SWALE HEATING LTD

Health and Safety File

[redacted] Queenborough,

Isle of Sheppey, Kent

Bernard Kelvin Clarke

2010

EUROLINK INDUSTRIAL ESTATE, HEARD WAY, SITTINGBOURNE, KENT, ME10 3SA

Health and Safety File Contents

Queenborough, Isle of Sheppy, Kent

---

1) **Project Description**
2) **Residual Hazards**
3) **Key Structural Principals**
4) **Hazardous Materials**
5) **Major Equipment information including Health and Safety information**

Heating and Hot Water Service

Boiler

Fuel

Chimney

Health and Safety – Maintenance

Hot water Supplies

Cold Water Supplies

Solar panels – Baxi Solarflo FK8200 On Roof collector

Solar Pump Set and Pressure relief excess fluid vessel

Health and Safety

Glycol

Safe Working at Height

Photovoltaic Cells – Grant Solar PV Systems

Technical specification Each Panel

Health and Safety

Safe working at Height

Electrical – Alternating Current (AC) and Direct Current (DC)

Wiring Schematic

Mechanical Ventilation/Heat Recovery (MVHR)

Building Details

Drawings indicating Layout and Major equipment Locations

Ground Floor Layout

First Floor Layout

Roof Space

WattBox Control System

NOTE:- All Installation, Operating and Maintenance Instructions are held by the resident in a purpose provided lever arch file so that it can be made available to Maintenance Contractors

Health and Safety File

Queenborough, Isle of Sheppy, Kent

1) Project Description

The aim of the project was to take a mid terraced property that could be easily identifiable as being typical of the type built in vast numbers across the country in the 1950's and 1960's, install energy saving systems and to improve the thermal insulation of the property.

The overall aim of the project was:

- Reduce the residents running costs thereby saving energy
- Reducing running costs by the introduction of a gas fired condensing boiler to provide heating and hot water and an electrical supply, where the excess could be exported to the national grid
- Using solar energy to provide hot water. This reduces the amount of gas used to provide hot water
- Using the suns energy for the production of electricity for use in the home. Any surplus is exported into the national grid system
- Reducing the amount of Carbon Dioxide, a green house gas, being put into the atmosphere as a result from burning fossil fuels
- Reduce the amount of wasted heat energy being allowed to escape to atmosphere

Installation of renewable energy systems featuring

- Solar Panels mounted on the roof for the production of hot water
- Photovoltaic Cells mounted on the roof for the production of Electricity
- Combined Heat and Power boiler for the production of not only heating and hot water, but of electricity also
- Improved control systems allowing the resident to have more control over the systems
- Improved levels of wall insulation, in addition to the existing cavity fill, to reduce further the amount of fabric heat loss
- Improved levels of loft insulation
- Improved household white goods package to Energy Rating A
- Improved control over the ventilation within the property

2) Residual Hazards

Asbestos containing materials have been removed from the inside of the property as detailed under Key Structural Principles

Other asbestos containing material can be found externally as part of the construction forming soffits boards along the edges of the property front and back and is out of normal reach.

3) Key Structural Principles

There are no additional structural additions to the existing property.

Boiler

The boiler, which is a Baxi Ecogen 24/1.0, is a combined Heat and Power gas fired appliance and as part of its installation it is a manufacturers that due to its installation weight lift 115 kg it must be mounted on a structural wall.

Ground Floor

The ceiling was removed in the ground floor dining area and kitchen to allow the insertion of the mechanical ventilation and heat recovery duct work.

Ground Floor Ceiling

The ceilings in all areas of the ground floor were removed with the exception of the kitchen because the artex contained asbestos

First Floor

On the first floor the floorboards were lifted to allow the insertion of pipework necessary for the system installation.

First Floor Ceiling

The first floor ceiling was removed throughout because it contained asbestos artex

4) Hazardous Materials

The inside of the external walls was insulated using:

- **Kingspan K5 Kooltherm Insulation – this material is CFC/HFC free rigid phenolic insulation**

However if repairs are required to be carried out a future date then the Material Safety Data Sheets for the appropriate material should be consulted and are held within the overall Health and Safety File

The surface of the render has been painted as shown in the pictures above.

5) Major Equipment information Including Health and Safety Information

Heating and Hot Water Service

Heating to radiators and the unvented hot water cylinder is provided from a:

Baxi Ecogen 24/1.0 wall mounted appliance.

The boiler has a nominal thermal output to water of 24kw in condensing mode and is depicted in the picture on the left hand side.

The appliance is a room sealed fan assisted balanced flued.

It will provide an electrical output of 1 KW

Chimney

The chimney and its terminal has been sighted to meet both the current requirements of the manufacturer and the appropriate British Standards

Health and Safety - Maintenance

It must be noted that according to the manufacturer's instructions the appliance contains a pressure vessel filled with Helium to 23bar

The following should be noted

- **Do Not strike, drop, drill or puncture the vessel**
- **Do not unbolt any of the covers or flanges**
- **The vessel contains no user serviceable parts**
- **And dispose of safely**

Because the weight of the boiler was 115kg it required three men to lift the appliance on to the wall. The cupboard was subsequently built around it.

However should the appliance require replacing at any time it will require a risk assessment and production of a method statement detailing how the boiler is to be removed and its subsequent disposal.

Servicing the appliance in its installed position does present any problems.

Hot water supplies

Hot Water is provided from a 210 litre capacity Santon Premier Plus Solar Unvented Hot Water Service Cylinder, this is installed in the roof space.

- **Type Indirect PES210I - Nominal Capacity 210litres, weight of full unit 264 kg**

Hot water is supplied to all outlets via copper pipework which has been modified and extended to run from the Unvented Hot water Cylinder to connect to the existing hot water pipework.

Cold water Supplies

The existing cold water supplies have been modified to allow connection to the incoming cold water mains following removal of the original Cold Water Storage Cistern. This has improved the performance particularly since a shower has been added.

Benefits-The resident has been using less baths and mores showers leading to a reduction in water consumption.

Solar panels - Baxi Solarflo FK8200 on roof collector

Two Solar panels have been fitted on to the roof of the south facing elevation and connected to the unvented hot water cylinder to provide an additional source of heating hot water.

This be a particular benefit during the summer months and to a lesser extent during winter periods

This will reduce the reliance on the use of fossil fuel produced energy to heat hot water.

Baxi Solarflo FK8200 on roof collector

Technical specification for Each Panel:

Outer Dimensions	1370mm Long
	1170mm Wide
	83mm High
Weight for each panel	39kg
Pressure	10 Bar
Stagnation Temperature	184°C

Solar Pump set and Pressure relief excess fluid vessel

Stainless steel flexible flow and return pipework connects the solar panels and the unvented hot water cylinder.

The system is controlled by a pump set shown above on the left hand side and is provided with a combined filling valve and pressure relief set to the right had side of the pump set.

Should the pressure exceed the valves setting the excess pressure and fluid is vented into the Grey Tube that acts as the **Pressure relief excess fluid vessel.**

As the system is unvented the white pressure vessel takes the expansion of the fluid under normal operating conditions.

Health and Safety

Glycol

The working medium/fluid used in the solar heating system is glycol, which is an anti freeze. During periods when the system does not require heat it can lead to lead to a rise in temperature particularly during the summer months when the stagnation temperature can reach 184oC.

There is cause to be careful when carrying out any work or maintenance on the system when temperatures can be so high, also taking into account that this is a pressurised system, those not familiar with this type of system may suffer scalding or other injuries if attempts are made to disconnect the system when under pressure and at high temperatures.

If the system does over heat, which results in expansion of the fluid and an increase in pressure beyond the system settings, the excess is released via a pressure relief valve into a **Pressure relief excess fluid vessel** sighted adjacent to the pump set.

If the loss of fluid is sufficient the solar system will cease to function correctly. It will require a special pump set to re-charge the system using the fluid from the Pressure relief excess fluid vessel

Safe working at height

To access the solar panels for replacement, repairs and maintenance should involve a risk assessment to select the appropriate method and equipment needed to work at height; this would in most circumstances be scaffolding and a working platform.

The correct personal protective equipment should be worn; again the correct type would be assessed through a risk assessment and method statement.

Photovoltaic Cells - Grant Solar PV Systems

Ten Photovoltaic cells have been fitted on to the roof of the south facing elevation to provide an additional source of electrical current.

Detail of the fixing arrangements for the photovoltaic panels.

The photovoltaic cell produces Direct Current, which passes through an inverter where it is converted into Alternating Current for use in the household. Excess current is exported into the national grid.

It requires an electrician who has the right qualifications and competency to work on the system.

Technical specification Each Panel:

Outer Dimensions	1580mm Long	
	808mm Wide	
	45mm High	
Electrical for each panel	180W	
Weight for each panel	15.5kg	
Electrical Classification	Safety Class 2	
Total electrical output for 10 panels		**1800W**

Health and Safety

Safe Work at Height

To access the photovoltaic cells for replacement, repairs and maintenance should involve a risk assessment to select the appropriate method and equipment needed to work at height; this would in most circumstances be scaffolding.

The correct personal protective equipment should be worn; again the correct type would be assessed through a risk assessment and method statement.

Electrical - Alternating Current (AC) and Direct Current (DC)

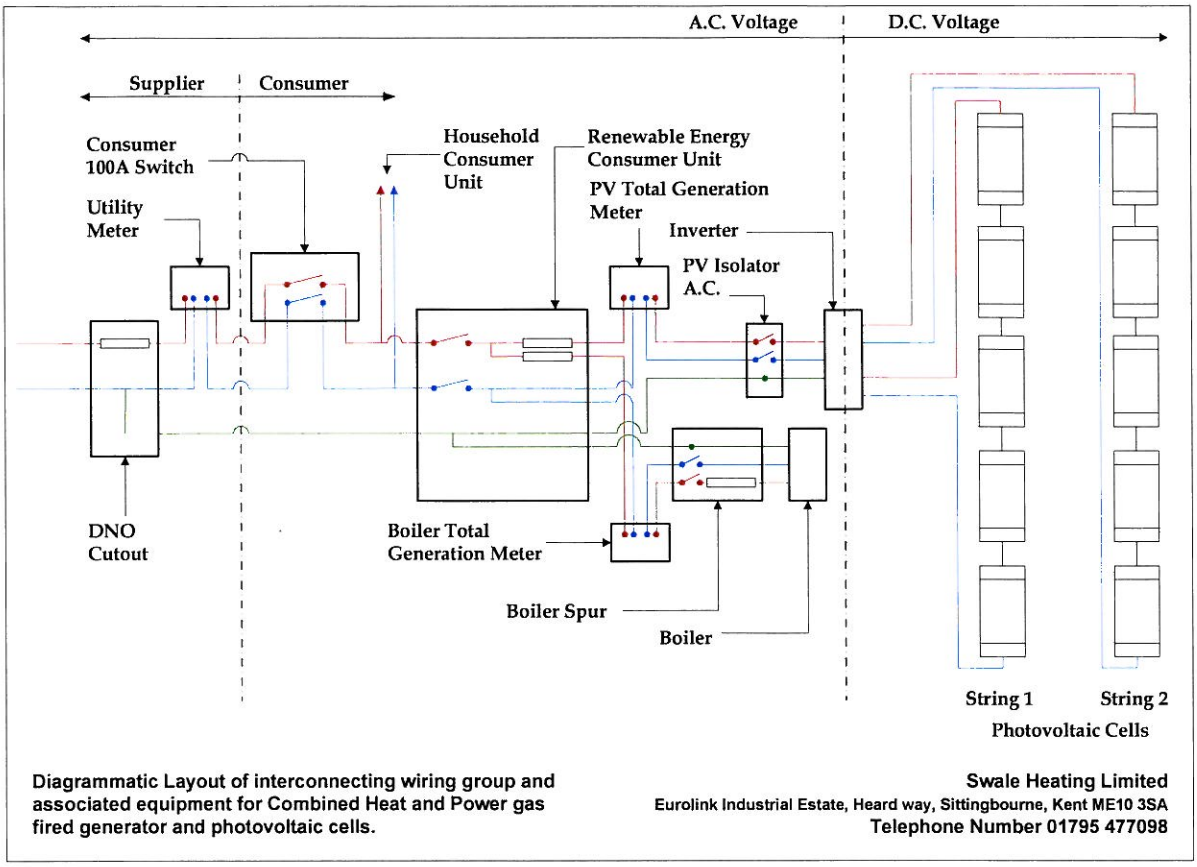
The photovoltaic cell's provide a DC electrical supply and this is then converted via an inverter (As shown to the left) to AC electrical supply for domestic use.

There are dangers associated on working with electrical current and there are different dangers.

Alternating Current (AC) fibrillates the heart, which is the rapid, irregular, and unsynchronized contraction of muscle fibers. An important occurrence is with regards to the heart when the heart muscle has a quivering motion rather than normal pumping action. This condition could affect the upper (atrial) or lower (ventricular) chambers of the heart. Ventricular fibrillation of the heart can cause death in minutes.

Direct Current (DC) causes deep tissue burns as it causes continuous muscle contraction and disabling you by preventing you from letting go.

The result of any electrical shock can be Death.



Mechanical Ventilation/Heat Recovery (MVHR)

Fitted in the roof space is the MVHR. This takes warm stale air from the designated rooms transfer's the heat to fresh incoming air from the atmosphere and redistributes the various rooms. Stale air is expelled to atmosphere.

A series of ducts circulates the stale and fresh heated air around the property

The MVHR will require an annual inspection along with the boiler to clean and service the following:

1. **Fan filters**
2. **Unit and heat exchanger cell**
3. **Motors**
4. **Condensate drain**
5. **Fastenings**

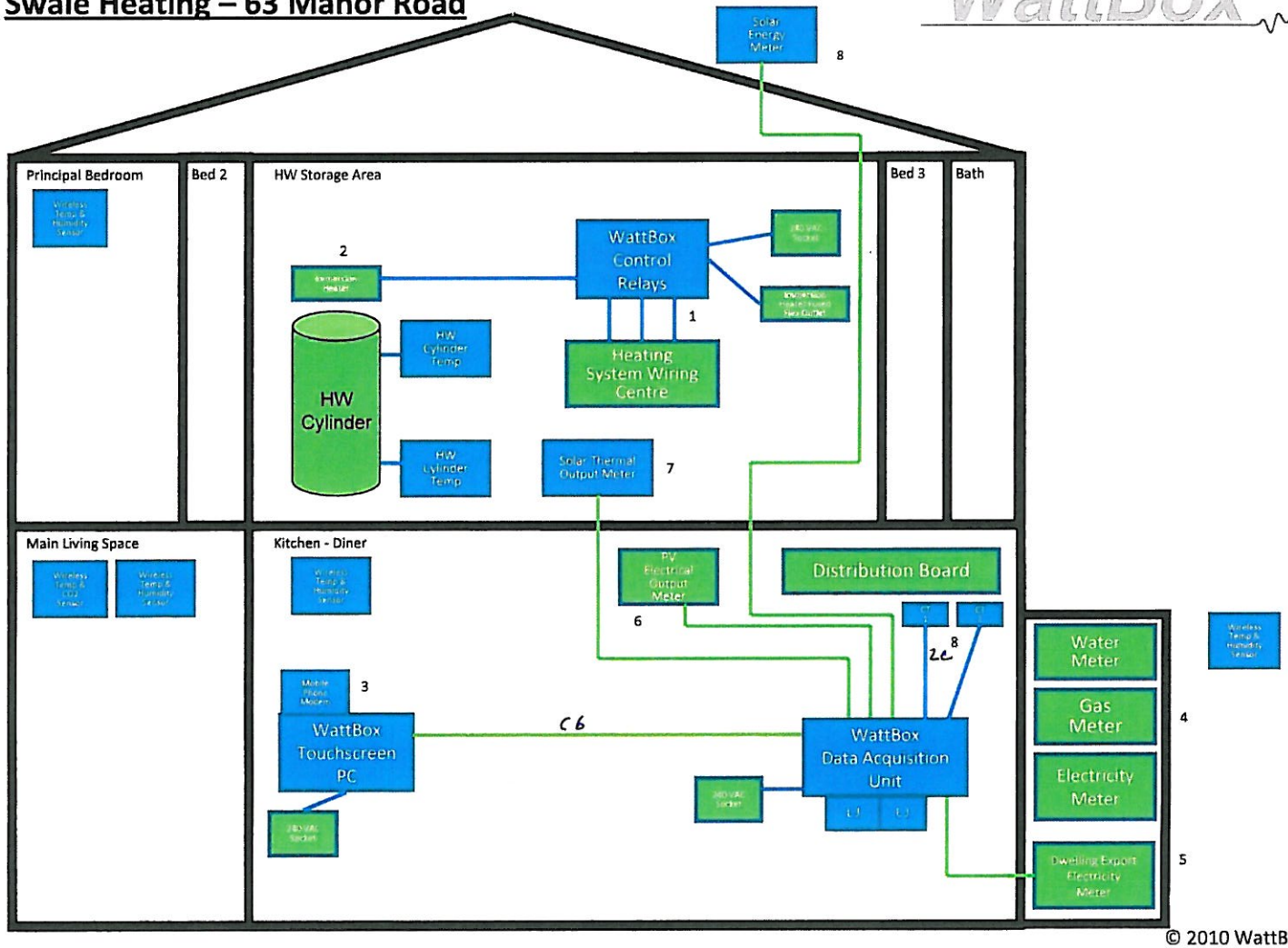
WattBox
Control System

The WattBox monitors the functions of the interacting sensors and relays and records their information whilst using this information to control the functions of the main heating controls such motorised valves and pumps.

1) WattBox utilises three control relays to interface with the heating system wiring centre
   a) One will send a heat demand signal to the boiler
   b) One will control the operation of the Heating two port motorised valve
   c) One will control the operation of the Hot Water Service two port motorised valve
2) WattBox controls the operation of the immersion heater in the Hot Water Cylinder if the solar thermal heating does not meet the required demand.
3) WattBox PC unit is located in the hall adjacent to the front door
4) Smart meter to be fitted in the same location as the WattBox
5) The system has been fitted with an export meter and is equipped with pulse outputs for connection to Data Acquisition Unit
6) PV electrical output meter supplied to meet the requirements of the Feed in Tariff. Pulsed outputs are used for connection to Data Acquisition Unit
7) Solar thermal output meter.
8) CT1 measures household consumption as a clamp on to appropriate section of distribution board.

   CT2 measures solar hot water system consumption.

WattBox Installation Schematic
Swale Heating – 63 Manor Road



WattBox Installation Instructions – Issue 1

Retrofit for the Future - Data Acquisition Projects

The WattBox Installation Schematic for the specific project should be consulted to confirm the preferred locations for all equipment to be deployed. Any changes of location required during site surveys or due to project changes should be marked up on this schematic and details passed back to WattBox Ltd for information.

For Data Acquisition projects the WattBox will be supplied as:

1. WattBox Touch-screen PC unit (WPC)
2. WattBox Data Acquisition unit (WDA)
3. WattBox Control Relays unit (WCR)
4. A selection of wired and wireless sensors and instruments tailored for the specific project

Each of the main boxes (items 1, 2 & 3) will be 222mm x 151mm x 65mm deep.

1. First Fix Wiring and Electrical Pre-Requisites

The following work should be completed during the first fix works in order to avoid later disruption and must be completed before the WattBox equipment and engineers are on site.

1.1 A mains socket or fused flex outlet to be fitted close to the chosen location for the WattBox Touch-screen PC (WPC) unit.

1.2 A mains socket or fused flex outlet to be fitted close to the chosen location for the WattBox Data Acquisition Unit (WDA).

1.3 A mains socket or fused flex outlet to be fitted close to the chosen location for the WattBox Control Relays (WCR).

1.4 CAT5 or CAT6 Ethernet data cable to be run between the location for the WPC unit and the WDA unit.

1.5 If the WDA unit is to be located further than 1 metre away from the household electricity distribution board or its incoming mains electricity cable then a 2-core bell wire, telephone or burglar alarm cable should be routed from the vicinity of the distribution board to the intended location for the WDA unit.

The following items are only required if WattBox is being fitted **without** the Energy Savings Trust Smart Meter solution.

1.6 A 2-core shielded cable shall be connected to the data pulse output connection of the utility electricity meter and routed through the property to the location of the WDA unit.

1.7 A 2-core shielded cable shall be connected to the data pulse output connection of the utility gas consumption meter and routed through the property to the location of the WDA unit.

1.8 A 2-core shielded cable shall be connected to the data pulse output connection of the utility water consumption meter and routed through the property to the location of the WDA unit.

The following additional items relate to optional instruments that are not utilised on every project. Please refer to the appropriate Installation Schematic for project specific scope.

1.9 IF a Heat Meter is to be fitted to a Solar Thermal or Heat Pump installation. A 2 core screened signal cable to be fitted from the agreed heat meter location to the WDA unit.

1.10 IF a Solar PV or Solar Thermal system is to be fitted then a 4 core screened signal cable from the roof mounted location of the solar collectors to the WDA unit is required.

1.11 IF a heat pump type heating device powered through the mains electricity is to be fitted to the property then an additional current sensing transducer will be required to measure the power consumption of the device. During first fix an additional 2 core signal cable should be installed as per section 5 above.

1.12 IF any electricity generating devices are to be fitted such as Solar Photo Voltaic panels, Micro CHP or a Wind Turbine then a further additional current sensing transducer will be required to measure the power consumption of the device. During first fix an additional 2 core signal cable should be installed for each electricity generating device as per section 5 above.

1.13 IF any window or door sensors form part of the data acquisition scheme then these should be fitted and wired through to the location of the WDA unit using conventional burglar alarm signal cable.

2. Free Issue Equipment Installation and General Pre-Requisites

The following work should be completed before the delivery of the WattBox main equipment ready or installation and commissioning in addition to the first fix work described previously.

2.1 IF a Solar PV or Solar Thermal system is being used then a Pyranometer sensor should be mounted to the roof and the cable routed through the house to the location of the WDA unit. WattBox will supply the Pyranometer sensor and basic mounting hardware including a 2 metre pre-formed cable in advance of our main equipment delivery. Separate installation guidelines from the manufacturer will be provided for this device and the contractor will need to arrange roof access, local junction box and the main cable installation directly.

2.2 IF a heat meter is to be fitted to a Solar Thermal or Heat Pump installation then the Heat meter and associated temperature probes must be fitted into the radiator circuit output from the heat pump or solar collectors and the signal cables routed through the house to the location of the WDA unit. Separate installation guidelines from the manufacturer will be provided for this device and the contractor will need to arrange appropriate access, plumbing modifications, a local junction box and the main cable installation directly. NB: The Heat Meter will require a 230VAC Mains Supply from a socket or 1A fused outlet.

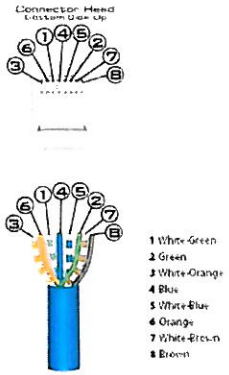
2.3 The heating system installation shall be completed as per a standard installation and if the unit is supplied with stand alone controls of any kind should be powered up and checked ready for connection to the WattBox. All control wiring should be routed to a common location close to the agreed position for the WCR unit – this would normally be located close to the Hot Water Cylinder.

3 WattBox Main Equipment Installation & Commissioning

These tasks are to be carried out by or under the direct supervision of WattBox engineers unless prior arrangements have been made in advance by WattBox Ltd in respect of training and experience.

3.1 Loosely position the 3 main WattBox units in their designated locations.

3.2 Connect the CAT5/6 cable between the WPC and WDA units ensuring that each end of the cable is terminated in accordance with the standard CAT5 wiring diagram shown below:



3.3 Ensure the plugs on the CAT5/6 cable are fully inserted into the USB extenders within the WPC and WDA units as per photographs below.

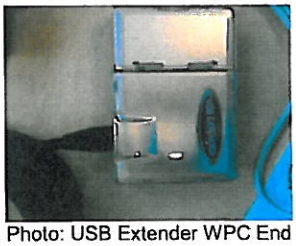


Photo: USB Extender WPC End

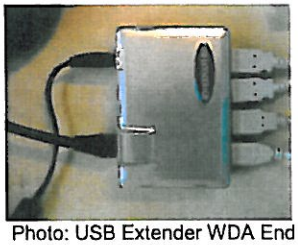


Photo: USB Extender WDA End

3.4 Connect the power supplies to the three main boxes and power them up in the following sequence:

a. WCR unit
b. WDA unit
c. finally WPC unit.

3.5 Confirm that communications are established between the main units by:

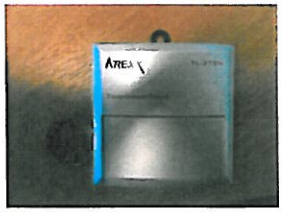
a. Close the WattBox application.

b. Use Control Panel to determine the Hardware Status of the WPC unit and ensure that all the USB subsystems (including Generic Hubs, Arexx Devices, XBee COM port and Labjack's) appear operational.

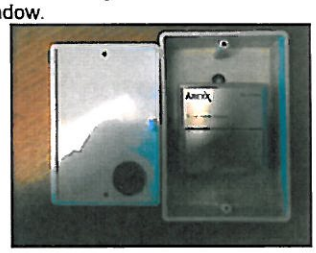
c. Run the LJ Control Panel and confirm that the correct number of Labjack's are configured and visible.

3.6 Fit batteries to the wireless sensors and locate them loosely according to the WattBox Installation Schematic for the project. Use Blu-Tac or similar to locate the sensors in each room following the guidelines below:

a. Internal sensors should be located approximately 1.5m above floor level away from direct sources of heat such as radiators or fires and away from windows or other sources of direct sunlight.



b. The external temperature/humidity sensor should be located in a sheltered location on a non South facing external wall if possible. The sensor should be located to avoid accidental damage but within reasonable range for access to replace batteries if required. Suggestions would be underneath Porch Eves or window ledges with access either from ground level or through an upstairs window.



c. Wireless temperature sensors also need to be fitted to the hot water cylinder in order to provide optimised control of hot water production and household occupancy. One or two sensors will be supplied depending on the scheme to be implemented and these will be shown on the WattBox Installation Schematic for the project.

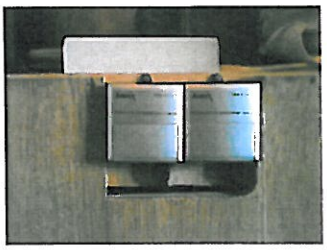
The sensors are similar to the room sensors but are supplied with the temperature sensing element on a wire which connects to the small grey transmitter box. The temperature sensing element needs to be mounted so that the small metal tab on the end of the wire makes a good metal to metal contact with the hot water cylinder and with insulation replaced over it. Typically sensors are located in areas where access through the insulation is already provided by the cylinder manufacturer but in some cases will require insulation to be removed and replaced to gain access.

On Single HW Sensor Systems:

Where a single HW sensor is provided and the project signal list describes the associated signal as Hot Water Feed Temperature the sensing element should be located on the Hot Water supply pipe where it leaves the storage cylinder or Combi-Boiler and before any branch in the hot water supply pipe. A small amount of insulation and tape covering the sensor will secure it in place and improve the reliability of the reading.

On Double HW Sensor Systems:

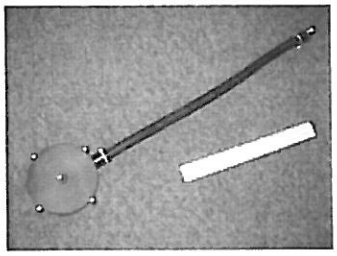
One sensor should be located towards the top of the cylinder at least 2/3 of the cylinder height. This will provide a control signal for HW temperature that is associated with the main body of the cylinder.



The second sensor should be located towards the base of the cylinder and generally close to the position where cold supply water is discharged into the cylinder volume. This will provide a temperature associated with the base of the tank and be used to detect the consumption of hot water through a drop in temperature when the cold feed flows into the cylinder.

The sensor heads should be located close to the cylinder and in a suitable location for battery replacement when required. The cable should be routed away from possible snags and be secured to prevent inadvertent disconnection. As far as possible they should be located so that the water tank does not screen the signal path from the transmitter to the WPC unit.

d. On systems with Ground Source Heat Pumps it is necessary to measure the ground temperature to meet the requirements of the Energy Savings Trust. The sensor is supplied by WattBox as a complete assembly as shown in the photograph below. The sensing element is located in the end of a sealed conduit which must be buried in the ground approximately 0.5m-1.0m deep outside the property.



It is important to keep the conduit box containing the batteries and transmitter above ground and accessible but in a location where it will not be disturbed. It is important to check the wireless signal range before confirming the location and this sensor will need to be located close to the outside wall of the property in order to ensure a clear signal to the WPC unit.

3.7 Confirm that wireless communications has been established with all the sensors using the Arexx Temperature Logger software. Move any sensors with communication problems and then leave all sensors running for a minimum of 2-3 hours and check for gaps in the communication of data before permanently fixing them in location. Permanent fixing will require a small hole to be drilled and plugged at each location to ensure the attachment screw is securely held.

3.8 Confirm that the relays within the WCR unit are communicating with the WPC unit.

e. Remove the lid from the WCR unit and check the status of the green LED's on the printed circuit board.

f. Re-start the WPC unit and observe the WCR unit re-setting a relay through an audible click and flash of one of the green LED's on the printed circuit board.

g. Operate the More Heat and More Hot Water buttons on the WattBox application and confirm that a change of relay status is observed on the WCR unit printed circuit board.

3.9 Fix the WPC, WDA and WCR units to the wall using the screw fixings provided.

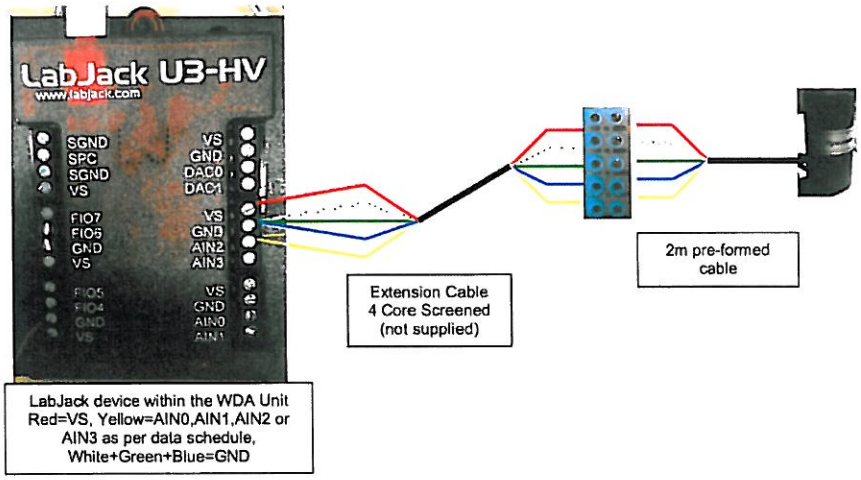
3.10 Connect relay outputs into the heating system wiring in accordance with the appropriate diagram in Appendix A for the heating system being used. The relay configuration should be checked against the project configuration file to ensure a consistent approach has been adopted.

4.0 Wired Sensor Connections to the WattBox Data Acquisition Unit

A number of wired sensors will be required for all Retrofit for the Future projects and the WattBox Installation Schematic for the specific project should be consulted to determine the specific scope required. The following sections describe the specific connection methodology for the most common instruments and sensors.

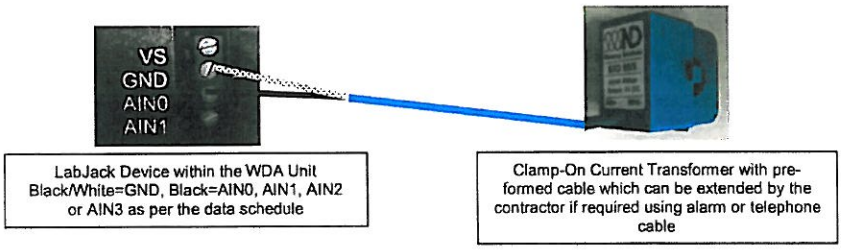
4.1 Skye Instruments Pyranometer – Model SKL2650

WattBox will supply the Pyranometer sensor plus a mounting bracket (SKM226) and levelling plate (SKM221) which should be fitted before our engineers attend the site as described in previous sections and with reference to Skye Instruments standard installation documentation. The specific wiring connections to the WDA unit should be completed in accordance with the diagram below:



4.2 Clamp-On Current Transformer

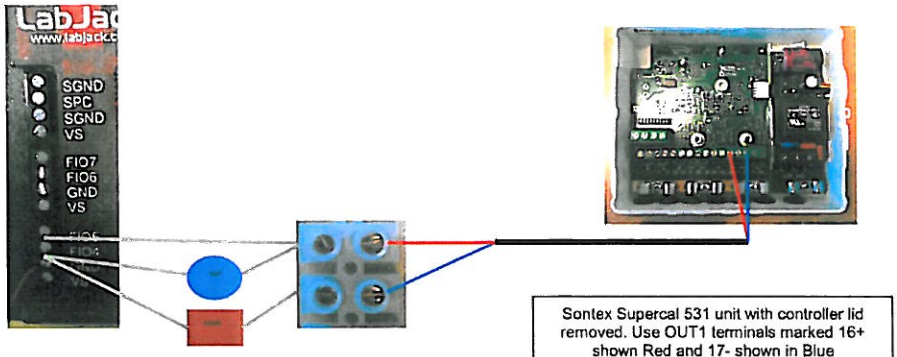
WattBox will supply a minimum of 1 Clamp-On Current Transformer to be connected to electrical circuits as per the data schedule and as shown on the Installation Schematic for the project. The device should be physically clamped around the insulated Live conductors for each circuit to be measured and connected to the WDA unit as shown in the diagram below:



4.3 Heat Output Meter for Solar Thermal Panels and Heat Pump Installations

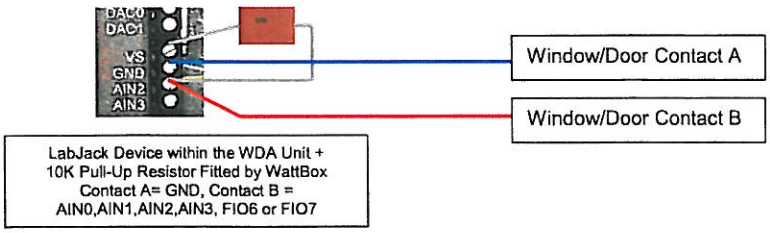
WattBox will supply a complete Superstatic 440 heat meter kit complete with full installation instructions which must be followed by the plumbing and electrical contractor, installation work should be completed before the main WattBox equipment is delivered to site. The kit will include a Superstatic 440 flow meter, temperature probes and pockets and a Sontex Supercal 531energy meter unit.

Connections to the WDA Unit will be in the form of pulse outputs routed to specific channels on the Labjack units contained within the main WDA box. Consult the data schedule to determine which of the LabJack units and which channel are to be utilised for the project and signal in question and then complete the wiring connections as per the diagram shown below:



4.4 Window and Door Sensors

Where Window and door sensors are utilised on a project to help understand occupant behaviour patters they should be wired through to the WDA unit using standard alarm cables. Connections into the appropriate Labjack and channels should be determined from the data schedule for the specific project and connected in accordance with the diagram below:



5.0 Sensor Calibration Check and Remote Data Connection

Once the system is functional and all the instrumentation is connected and operational a calibration check should be carried out. All sensors have been fully calibrated within the target system before delivery and documentation can be provided to confirm this. The on-site check ensures that the installation and commissioning has been completed satisfactorily and allows a level of client involvement to sign off the installation if required.

Calibration offsets are applied by the WattBox software before data is written to the CSV files that are transmitted from the unit so it is necessary to have the software running and to follow the sequence suggested below in order to check calibration.

5.1 Check the time displayed on the WattBox screen and synchronise with a wristwatch. Jim wonders if we will now intend to sync time across the internet with wattbox controller?

5.2 Use an appropriate hand held calibrated instrument to measure temperature, humidity, CO2 level or ambient light energy in the location of each sensor and record 3 measurements of each taking note of the time that each reading is taken.

5.3 Check the readings on any pulse generating meters such as utility electricity or gas meters and then re-check the reading exactly 1 hour later. Record the number of units of electricity, gas or water that have been consumed during the time period. Jim wonders if these calibration discrepancies will be recorded by installer on site using live Filemaker connected database?

5.4 Open up the sensor records file for the current day and compare all the measured readings with those produced by WattBox for the time periods noted.

5.5 If there are small discrepancies between readings then record the data and advise the WattBox office who will carry out any small adjustments remotely before data transmission to the EST is started.

5.6 If there are any large discrepancies or missing data investigate the sensor connections and resolve any problems found before repeating the steps above. Jim wonders what spare parts we will provide to installer for his visit?

5.7 Check that the WattBox has established a robust internet connection through either the 3G dongle, Wi-Fi dongle or wired Ethernet connection. By doing what, not everyone knows how to do this?

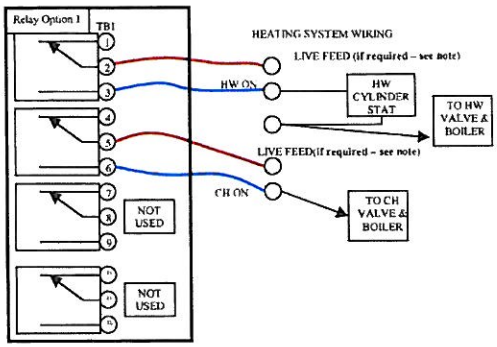
5.8 Check the scheduled applications in Windows and ensure that the data transmission service is scheduled to run between 2AM and 4AM every night. Run the data transmission service and check that data has been sent to the WattBox servers.

Appendix A

The relay configuration for each project will vary depending on the type of heating systems to be controlled. Check the project Configuration File stored on the WPC unit for confirmation of the correct option before making final connections: by comparing it to what? Jim wonders ?

Relay Configuration Option 1

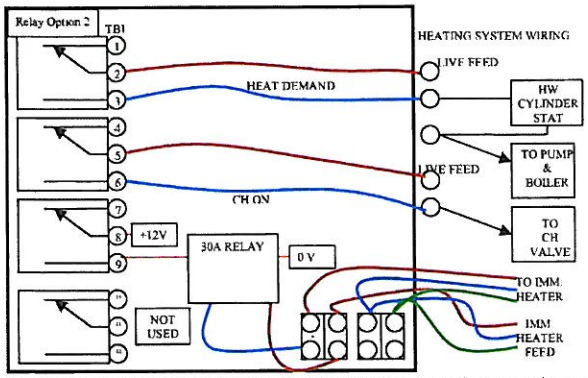
Relay 1 closure initiates water heating
Relay 2 closure initiates room heating.



Used where the Wattbox relays are directly replicating the function of a room thermostat and a hot water tank thermostat with no provision for control of an immersion heater and no provision for optimisation of pump over-run. The relays may need to carry a live feed from or to the heating device, or may simply signal a contact closure to an internal control system within the heating device. Consult specific details for the appliance.

Relay Configuration Option 2

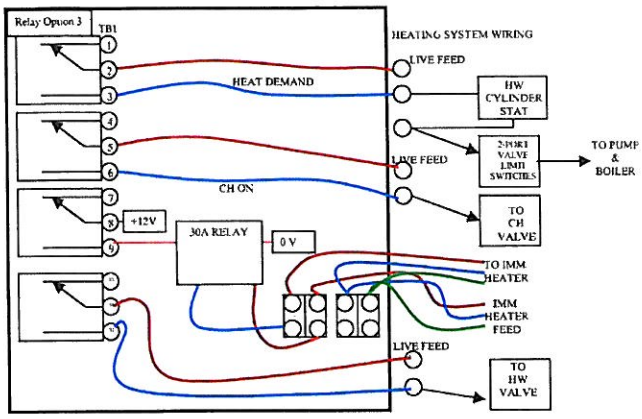
Relay 1 closure sends demand for heat to boiler
Relay 2 closure puts 3-way valve into the position for space heating
Relay 3 switches on an immersion heater.



Used for conventional Y or W plan gas boiler installations where there is a hot water tank with immersion and the 3 way valve is in the water heating position when not energised. In this configuration the boiler must control pump operation

Relay Configuration Option 3

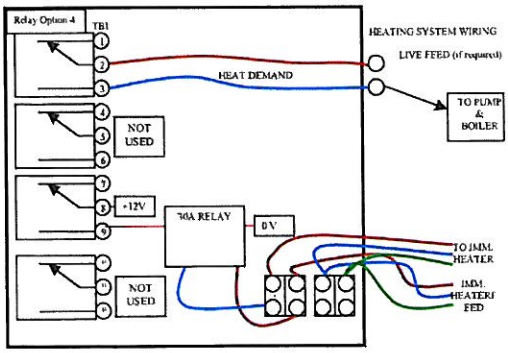
Relay 1 closure sends demand for heat to boiler
Relay 2 closure opens a 2 port valve enabling space heating
Relay 3 switches on an immersion heater
Relay 4 closure opens a 2 port valve enabling hot water heating



Used for conventional S plan gas boiler installations where there is a hot water tank with immersion. In this configuration the boiler must control pump operation.

Relay Configuration Option 4

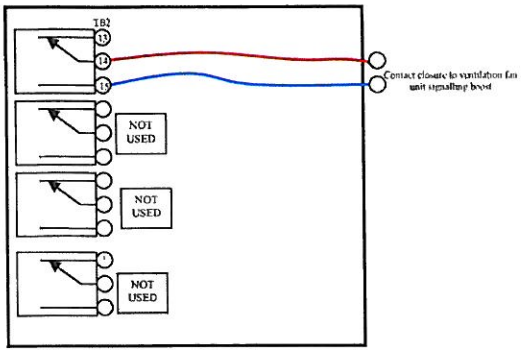
Relay 1 closure initiates room heating
Relay 2 is not used
Relay 3 closure initiates hot water heating by an immersion heater



Similar to Option 1 but used where water heating is always by immersion so Relay 3 (which has 30Amp contacts) must be used. Relay 1 may need to carry a live feed from or to the heating device, or may simply signal a contact closure to an internal control system within the heating device. Consult specific details for the appliance.

Humidity Control Using Relay 5

Relay 5 closure starts ventilation fan boost mode.



This option is used where a dwelling has controlled ventilation with heat recovery and there is a need to boost ventilation when humidity is excessive. Settings for humidity threshold etc. must be configured on row 58 of the WPC configuration file. Relay 5 closes when humidity exceeds threshold and there is occupancy and internal temperature exceeds external temperature by a threshold. It releases when humidity falls below a lower threshold, or occupancy drops, or the difference between internal and external temperature falls below threshold.