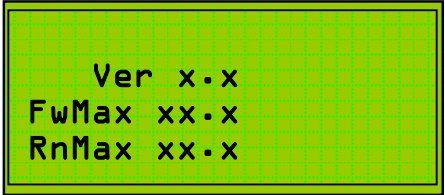

The Boiler Thermostat should now be set to a higher setting to ensure correct operation of the TEC 500.

Setting the Programs

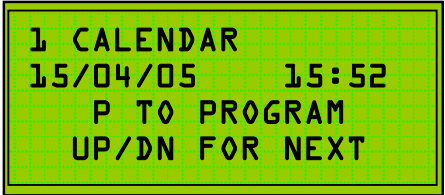

P1. Setting the Calendar (Factory Set)

1. Press and hold  until display shows:

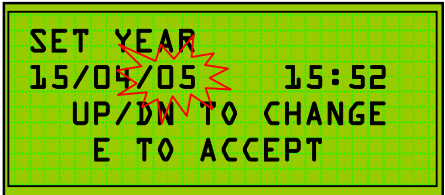


PROGRAM



2. Press  to display:

ENTER

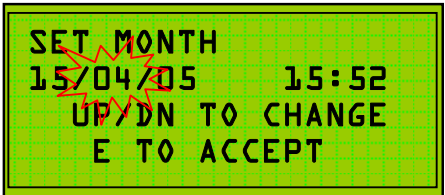



3. Press  again to display:

PROGRAM


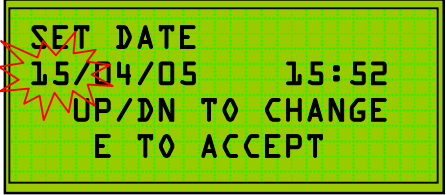



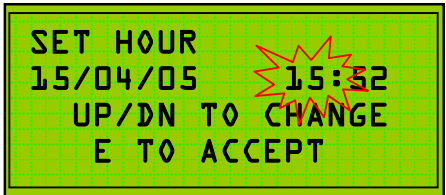



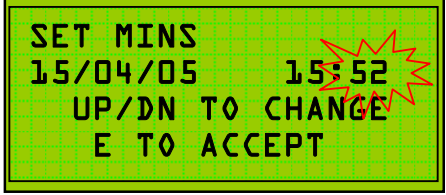



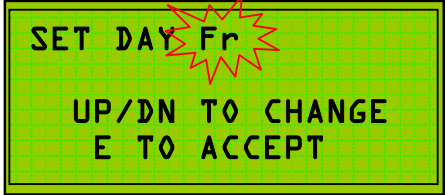



4. Press  or  to set the year.


SELECT RETURN
5. Press  to change display to:


ENTER


6. Press  or  to set the month.



SELECT RETURN

7. Press  to change display to: 
8. Press  or  to set the date.
9. Press  to change display to: 
10. Press  or  to set the hour.
11. Press  to change display to: 
12. Press  or  to set the minutes.
13. Press  to change display to: 
14. Press  or  to set the day.

15. Press  to confirm the program change and return to main menu.
ENTER

16. Press  to advance to next program.
SELECT

P2. Programming the Time Clock (Occupancy Times)

1. Press  or  to select program 2:



```
2 SET OCCUPANCY
TIMES
P TO PROGRAM
UP/DN FOR NEXT
```


2. Press  again to display:

```
P TO PROGRAM
Mo 1 07:30-12:00
2 13:00-16:30
UP/DN FOR NEXT
```

There are two (2) programmable On/Off times per day.

The second OFF time must ALWAYS be programmed, and set to a time after, but in the same 24 hour period as the first ON time.

3. To change On/Off Times select the required day with  


4. Press  to enter programming mode for the chosen day:

```
* P TO PROGRAM
Mo 1 07:30-12:00
2 13:00-16:30
UP/DN FOR NEXT
```

5. Press  to set first ON time:

```
* SET ON HOUR
Mo 1 07:30-12:00
2 13:00-16:30
UP/DN FOR NEXT
```

6. Press  or  to set the hour as required.

7. Press  to set first ON time minutes:

```
* SET ON MINS
Mo 1 07:30-12:00
   2 13:00-16:30
UP/DN FOR NEXT
```


8. Press  or  to set the minutes as required.


9. Press  to set first OFF** time:

```
* SET ON MINS
Mo 1 07:30-12:00
   2 13:00-16:30
UP/DN FOR NEXT
```

** If the FIRST OFF time is not required leave at 00:00.

Adjust HOUR and MINUTES in the same way as previously described.


10. Press  to set the second ON time and repeat as above.

11. Press  to set the second OFF time and repeat as above.



If different On/Off times are required for each day, then repeat the above instructions for each day's times.

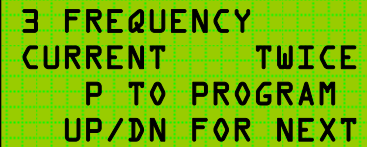
To repeat a days On/Off times into the next day, select the next day as

described above and press  followed by .

12. Press  to confirm program changes and return to main menu.

P3. Frequency (How the Time Clock operates)

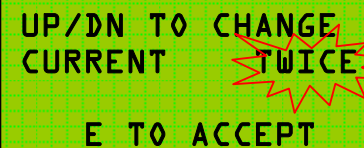
1. Press  or  to select program 3:
 SELECT RETURN



```

3 FREQUENCY
CURRENT TWICE
P TO PROGRAM
UP/DN FOR NEXT
  
```

2. Press  to display:
 PROGRAM



```


UP/DN TO CHANGE
CURRENT TWICE
E TO ACCEPT
  
```

3. Press  or  to set as described below:
 SELECT RETURN



ONCE The time clock operates from the first ON time to the second OFF time.

TWICE The time clock operates on both ON and OFF times i.e. two On/Off periods per day.

24 HOUR The time clock operates 24 hours a day regardless of the On/Off settings.

4. Press  to confirm program changes and return to main menu.
 ENTER

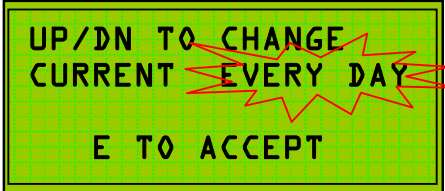
P4. Select Days (Weekdays/Everyday/Weekends)

1. Press  or  to select program 4:



4 SELECT DAYS
CURRENT EVERY DAY
P TO PROGRAM
UP/DN FOR NEXT

2. Press  to display:




~~UP/DN TO CHANGE~~
~~CURRENT EVERY DAY~~
E TO ACCEPT

3. Press  or  to set as described below:



EVERY DAY The heating will operate everyday as set by the time clock On/Off times.

WEEK ENDS The heating will operate at week ends only as set by time clock On/Off time for Sat – Sun. If reduced heating is required at week ends then set the time clock for reduced hours during Saturday and Sunday, and then set program 4 to EVERY DAY.

WEEK DAYS The heating will operate during week days only as set by the time clock On/Off times Mon – Fri. The heating will be OFF at weekends.

4. Press  to confirm program changes and return to main menu.

P5. Pre-Heat Time (Optimise On) (0 - 240 minutes)

1. Press  or  to select program 5:
 SELECT RETURN

5 PRE_HEAT TIME
 CURRENT 90 MINS
 P TO PROGRAM
 UP/DN FOR NEXT

When programming a **Variable Pre-Heat** period (Optimum On) the first switch on time (P2) should be set to the buildings occupation time. If a **variable pre-heat** period is **not** required, then the first switch on time must allow for a sufficient warm-up period before occupation time.



When selected, the full programmed **variable pre-heat** period will occur at 0°C external temperature. At temperatures above 0°C the system will calculate the required **pre-heat** time.


Note: To assure adequate temperatures are achieved by occupation time the maximum **pre-heat** period must satisfy the building's thermal characteristics.

If Optimum On is not required then set to 000 mins.

2. Press  to display:
 PROGRAM



UP/DN TO CHANGE
 CURRENT 90 MINS
 E TO ACCEPT

3. Press  or  to set the required number of minutes.
 SELECT RETURN

4. Press  to confirm program changes and return to main menu.
 ENTER
-

P6. Optimise Off

(0 - 240 minutes)

1. Press  or  to select program 6:
 SELECT RETURN

↳ OPTIMISE OFF
 CURRENT 90 MINS
 P TO PROGRAM
 UP/DN FOR NEXT



Optimum Off periods will, when selected, switch off a boiler / heating system earlier than the programmed **off** time.


At 15°C external temperature the full **optimum off** period will occur and the boilers will switch off early. At 0°C external temperature there will be **no optimum off** and the boilers will switch off at the normal programmed time. At external temperatures between 0°C and 15°C the system will calculate the required **off** time.

If Optimum Off is not required then set to 000 mins.

2. Press  to display:
 PROGRAM



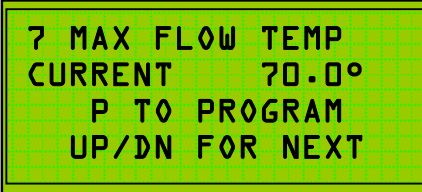

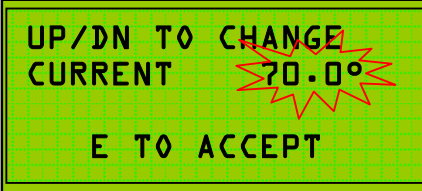



UP/DN TO CHANGE
 CURRENT 90 MINS
 E TO ACCEPT

3. Press  or  to set the required number of minutes.
 SELECT RETURN

4. Press  to confirm program changes and return to main menu.
 ENTER



P7. Maximum Flow Temperature


(30 - 85°C)




1. Press  or  to select program 7:
SELECT **RETURN**

 2. Press  to change display to:
PROGRAM

 3. Press  or  to change the temperature setting to that required (i.e. 73°C).
SELECT **RETURN**
 4. Press  to confirm the program changes and return to main menu.
ENTER
-

P8. Minimum Flow Temperature

(25 - 85°C)

1. Press  or  to select program 8:
SELECT RETURN

8 MIN FLOW TEMP
 CURRENT 55.0°
 P TO PROGRAM
 UP/DN FOR NEXT
2. Press  to change display to:
PROGRAM

UP/DN TO CHANGE
 CURRENT 55.0°
 E TO ACCEPT
3. Press  or  to change the temperature setting to that required.
SELECT RETURN
4. Press  to confirm the program changes and return to main menu.
ENTER

Setting a Minimum Flow Temperature is required to limit the effect of the Compensation. The flow temperature will not fall below that set in the Minimum Flow program (- differential), even if the compensated flow temperature is below this level.

The Minimum Flow Temperature should be chosen to meet heating criteria.

P9. Return/HW Temperature

(20 - 85°C)

The **Return/HW** temperature will depend on the type of heating system:



Heating and Hot Water.

Where convenient, the return temperature sensor should be fitted to the hot water storage tank (see installation instructions), the hot water return pipework or the hot water circulating pipework.

The **Return/HW** temperature should be set to provide normal hot water tank temperature, i.e. 60°C.

Heating Only.

In this instance, the **Return/HW** temperature should be set to the boiler manufacturers recommended level, i.e. 55°C for oil fired systems, 50°C or lower for gas fired systems. These figures are examples only. Refer to your boiler manual for manufacturer recommended settings.

1. Press  or  to select program 9:
 SELECT RETURN



```


9 RTN/HW TEMP
CURRENT 50.0°
P TO PROGRAM
UP/DN FOR NEXT
  
```

2. Press  to change display to:
 PROGRAM

```

UP/DN TO CHANGE
CURRENT 50.0°
E TO ACCEPT
  
```

3. Press  or  to set the required temperature.
 SELECT RETURN













4. Press  to confirm program changes and return to main menu.
 ENTER

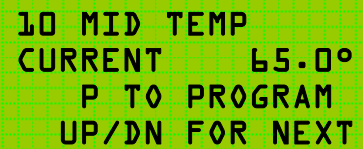
P10. Mid Temperature

(0 - 85°C)

The **Mid Temperature** is used (if required) to set the **flow** temperature during the period between the **1st Off Time** and the **2nd On Time**.

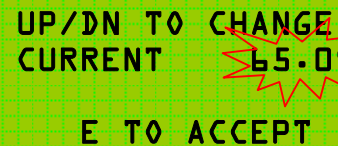
If a second **On Period** is not required, then set **Frequency** (P3) to **Once**.

1. Press  or  to select program 10:
 or 
2. Press  to change display to:

3. Press  or  to set the required temperature.
 or 
4. Press  to confirm program changes and return to main menu




```

10 MID TEMP
CURRENT 65.0°
P TO PROGRAM
UP/DN FOR NEXT
  
```



```



UP/DN TO CHANGE
CURRENT 65.0°
E TO ACCEPT
  
```

P11. Night Temperature

(0 - 85°C)

The **Night Temperature** can be used in 2 ways:

1. To provide basic **frost protection** in conjunction with the **frost temperature** (P11).
2. To provide night time economies on 24 hour systems by selecting a lower **flow temperature** during the programmed **off** periods.

1. Press  or  to select program 11:

SELECT

RETURN

```

11 NIGHT TEMP
CURRENT 60.0°
P TO PROGRAM
UP/DN FOR NEXT
  
```

2. Press  to change display to:

PROGRAM


```

UP/DN TO CHANGE
CURRENT 60.0°
E TO ACCEPT
  
```

3. Press  or  to set the required temperature.

SELECT

RETURN

4. Press  to confirm program changes and return to main menu

ENTER

P12. Frost Temperature

(0 - 35°C)

The **Frost Temperature** can be set to cancel the **Night Temperature** (P11) at a programmed external temperature.

E.G. For **frost protection** only set P12 to say 1°C.

The **night temperature** will not be activated until the external temperature falls to this level.

If the unit is installed in a nursing or residential home it may be possible to set P12 to 15°C - 16°C so that the **night temperature** will not be activated at temperatures above this and the heating will switch off.

If **night temperature** is required whatever the external temperature, set P12 to maximum, i.e. 35°C. Discuss this aspect with the building manager / owner to establish the requirements.


Operation of the Frost Temperature will cancel 24 Hr Hot Water Priority.

1.

Press  or  to select program 12:
SELECT RETURN



12 FROST TEMP
CURRENT 02.0°
P TO PROGRAM
UP/DN FOR NEXT

2.


Press  to change display to:
PROGRAM

UP/DN TO CHANGE
CURRENT 02.0°
E TO ACCEPT

3.

Press  or  to set the required temperature.
SELECT RETURN

4.





Press  to confirm program changes and return to main menu.
ENTER



P13. External Cut-Off Temperature







(0 - 35°C)

The **External Cut-Off Temperature** sets the outside temperature above which the heating system will switch off. This setting is also referred to as the Summer Cut-Off Temperature. The heating will come back on at 2°C below the External Cut-Off Temperature.

If the heating system provides both heating and hot water the **External Cut-Off** may not be appropriate (see notes on page 28, Hot Water Priority).

1. Press  or  to select program 13:
 





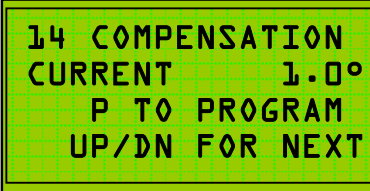


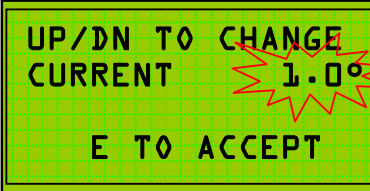






```
13 EXT C/O TEMP
CURRENT 12.0°
P TO PROGRAM
UP/DN FOR NEXT
```
2. Press  to change display to:


```
UP/DN TO CHANGE
CURRENT 12.0°
E TO ACCEPT
```
3. Press  or  to set the required temperature.
 
4. Press  to confirm program changes and return to main menu.


P14. Compensation

(0 – 3 in 0.5 steps)

The **Compensation** setting controls the change in flow temperature relative to the change in the external temperature, i.e. if set to

1. Press  or  to select program 14:
 or 

2. Press  to change display to:


3. Press  or  to set required compensation level.
 or 
4. Press  to confirm program changes and return to main menu.


P15. Number of Boilers

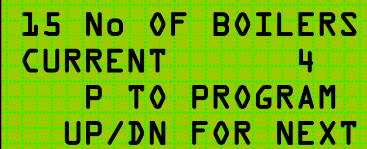
(1 – 5 boilers)

The **No of Boilers** setting is programmed to reflect the number of boilers on the heating system.

1. Press  or  to select program 15:

SELECT

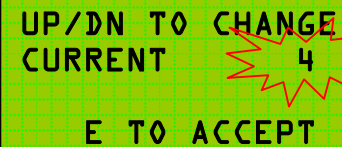
RETURN



15 No OF BOILERS
CURRENT 4
P TO PROGRAM
UP/DN FOR NEXT

2. Press  to change display to:

PROGRAM



UP/DN TO CHANGE
CURRENT 4
E TO ACCEPT

3. Press  or  to set required number.

SELECT

RETURN

4. Press  to confirm program changes and return to main menu.



ENTER

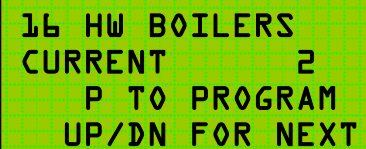
P16. Hot Water Boilers

(1 – 5 boilers)

The **HW Boilers** setting is programmed to reflect the number of boilers required for hot water. If heating only set to '0'.

Note: The number of boilers under control will reduce to the number set by P16 when the **external temperature** rises above the programmed level.

1. Press  or  to select program 16:
 SELECT RETURN






16 HW BOILERS
 CURRENT 2
 P TO PROGRAM
 UP/DN FOR NEXT

2. Press  to change display to:
 PROGRAM



UP/DN TO CHANGE
 CURRENT 2
 E TO ACCEPT

3. Press  or  to set required number.
 SELECT RETURN

4. Press  to confirm program changes and return to main menu.
 ENTER

P17. Differential

(0.5 – 5 in 0.5 steps)

The **Differential** should be set to match existing boiler thermostat cycling temperature.

Normal settings would be:

One Boiler	4 °C - 5 °C
Two Boilers	3 °C - 4 °C
Three Boilers	2 °C - 3 °C
Four to Five Boilers	2 °C

1. Press



or



to select program 17:

```
17 DIFFERENTIAL
CURRENT      2.0°
P TO PROGRAM
UP/DN FOR NEXT
```

2. Press



to change display to:

```
UP/DN TO CHANGE
CURRENT      2.0°
E TO ACCEPT
```

3. Press



or



to set required differential.

4. Press



to confirm program changes and return to main menu.





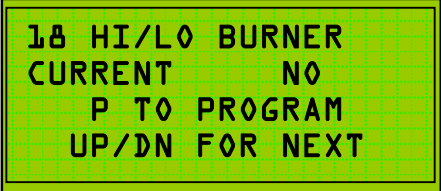


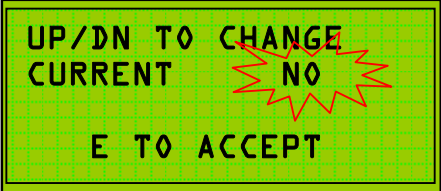






P18. Hi/Lo Burner

(Yes/No)

If two stage burners are installed (Hi/Lo), then set to **Yes**, otherwise set to **No**.

If two Hi / Lo boilers are encountered **P15** should be set to **4** and the **Lo Flame Burners** should be connected to outputs **1** and **3** on the TEC 500, and **Hi Flame** to **2** and **4**.





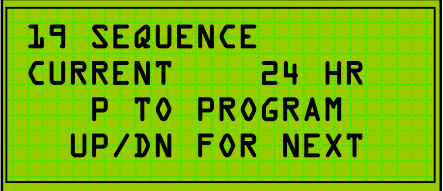


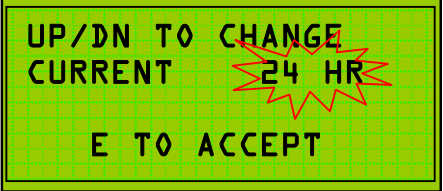






Note: Only 2 Hi/Lo boilers can be connected in the Hi/Lo mode.

1. Press  or  to select program 18:
 or 

2. Press  to change display to:


3. Press  or  to set as required.
 or 
4. Press  to confirm program changes and return to main menu.


P19. Sequence Mode

(None/24hr/7 day)

The **Sequence** program determines the frequency of the change of the lead boiler and can be set to None, 24 hrs or 7 days as appropriate.



1. Press  or  to select program 19:
 or 

2. Press  to change display to:


3. Press  or  to set as required.
 or 
4. Press  to confirm program changes and return to main menu.



P20. Test Mode




(Yes/No)

The **Test Mode** program is used to automatically switch the TEC 500 between Active Mode and Bypass Mode every 24 hours for use in various monitoring situations.

Set to '**NO**' for normal operation.

1. Press  or  to select program 20:
SELECT RETURN



20 TEST MODE
 CURRENT NO
 P TO PROGRAM
 UP/DN FOR NEXT
2. Press  to change display to:
PROGRAM

UP/DN TO CHANGE
 CURRENT ~~NO~~
 E TO ACCEPT
3. Press  or  to set as required.
SELECT RETURN
4. Press  to confirm program changes and return to main menu.
ENTER

P21. Calibration


(-10 °C to +20 °C)

Program 21 allows individual calibration of the Flow, Return and External temperature sensors. Each sensor reading can be adjusted by -10°C/+20°C.

1. Press  or  to select program 21:
SELECT RETURN




21 CALIBRATE

P TO PROGRAM

UP/DN FOR NEXT
2. Press  to change display to:
PROGRAM




UP/DN TO CHANGE

FLOW 15.0

E TO ACCEPT
3. Press  or  to adjust the displayed temp (-10°C/+20°C).
SELECT RETURN
4. Press  to confirm program changes and display:
ENTER

UP/DN TO CHANGE



RETN 15.0


E TO ACCEPT
5. Press  or  to adjust the displayed temp (-10°C/+20°C).
SELECT RETURN
6. Press  to confirm program changes and display:
ENTER

UP/DN TO CHANGE

EXTN 0.0

E TO ACCEPT

7. Press  or  to adjust the displayed temp (-10°C/+20°C).
SELECT RETURN

8. Press  to confirm program changes and return to main menu.
ENTER



P22. Hot Water Priority

(Yes/No)

When set to **NO** the TEC 500 Hot Water Priority operates during the programmed **ON** periods.

When set to **YES**, 24 hour hot water priority is provided.



Consideration should be given to the **Night Temperature** when setting Hot Water Priority. It should also be noted that operation of the **Frost Temperature** can cancel 24 Hour Hot Water Priority.


1. Press  or  to select program 22:
SELECT RETURN

22 HW PRIORITY
CURRENT NO
P TO PROGRAM
UP/DN FOR NEXT

2. Press  to change display to:
PROGRAM

UP/DN TO CHANGE
CURRENT NO
E TO ACCEPT

3. Press  or  to set as required.
SELECT RETURN

4. Press  to confirm program changes and return to main menu.
ENTER

P23. Internal / External Optimisation



(Yes/No)

Program 23 allows the TEC 500 to utilise either Internal AND External Optimisation or just External Optimisation.

This option can only be used (set to 'Yes') when the heating is programmed to be 'Off' during the night time, the **number of boilers** is less than 5 so that output 5 can be used as the **Plant Relay** and wired to the heating pump, and the **Return Sensor** is fitted to the return header to the boiler.

To use both modes of Optimisation set to YES.



To use just External Optimisation set to NO.


1. Press  or  to select program 23:
SELECT RETURN

```
23 INT&EXT OPTIM
CURRENT NO
P TO PROGRAM
UP/DN FOR NEXT
```

2. Press  to change display to:
PROGRAM

```
UP/DN TO CHANGE
CURRENT NO
E TO ACCEPT
```



3. Press  or  to set YES or NO.
SELECT RETURN

4. Press  to confirm program changes and return to main menu.
ENTER

P24. Back Up Time

(0 - 30 minutes)



If a boiler or boilers are unable to reach the required temperature but the flow temperature does not fall by the differential setting (P17) to bring in additional boilers, then additional boilers will be called after the time period set in **P24**.


1. Press  or  to select program 24:
SELECT RETURN

```
24 BACK UP TIME
CURRENT 10
P TO PROGRAM
UP/DN FOR NEXT
```

2. Press  to change display to:
PROGRAM

```
UP/DN TO CHANGE
CURRENT 10
E TO ACCEPT
```

3. Press  or  to set required time.
SELECT RETURN

4. Press  to confirm program changes and return to main menu.
ENTER

P25. Plant Relay



(Yes/No/Extn)

Where there are **less** than 5 boilers on the heating system this program allows channel 5 (boiler 5 output) to operate as a **Plant Relay**, i.e. control circulating pumps etc.

The modes of operation are:

- NO** - Disabled (system can operate in 5 boiler mode).
- YES** - Relay operates from programmed switch-on time (P2) and switches off **10 minutes** after programmed off time.
- EXTN** - Relay operates as setting 1 but also switches off based on **External Cut-Off** temperature (P13).



Note: Switching the heating pump off can only be programmed if there is a Hot Water primary pump to provide sufficient water circulation through the boiler.


1. Press  or  to select program 25:

25 PLANT RELAY
CURRENT NO
P TO PROGRAM
UP/DN FOR NEXT

2. Press  to change display to:

UP/DN TO CHANGE
CURRENT ~~NO~~
E TO ACCEPT

3. Press  or  to set as required.

4. Press  to confirm program changes and return to main menu.

P26. Auto BST

(Yes/No)

Program 26 is used to provide automatic adjustment for GMT-BST seasonal time changes. Set to **Yes** to enable.

1. Press  or  to select program 26:

SELECT

RETURN

```
26 AUTO B.S.T.
CURRENT YES
P TO PROGRAM
UP/DN FOR NEXT
```

2. Press  to change display to:

PROGRAM

```
UP/DN TO CHANGE
CURRENT YES
E TO ACCEPT
```

3. Press  or  to set as required.

SELECT

RETURN

4. Press  to confirm program changes and return to main menu.

ENTER