Total Energy Controls

TEC 100/200 Programming & Installation Manual

As of software v7.2

Contents

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 irrepairable damage to the PCB could result due to incorrect connections.

Mains Wiring

Unscrew the four screws of the TEC 100/200 and remove the lid to gain access to the PCB and wiring connections.

A 240V AC 1Ph 50Hz supply may be taken from the existing time clock switched or permanent supply, or direct from the boiler mains input connections (where available), which ever is the most suitable. The 240V connection to the TEC 100/200 is shown in Fig.1 below.
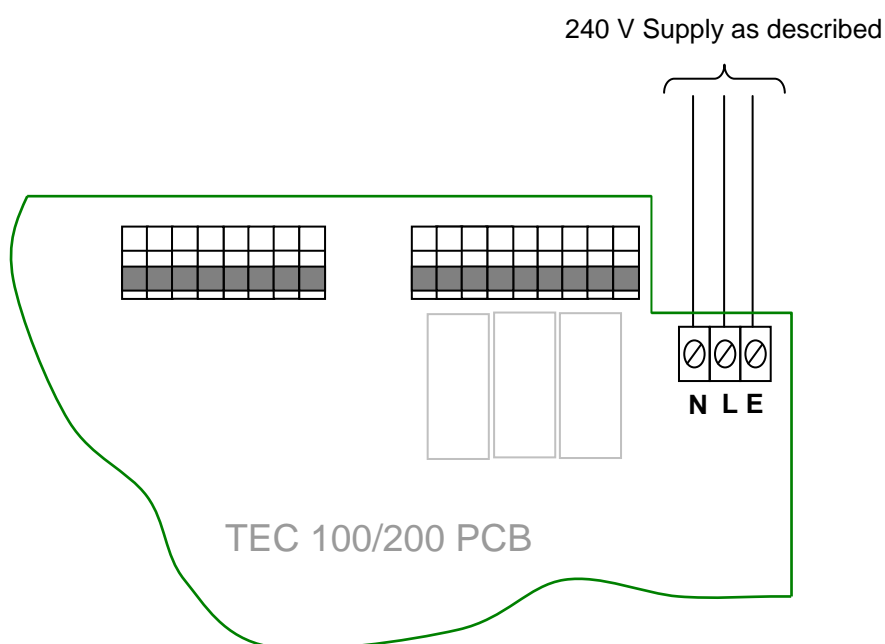
Fig. 1

Control Wiring

NOTE: If a wiring harness is provided in the rear of the enclosure please follow cables to TEC 100/200 PCB to determine connections as described in the following sections.

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 100/200 control wires can be connected as shown in Fig.2.
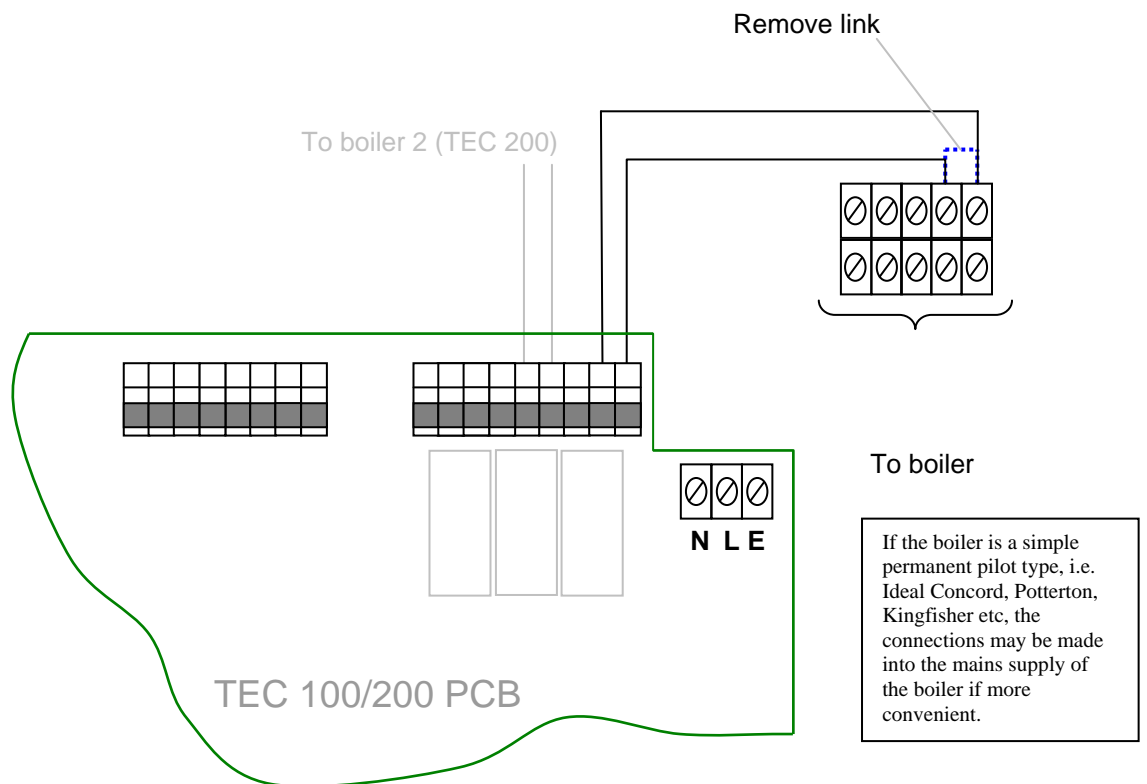
Remove link

To boiler 2 (TEC 200)

N L E

To boiler

TEC 100/200 PCB

If the boiler is a simple permanent pilot type, i.e. Ideal Concord, Potterton, Kingfisher etc, the connections may be made into the mains supply of the boiler if more convenient.

Fig. 2

Note: A 5-core heat resistant flex is ideal for connecting the TEC 100/200 to the boiler. The recommended connection method is via a flexible nylon conduit to house the cable.

Where a terminal block arrangement as shown in Fig.2 is not available, the control wiring should be connected directly into the boiler thermostat wiring as shown in Fig.3.
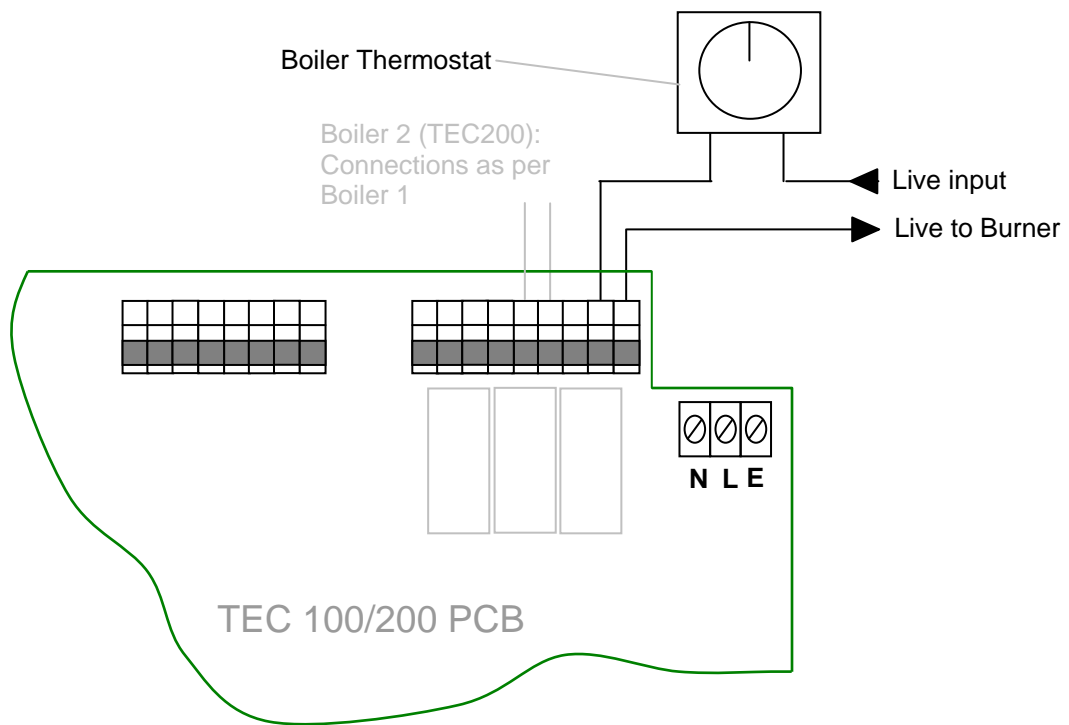
Boiler Thermostat

Boiler 2 (TEC200):
Connections as per
Boiler 1

Live input

Live to Burner

N L E

TEC 100/200 PCB

Fig. 3

Other Wiring Options

The TEC 100/200 has three control relays. On the TEC 100 the left hand relay
is the **Plant Relay** which may be used to control a circulating pump and the
right hand relay is the **boiler control circuit**.   The centre relay (Tec 100 only)
make and breaks on RTN/HW settings and may be used to control a HW pump,
solenoid etc, see Fig 4. On the TEC 200 the left hand relay is the **Plant Relay**,
the middle relay is **boiler 2 control circuit** and the right hand relay is **boiler 1
control circuit**.

Make on
RTN/HW
temperature
drop.

Pump

Neutral

Live

P 2 1

N L E
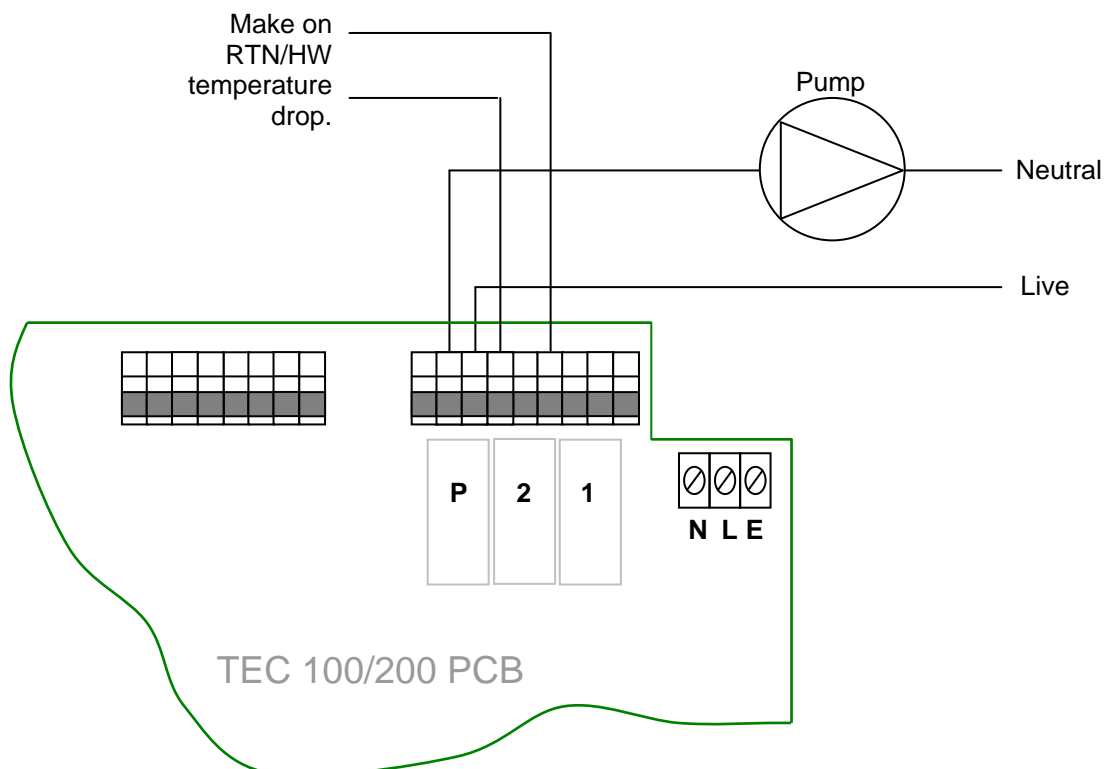
TEC 100/200 PCB

Fig. 4

Fitting and Wiring Temperature Sensors

The TEC 100/200 has three temperature sensor inputs, these being **Flow, Return/Hot Water** and **External**. Connections are as shown in Fig.5.

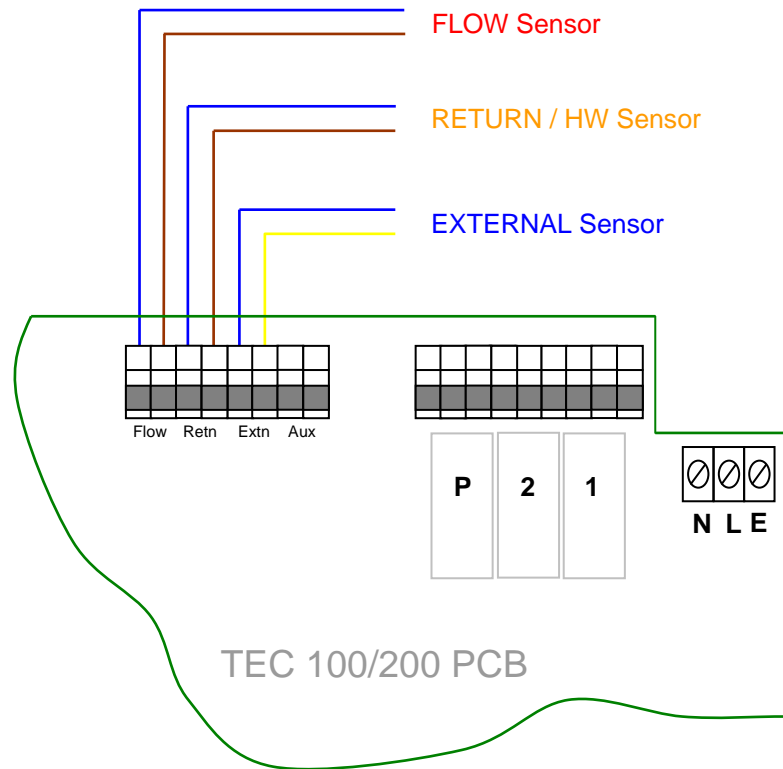FLOW Sensor

RETURN / HW Sensor

EXTERNAL Sensor

Flow   Retn   Extn   Aux

P   2   1

N L E

TEC 100/200 PCB

Fig. 5

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.6.

Heat Resistant Cloth Tape

Sensor Head

Pipe Insulation fixed over Sensor

Securing Ty-Wraps

Flow / Return Pipe
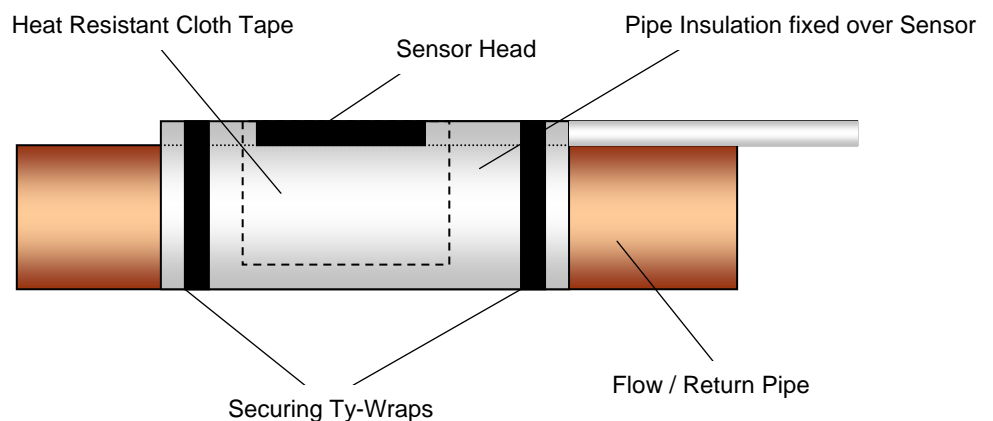
Fig. 6

Optional Hot Water Tank Sensor connections (replaces Return Temperature Sensor) are shown in Fig.7.

Optional HW Tank Sensor. Connect in place of Return Temperature Sensor. Mount 1/3 to 1/2 way up tank.

Fix Tank Sensor with expanding wire (supplied with optional Tank Sensor).

TEC 100/200 Return Temperature Sensor connections
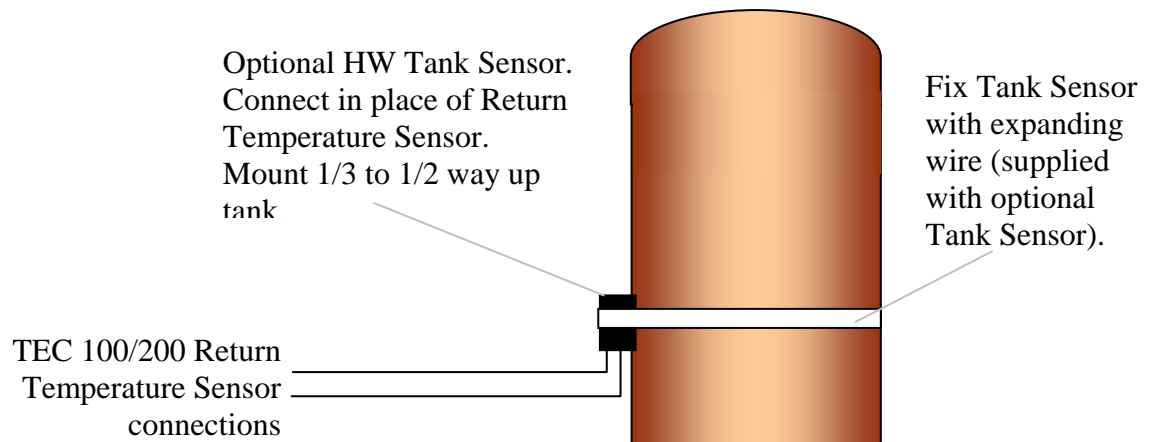
Fig. 7

If the hot water tank is a distance from the boiler, wiring to it may be impractical.

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.

External Sensor

The **External Sensor** should preferably be positioned on a north facing exterior wall, and connected to the appropriate terminals of the TEC 100/200. 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.

Note A special reflective, insulated external sensor is available when fitting in a position where solar heat is unavoidable.

Temperature Display Calibration

When required, the temperatures as displayed on the TEC 100/200 may be adjusted to cater for heat losses on pipework, losses on external temperature sensor etc. Program 17 (see page 30) can be used to calibrate the temperature display by -10ºC/+20ºC.

Commissioning - Introduction

The TEC 100/200 Digital has 18 main programs, these being:

1. Calendar
2. On/Off Times   (Two On/Off Periods per day)
3. Frequency   (Once, Twice, 24 Hours)
4. Select Days   (Every Day, Weekends, Week Days)
5. Optimise On Time   (0 to 240 minutes)
6. Optimise Off Time   (0 to 240 minutes)
7. Maximum Flow Temperature   (30ºC to 85ºC)
8. Minimum Flow Temperature   (25ºC to 85ºC)
9. Minimum Return Temperature   (20ºC to 65ºC)
10. Mid Temperature   (0ºC to 85ºC)
11. Night Temperature   (0ºC to 85ºC)
12. Frost Temperature   (0ºC to 35ºC)
13. External Cut Off Temperature   (0ºC to 35ºC)
14. Differential   (1ºC to 5ºC)
15. Hot Water Priority   (Yes / No)
16. Internal/External Optimisation   (Yes / No)
17. Calibration   (-10ºC/+20ºC)
18. Rotation   (Yes / No)

Certain Differentials and the Compensation Slope are fixed within the software, i.e. Return Temp 2ºC, External Temp 2ºC, Compensation Slope 1.5.

Keypad and Running Mode Overview

P

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.

↓
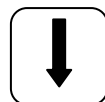
RETURN

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

E

ENTER

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

The TEC 100/200 will go into **Boost** mode from a cold start. It will stay in this mode for 15 minutes, or until the **Return Temp** is within10ºC of the **Flow Temp** If a **Hot Water Sensor** is fitted then the TEC 100/200 will go into **Boost** mode if the **HW Tank** is cold.

```
BOOST
S57   F20   R20   E12
```

Firing mode indicates that the boiler is firing.

```
FIRING
S57   F50   R42   E12
```

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

```
TEMPERATURE SET
S57   F59   R53   E12
```

Economising indicate that the TEC 100/200 has entered self learning mode and is making economies. The boiler will **not** be firing at this point.

```
ECONOMISING
S57   F59   R53   E12
```

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

```
EXT
S57   F36   R34   E16
```

**   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 100/200's weather compensation circuitry.

Establishing the System Maximum Flow Temp

Switch on the power to the TEC 100/200.

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:

Current Mode ────────────

```
FIRING     Tu 10:05
S57   F50   R42   E05
```

Set Temp ────────

Actual Flow Temp ────────

Actual Return / HW Temp ────────

Actual External Temp ────────
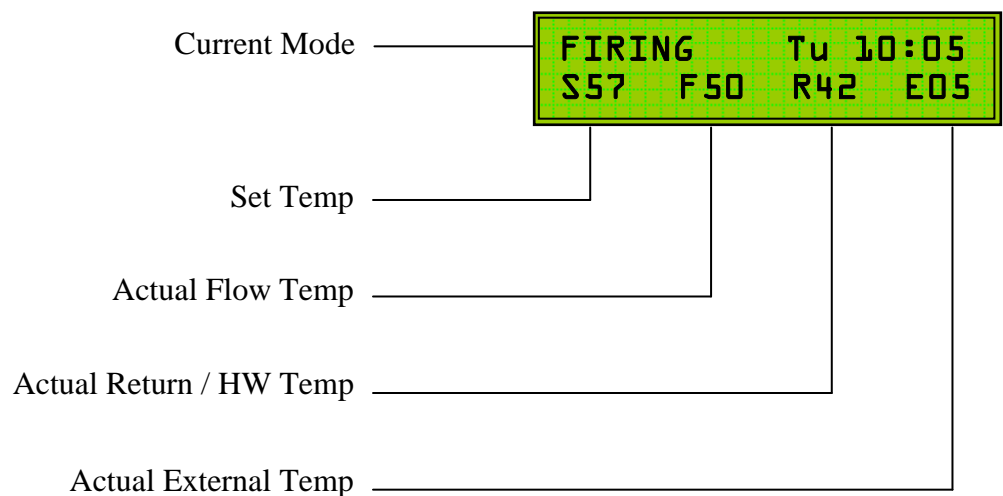
3. When the actual **Flow Temperature** exceeds the **Set Temperature**, the display will change:

```
TEMP·SET   Tu 10:05
S57   F58   R48   E05
```
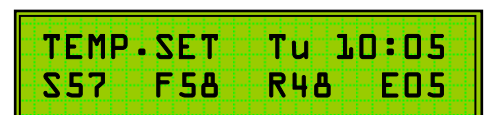
4. When the boiler has cycled twice with the TEC 100/200 in **bypass**, observe the **actual flow temperature** as shown on the display:

```
TEMP·SET   Tu 10:05
S57   F73   R65   E05
```
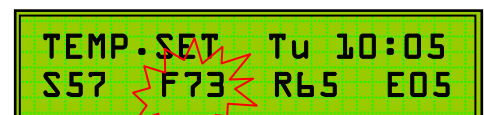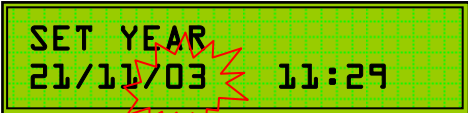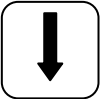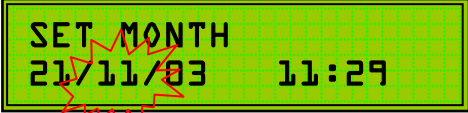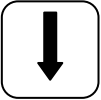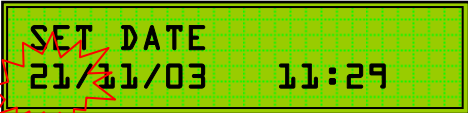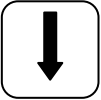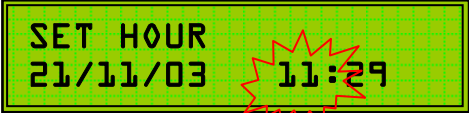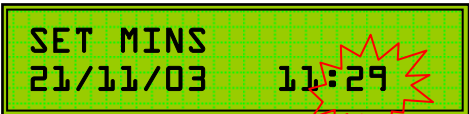
In this example, the winter setting for the heating system (TEC 100/200 maximum flow setting) should be set to 72ºC (73ºC - 1ºC).

The Boiler Thermostat should now be set to a higher setting to ensure correct operation of the TEC 100/200.
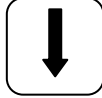
Setting the Programs

P1. Setting the Calendar (Factory Set)

1. Press [**P** PROGRAM] to change display to:

    ```
    1 CALENDAR
    21/11/03    11:29
    ```

2. Press [**P** PROGRAM] again to display:

    ```
    SET YEAR
    21/11/03    11:29
    ```

3. Press [↑ SELECT] or [↓ RETURN] to set the year.

4. Press [**E** ENTER] to change display to:

    ```
    SET MONTH
    21/11/03    11:29
    ```

5. Press [↑ SELECT] or [↓ RETURN] to set the month.

6. Press [**E** ENTER] to change display to:

    ```
    SET DATE
    21/11/03    11:29
    ```

7. Press [↑ SELECT] or [↓ RETURN] to set the date.

8. Press [E ENTER] to change display to:

```
SET HOUR
21/11/03    11:29
```

9. Press [↑ SELECT] or [↓ RETURN] to set the hour.

8. Press [E ENTER] to change display to:

```
SET MINS
21/11/03    11:29
```

9. Press [↑ SELECT] or [↓ RETURN] to set the minutes.

10. Press [E ENTER] to change display to:

```
SET DAY  Fr
```

11. Press [↑ SELECT] or [↓ RETURN] to set the day.

12. Press [E ENTER] to confirm the program change and return to main menu.

13. Press [↑ SELECT] to advance to next program.

P2. Programming the Time Clock (On/Off Times)

1. Press [↑ SELECT] or [↓ RETURN] to select program 2:

```
2 ON/OFF TIMES
```

2. Press [P PROGRAM] again to display:

```
MO 1 07:30-00:00
   2 00:00-16:30
```

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 [↑] [↓] SELECT RETURN
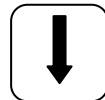
4. Press [P PROGRAM] to enter programming mode for the chosen day:

```
MO 1 07:30-00:00
*  2 00:00-16:30
```

5. Press [P PROGRAM] to set first ON time:

```
MO 1 07:30-00:00
*  2 00:00-16:30
```

6. Press [↑ SELECT] or [↓ RETURN] to set the hour as required.

7. Press [E ENTER] to set first ON time minutes:

```
MO 1 07:30-00:00
*  2 00:00-16:30
```

8. Press ⬆ or ⬇ to set the minutes as required.

SELECT   **RETURN**

9. Press **E** to set first OFF** time:

ENTER

```
MO 1 07:30-00:00
*   2 00:00-16:30
```

** 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 **E** to set the second ON time and repeat as above.

ENTER

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

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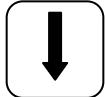
If different On/Off times are required for each day, then repeat the above instructions for each day's times.

To repeat a days On/Off times into the next day, select the next day as described above and press **P** followed by **E** .

PROGRAM   **ENTER**

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

ENTER

P3. Frequency (How the Time Clock operates)

1. Press [↑] **SELECT** or [↓] **RETURN** to select program 3:

```
3 FREQUENCY
CURRENT ONCE
```

2. Press [P] **PROGRAM** to display:

```
UP/DN TO CHANGE
CURRENT ONCE
```

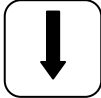**3.** Press [↑] **SELECT** or [↓] **RETURN** to set as described below:
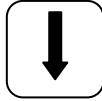
ONCE The time clock operates from the first ON time to the second OFF time.

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.

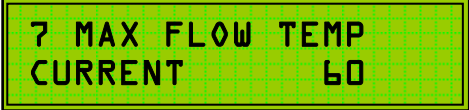**4.** Press [E] **ENTER** to confirm program changes and return to main menu.

P4. Select Days

1. Press [↑ SELECT] or [↓ RETURN] to select program 4:

```
4 SELECT DAYS
CURRENT EVERY DAY
```

2. Press [P PROGRAM] to display:

```
UP/DN TO CHANGE
CURRENT EVERY DAY
```

3. Press [↑ SELECT] or [↓ RETURN] to set as described below:

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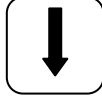
WEEK ENDS   The heating will operate at week ends only as set by time clock On/Off time for Sat – Sun. If reduced heating is required at week ends then set the time clock for reduced hours during Saturday and Sunday, and then set program 4 to EVERY DAY.

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 [E ENTER] to confirm program changes and return to main menu.

P5. Optimise On (Pre-Heat)

1. Press ⬆ **SELECT** or ⬇ **RETURN** to select program 5:

```
5 OPTIMISE ON
CURRENT 000 MINS
```

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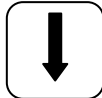
When selected, the full programmed **variable pre-heat** period will occur at 0ºC external temperature. At temperatures above 0ºC the system will calculate the required **pre-heat** time.

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 **P** **PROGRAM** to display:

```
UP/DN TO CHANGE
CURRENT 000 MINS
```

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

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

P6. Optimise Off

1. Press [↑ SELECT] or [↓ RETURN] to select program 6:

```
6 OPTIMISE OFF
CURRENT 000 MINS
```

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

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

If Optimum Off is not required then set to 000 mins.
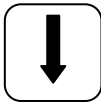
2. Press [P PROGRAM] to display:

```
UP/DN TO CHANGE
CURRENT 000 MINS
```

3. Press [↑ SELECT] or [↓ RETURN] to set the required number of minutes.

4. Press [E ENTER] to confirm program changes and return to main menu.
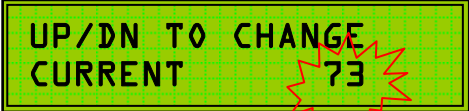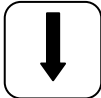
P7. Setting the Maximum Flow Temperature

1. Press [↑] **SELECT** or [↓] **RETURN** to select program 7:

```
7 MAX FLOW TEMP
CURRENT      60
```

2. Press [P] **PROGRAM** to change display to:

```
UP/DN TO CHANGE
CURRENT      73
```

3. Press [↑] **SELECT** or [↓] **RETURN** to change the temperature setting to that required (i.e. 73ºC).

4. Press [E] **ENTER** to confirm the program changes and return to main menu.

P8. Setting the Minimum Flow Temperature

1. Press ⬆️ or ⬇️ to select program 8:

   SELECT   **RETURN**

   ```
   8 MIN FLOW TEMP
   CURRENT      40
   ```

2. Press **P** to change display to:

   PROGRAM

   ```
   UP/DN TO CHANGE
   CURRENT      40
   ```
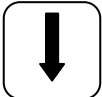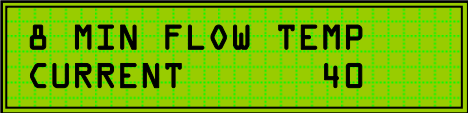
3. Press ⬆️ or ⬇️ to change the temperature setting to that required.

   SELECT   **RETURN**

4. Press **E** 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. Setting the Minimum Return Temperature

The **Minimum Return** temperature will depend on the type of heating system:
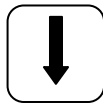
Heating and Hot Water.
Where convenient, the return temperature sensor should be fitted to the hot water storage tank (see installation instructions), the hot water return pipework or the hot water circulating pipework.
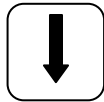
The **minimum return temperature** should be set to provide normal hot water tank temperature, i.e. 60ºC.

Heating Only.
In this instance, the **minimum return temperature** should be set to the boiler manufacturers recommended level, i.e. 55ºC for oil fired systems, 50ºC 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:
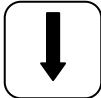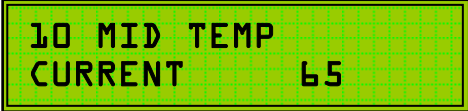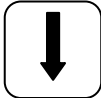
    SELECT   **RETURN**

    ```
    9 MIN RETN TEMP
    CURRENT     50
    ```

2. Press   **P**   to change display to:

    PROGRAM

    ```
    UP/DN TO CHANGE
    CURRENT     55
    ```

3. Press   ↑   or   ↓   to set the required temperature.

    SELECT   **RETURN**

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

    ENTER

P10. Setting the Mid Temperature

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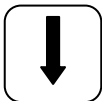
If a second **On Period** is not required, then set **Frequency** (P3) to **Once**.

1. Press   ⬆   or   ⬇   to select program 10:

    SELECT   **RETURN**

    ```
    10 MID TEMP
    CURRENT    65
    ```

2. Press   P   to change display to:

    PROGRAM

    ```
    UP/DN TO CHANGE
    CURRENT    65
    ```

3. Press   ⬆   or   ⬇   to set the required temperature.

    SELECT   **RETURN**

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

    ENTER

P11. Setting the Night Temperature

The **Night Temperature** can be used in 2 ways:
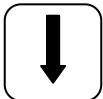
1.   To provide basic **frost protection** in conjunction with the **frost temperature** (P12).

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     35
```

2. Press **P** to change display to:

PROGRAM

```
UP/DN TO CHANGE
CURRENT     35
```

3. Press ↑ or ↓ to set the required temperature.

SELECT   **RETURN**

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

ENTER

P12. Setting the Frost Temperature

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 1ºC.

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 15ºC - 16ºC 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. 35ºC. Discuss this aspect with the building manager / owner to establish the requirements.

Operation of the Frost Temperature will cancel 24 Hr Hot Water Priority.
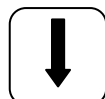
1.   Press ↑ **SELECT** or ↓ **RETURN** to select program 12:

```
12 FROST TEMP
CURRENT     03
```

2.   Press **P** **PROGRAM** to change display to:

```
UP/DN TO CHANGE
CURRENT     03
```

3.   Press ↑ **SELECT** or ↓ **RETURN** to set the required temperature.
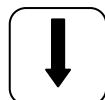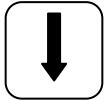
4.   Press **E** **ENTER** to confirm program changes and return to main menu.

13. Setting the External Cut-Off Temperature

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 2ºC below the External Cut-Off Temperature.
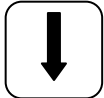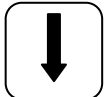
1. Press   [↑] **SELECT**   or   [↓] **RETURN**   to select program 13:

                                                         `13 EXT C/O TEMP`
                                                         `CURRENT    35`

2. Press   [P] **PROGRAM**   to change display to:

                                                         `UP/DN TO CHANGE`
                                                         `CURRENT    35`

3. Press   [↑] **SELECT**   or   [↓] **RETURN**   to set the required temperature.

4. Press   [E] **ENTER**   to confirm program changes and return to main menu.

14. Differential

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

1. Press ⬆ or ⬇ to select program 14:

SELECT   RETURN

```
14 DIFF
CURRENT      2
```
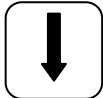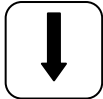
2. Press **P** to change display to:

PROGRAM

```
UP/DN TO CHANGE
CURRENT      2
```

3. Press ⬆ or ⬇ to set required differential.

SELECT   RETURN

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

ENTER

P15. Hot Water Priority (24 Hour)

1. Press [↑] SELECT or [↓] RETURN to select program 15:

```
15 HW PRIORITY
CURRENT  NO
```

2. Press [P] PROGRAM to change display to:

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

3. Press [↑] SELECT or [↓] RETURN to set YES, NO or HW Only.

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

When set to **NO** the TEC 100/200 Hot Water Priority operates during the programmed **ON** periods.

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

When set to **HW ONLY** the **plant relay** controlling the heating pump will switch off when the **external cut-off** temperature is exceeded. This may only be set if a separate HW pump is installed, or gravity flow to the hot water cylinder is used.

Note: The centre relay of the **TEC 100** is programmed to operate at the **RTN/HW** temperature setting and may be used to control the HW pump etc.

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.
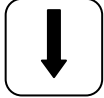
P16. Internal / External Optimisation

Program 16 allows the TEC 100/200 to utilise either Internal AND External Optimisation or just External Optimisation.

Internal Optimisation requires the heating pump to be connected to the Plant/Pump Relay as described on page 5.

To use both modes of Optimisation set to YES.

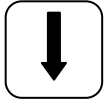To use just External Optimisation set to NO.
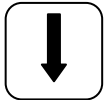
1. Press **↑** or **↓** to select program 16:

    SELECT   RETURN

    ```
    16 INT&EXT OPTIM
    CURRENT  NO
    ```

2. Press **P** to change display to:

    PROGRAM

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

3. Press **↑** or **↓** to set YES or NO.

    SELECT   RETURN

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

    ENTER

P17. Calibration

Program 17 allows individual calibration of the Flow, Return and External temperature sensors. Each sensor reading can be adjusted by -10ºC/+20ºC.

1. Press **↑** SELECT or **↓** RETURN to select program 17:

```
17 CALIBRATE
```

2. Press **P** PROGRAM to change display to:

```
17 CALIBRATE
FLOW 60
```

3. Press **↑** SELECT or **↓** RETURN to adjust the displayed temp (-10ºC/+20ºC).

4. Press **E** ENTER to confirm program changes and display:

```
17 CALIBRATE
RETN 50
```

5. Press **↑** SELECT or **↓** RETURN to adjust the displayed temp (-10ºC/+20ºC).

6. Press **E** ENTER to confirm program changes and display:

```
17 CALIBRATE
EXTN 16
```

7. Press ⬆ or ⬇ to adjust the displayed temp (-10ºC/+20ºC).

SELECT   **RETURN**
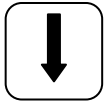
8. Press **E** to confirm program changes and return to main menu.

ENTER

P18. Rotation (TEC 200 only)

Program 18 allows the TEC 200 to rotate the lead boiler every 24 hours.

When set to YES the lead boiler is changed at midnight i.e. boiler 1 leads one day, and boiler 2 the next, then boiler 1 next etc etc.
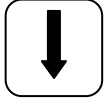
When set to NO the boiler connected as boiler one will always be the lead boiler.

1.   Press   ↑   or   ↓   to select program 18:

         SELECT   **RETURN**

```
18 ROTATION
CURRENT  YES
```

2.   Press   **P**   to change display to:

         PROGRAM

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

3.   Press   ↑   or   ↓   to set YES or NO.

         SELECT   **RETURN**

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

         ENTER

Exiting Programming Mode

To exit from the programming mode, first ensure that the display indicates you are in the main menu.

At this point, press **E** to exit programming mode.

ENTER

The display will change to:

```
TEC 100 V3
       ACTIVE
```

⇩

And then, after a few seconds to:
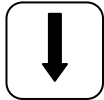
```
FIRING     Tu 15:35
S57   F50   R42   E05
```

The display may show slightly different information depending on the current mode of operation, i.e. boost, firing, economising etc.

Note: When in programming mode the TEC 100/200 will revert to normal

running mode if the keypad is not operated for a period of 30 seconds (4 minutes if in program change mode).

To access programming mode from normal running mode:

Press **P** and then select required program with **↑** **↓** .

PROGRAM   **SELECT**   **RETURN**

Make any program changes as described previously.

TEC 100/200 with Monitor Socket

The TEC 100/200 is available with a pre-wired **Monitoring Socket**. In such a case, the control wiring must be as shown in Fig.3 (page 5).

The power supply to the unit **must** be from a **permanent** source to enable the monitoring system to function in the correct manner.

Within the TEC 100/200 you will see an **orange fly lead**. This should be connected to the **timeswitch output** to provide a signal for the **demand meters** (lower set).

If for any reason the system will not allow connections into the control thermostat as shown in Fig.3, then remove the **red link** wire as shown in Fig.9. Connect the **white fly lead** to the now spare connector on the **monitor socket** (originally connected to red link), and connect directly to burner supply to provide a signal for the **firing meters** (upper set).

The monitoring system has an integral digital timer that has been programmed to operate the **Day On/Day Off** changeover at 00:05 – 00:10 hrs. Open the monitor lid and operate the **change button** on the digital timer to initiate an **active** period (red LED **off**).

With the boiler firing and the heating timeswitch **on**, the two **active** meters should be operating. The **top** active meter indicating **firing hours**, and the **bottom** active meter indicating **demand** hours.

If they are not operating, re-check all connections.

Allow the TEC 100/200 to reach **Temp Set** mode (boiler cut-off), and note the **firing** meter has stopped. Operate the **change button** on the digital timer to initiate a **bypass period** (red LED **on**). Providing that the boiler thermostat is **on**, the boiler will re-fire (TEC 100/200 bypassed), and the **bypass** meters will operate. The **top** bypass meter indicating **firing hours**, and the **bottom** bypass meter indicating **demand** hours.

When ready to start the monitored test, operate the **change button** on the digital timer to enter an **active** period (red LED **off**), ensuring that the timer is itself in the **off** state. If necessary, reset the hour meters to zero with the **reset button** provided in the top right hand corner of the unit. The system will now

record **firing** and **demand** hours in both **active** and **bypass** modes. These modes will alternate on a day to day basis.
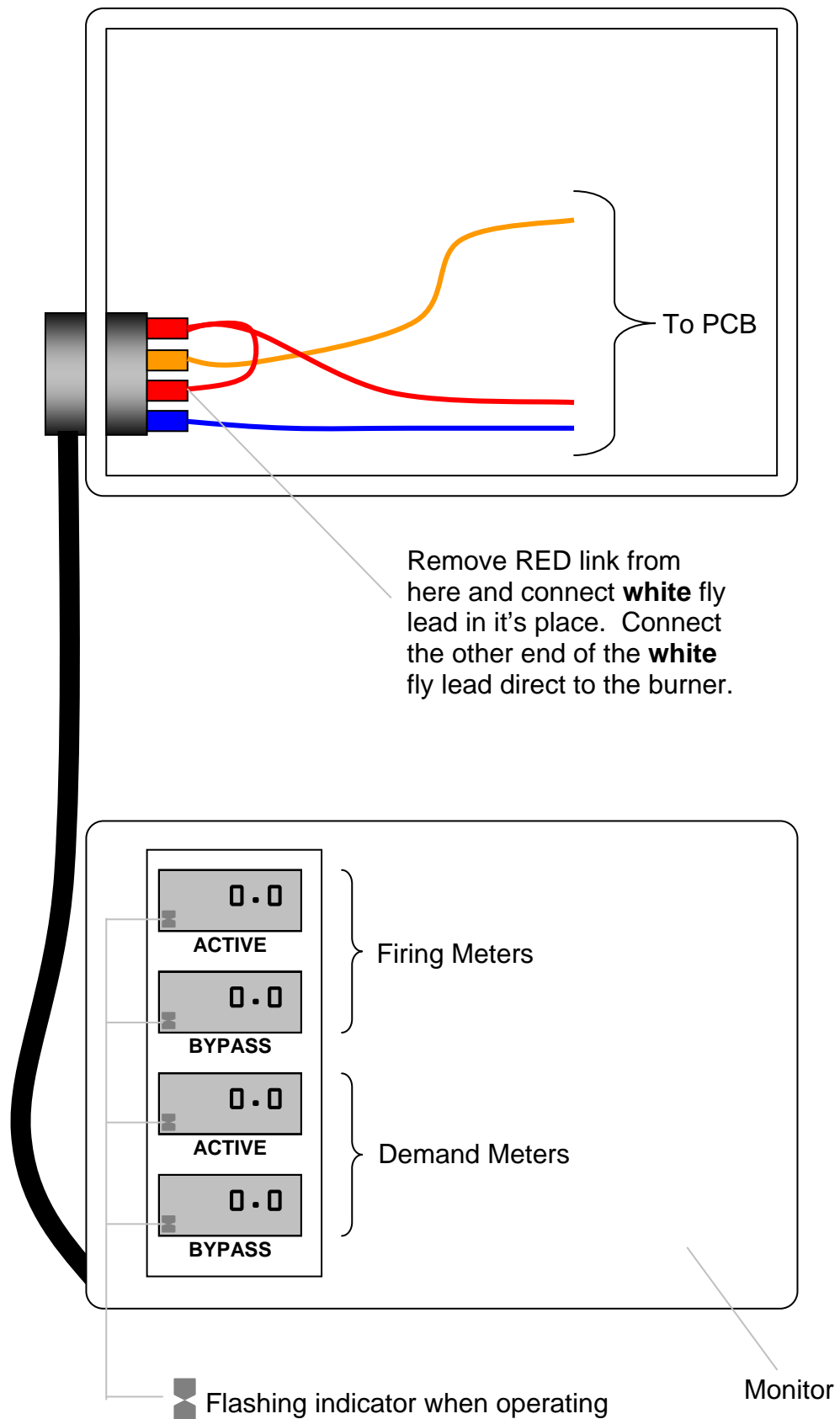
To PCB

Remove RED link from here and connect **white** fly lead in it's place. Connect the other end of the **white** fly lead direct to the burner.

0.0
ACTIVE

0.0
BYPASS

Firing Meters

0.0
ACTIVE

0.0
BYPASS

Demand Meters

Monitor

Flashing indicator when operating

Fig. 9