

Product Guide

Wireless Set-Back Thermostat



today, tomorrow and in the future

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Product Overview

The W-SBT provides a wireless, tamperproof solution to set-back thermostatic control. The W-SBT comprises of two separate units – the W-SBT-S (wireless sensor) and the W-SBT-C (wireless control unit). Both units operate as a wireless pair to provide accurate and reliable energy saving capabilities to a heating installation. The W-SBT is fully configurable, operating as a wireless thermostat with the addition of being able to temporarily ‘boost’ the temperature to a higher level for a predefined period at a push of a button when the end user so desires.

The W-SBT-S sensor unit is a battery powered remote sensor that can typically be located up to 30m from the W-SBT-C control unit. It accurately measures and wirelessly reports the room temperature back to the W-SBT-C control unit as well as providing the end user with a ‘boost’ pushbutton for the purpose of temporarily increasing the temperature setpoint. No configuration controls are located in the W-SBT-S, so increasing the tamperproof nature of the system and leaving the bill payer with peace of mind that the heating system is being efficiently managed to minimise their energy bills.

The W-SBT-C control unit is a mains powered wireless unit which receives temperature reports from the W-SBT-S to control a heating system via a voltage-free relay contact output. The unit is housed in a standard 32mm deep surface-mounted back box (supplied) and contains all adjustments for temperature setpoint (+12°C to +26°C), temperature set-back (0°C to 14°C below the temperature setpoint) and set-back delay (15 mins to 8 hrs). The unit is fully enclosed and utilises security screws to prevent modification of the temperature and delay settings by unauthorised persons.

Both units provide LED feedback to indicate which mode the system is operating in (Red: High/Boost and Green: Low/Normal).

Figure 1 W-SBT-C and W-SBT-S



Product Wiring

IMPORTANT: ensure all electrical connections are isolated before commencing any work on the unit.

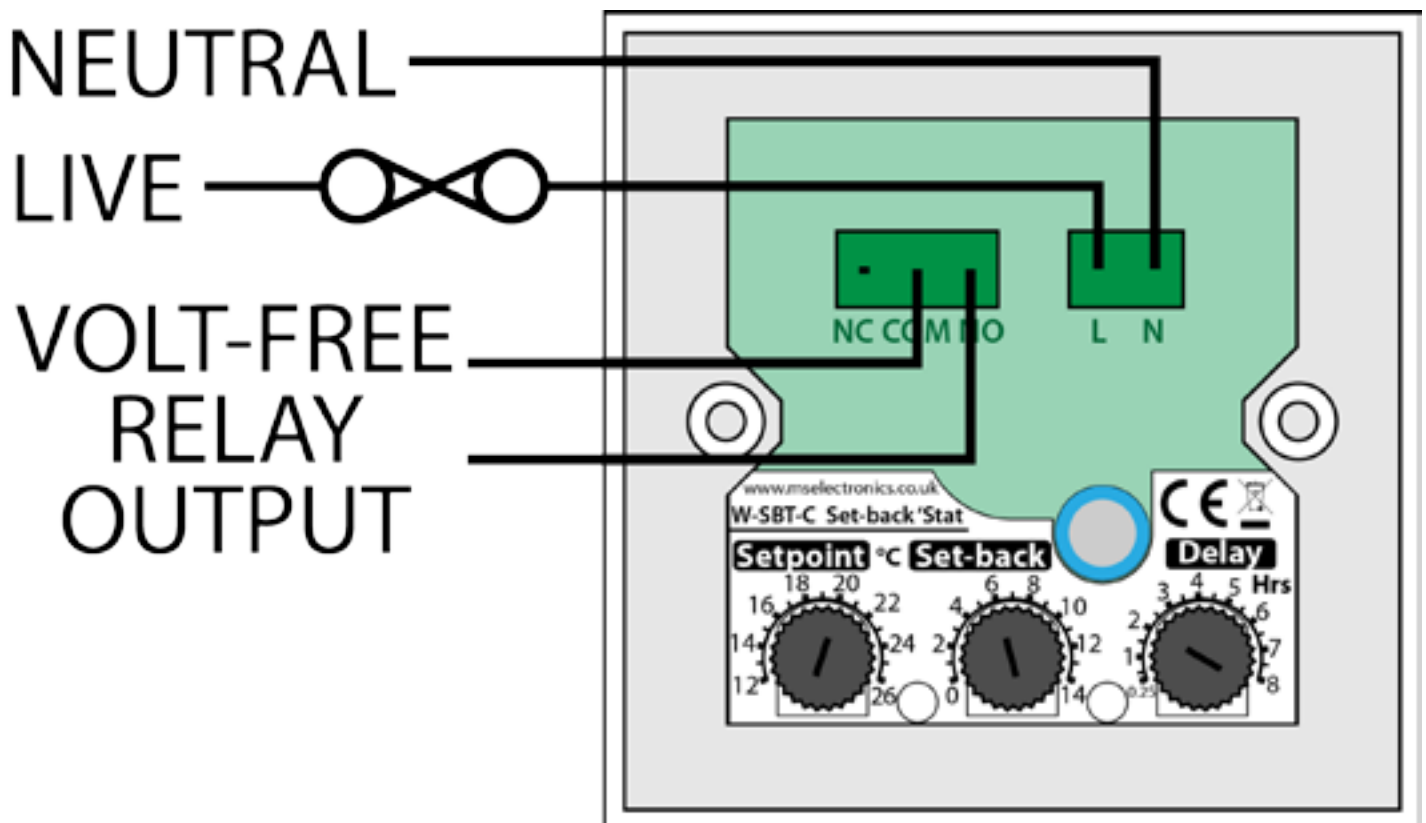
W-SBT-C

1. Power to the W-SBT-C control unit is provided via the 2-pin pluggable terminal block labelled “L” and “N” on the green circuit board. A permanent Live and Neutral (230V AC, 50Hz) mains supply must be applied here. This supply should be suitably fused (recommended: 1A slow blow).
2. A voltage-free changeover relay output capable of switching loads of up to 10A at 250V AC (resistive) is provided by the thermostat unit via the 3-pin pluggable terminal block. The individual connections are labelled “NO”, “COM” and “NC” on the green circuit board. When the unit is operating, the Common “COM” terminal is electrically connected to the Normally Open “NO” terminal when the sensed room temperature is above the “Setpoint” temperature. Conversely, it is electrically connected to the Normally Closed “NC” terminal when the room temperature is sensed to be below the “Setpoint”.

W-SBT-S

The W-SBT-S requires no additional wiring as it is battery operated and communicates with the W-SBT-C wirelessly.

Figure 2 Typical Wiring Diagram



Installation

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W-SBT-C

1. Unscrew the 2 security screws using M.S. Electronics tamperproof screwdriver MSD-155 to remove the unit from the supplied surface-mounted electrical back box.
2. Mount the back box using suitable fixings at a location in proximity to the heater/boiler to be controlled.
3. **NOTE:** The W-SBT units communicate wirelessly using low-power 433MHz radio transmitters/receivers. Placement of the units will therefore heavily impact on the potential communication range of the devices because any objects in the path of the radio waves will degrade the signal. For example, a device hidden away inside the metal casing of a boiler is likely to have a much reduced range compared to a device mounted on the wall next to the boiler. Typical ranges obtainable are 100m with line-of-sight and 30m indoors, but it is advised that the suitability of the location is tested because the characteristics of every installation will be different.
4. Connect the wiring as shown in Figure 2 (or any suitably appropriate form that is compatible with your application) using the convenient pluggable green terminal blocks provided. Make sure to choose the correct output terminals (COM+NC or COM+NO) that are suitable to your application.
5. Adjust the internal controls to suit the operational requirements (see section “Setting Up”).
6. Close the unit and replace the 2 security screws using the tamperproof screwdriver.

W-SBT-S

1. Open the W-SBT-S by squeezing the two vent areas on the side of the unit while gently pulling the back cover off. Take care not to damage the delicate circuit board inside.
2. Mount the back cover to the desired wall using suitable fixings. Note that only 3 of the 4 fixing points may be used as one may interfere with the battery when the unit is closed. The battery replacement guide label is covering this unusable mounting point.
Note that the sensor must be located in a suitable place to provide optimal results (in a location where the temperature is to be measured, but out of the way of drafts, air vents, radiators or direct sunlight etc). It must also be suitably placed where the ‘boost’ pushbutton on the unit can be easily accessed by the end-user.
3. Clip the front cover back on to the back cover and insert the single fixing screw (provided) into the bottom of the unit to secure the front cover.

Setting Up

IMPORTANT: ensure all electrical connections are isolated before commencing any work on the unit.

W-SBT-C

1. Adjust the “Setpoint” dial to the temperature the room is to be regulated at when in ‘High’ mode (typically 21°C).
2. Adjust the “Set-Back” to the number of degrees below the “Setpoint” that the temperature will be regulated at when in ‘Low’ mode (typically 4°C).
3. Adjust the “Delay” to the number of hours that the unit will remain in ‘High’ before automatically reverting back to the ‘Low’ mode.

4. Example of a typical scenario:

High mode (**RED** LED):

“Setpoint” set to 21°C, “Delay” set to 1 hour.

The unit will maintain the temperature between 20.5°C and 21.5°C for 1 hour before reverting back to Low mode.

Low mode (**GREEN** LED):

“Setpoint” set to 21°C and “Set-Back” set to 4 °C.

The unit will permanently maintain the temperature between 16.5°C and 17.5°C.

Pairing Devices

The W-SBT-C and W-SBT-S devices communicate wirelessly with each other as a matched pair. This prevents neighbouring installations that may be within radio range from interfering with each other. If this pairing needs to be re-assigned (such as devices becoming mixed up, or a replacement device needs to communicate with an existing device) then the following pairing procedure must be carried out:

1. Ensure both the W-SBT-C and W-SBT-S devices are powered and within radio range.
2. Hold the button down on the W-SBT-C unit for 8 to 10 seconds until both LEDs start to slowly flash on and off together. The W-SBT-C is now ready and waiting to be paired with the W-SBT-S. Note that a successful pairing must occur within 30 seconds otherwise the W-SBT-C will revert back to its normal mode (illustrated by one LED on continuously).
3. Complete the pairing by holding down the button for 8 to 10 seconds on the W-SBT-S. As soon as the pairing is successful, the Green LEDs on both units will blink quickly.
4. If the pairing is unsuccessful then the Red LED on the W-SBT-S will blink quickly and the W-SBT-C will still be waiting in the pairing mode. Retry again from step 2 if the pairing fails or step 1 if the W-SBT-C has exited the pairing mode.

Battery Replacement

The W-SBT-S device is powered by a CR2477 3V lithium cell. The battery is estimated to typically last 4 to 6 years under normal operation. Replacements are available from M.S. Electronics (see “Product Accessories” at the back of this manual).

1. Unscrew the single screw that is securing the W-SBT-S faceplate.
2. Pinch the two vented areas (**blue ovals**) on the side of the unit to release the front from the back of the unit.
3. Carefully unscrew the 4 circuit board mounting screws (**red circles**).
4. Gently lift up the circuit board enough to slide the old battery out and replace with a new Panasonic CR2477 battery. Note: CR2477 batteries from other manufacturers exist but may not provide the same typical lifetime in comparison to the Panasonic battery.
5. Re-assemble the unit again in reverse order.
6. Note that the W-SBT devices permanently remember their configuration and so will not need to be paired again when the battery is replaced.

Figure 3 W-SBT-S Battery Replacement

Operation

Low Mode

The W-SBT system has 2 normal modes of operation, “High” and “Low”. The default mode of operation is the Low mode and is indicated by only the **GREEN** LED being continuously illuminated on the W-SBT-C unit. In this mode the unit will attempt to continuously regulate the room to a calculated temperature of the Setpoint minus the Set-Back temperature (see the example in the “Setting Up” section). The W-SBT-S also provides the same feedback through its **GREEN** LED, but this is shown as a quick flash every 8 seconds to help preserve battery life.

High Mode

The end-user may temporarily increase the room temperature level by pressing the ‘boost’ button on either of the two W-SBT units. This removes the Set-Back and the room temperature will be regulated to the Setpoint temperature. This mode of operation is indicated on the W-SBT-C by only the **HIGH** LED being illuminated continuously. Again, the W-SBT-S will also indicate this mode by quickly flashing its **RED** LED at regular intervals.

If the ‘boost’ button is pressed again when the system is in the High state it will have no further effect. This helps to prevent people re-starting the delay time each time they walk past one of the units.

The boost may be manually cancelled by the user at any time. Simply holding down either of the pushbuttons on the W-SBT units for 2 seconds will revert the system back to the Low mode.

Time Delay

After the pre-set time delay has elapsed while in High mode (see “Setting Up” on how to change this) the W-SBT will automatically revert back to the Low mode of operation. The user may only now press the pushbutton to start the boost again.

Communications Failure

All communications between the W-SBT-S and W-SBT-C are verified to see if they have been successfully received.

Upon changing modes using the pushbutton on the W-SBT-S, it will illuminate the relevant LED for 2 seconds to confirm that the W-SBT-C successfully received the command. If the communication fails for some reason (out of range or there is radio interference for example) then both LEDs on the W-SBT-S will blink quickly for 2 seconds to draw the user’s attention to this failure. The W-SBT-S will also stop blinking the relevant LED periodically every 8 seconds if it failed to communicate the measured temperature to the W-SBT-C.

If continuous communication problems occur for more than 20 minutes, the W-SBT-C will every 3 seconds briefly blink off the LED which would normally be continuously illuminated. In this case it is likely that the units are either out of range of each other or the W-SBT-S battery is flat. Once communications is restored, the LED will revert back to staying permanently illuminated.

Many factors such as the distance between the W-SBT units, building construction (e.g. foil-backed plasterboard and insulation, concrete walls, steel supports etc.), building contents (e.g. metal filing cabinets, computers, household appliances etc.) can influence the reliability and range of the wireless communications. Although the wireless communications will commonly work at well over 30 metres, it may be necessary to move the units closer to each other or to an alternative location if communication problems are observed.

Low Battery

The W-SBT-S checks its own battery voltage when the pushbutton on the unit is pressed. If it is detected to be getting low, it indicates this to the user by quickly blinking the single LED for 2 seconds when the user changes between High/Low modes, rather than continuously illuminating it for 2 seconds as described earlier in this user guide. This is not to be confused with the

'Communications Failure' status which blinks both LEDs simultaneously.

The battery does not require immediate replacement once it is detected to be low—it is just an advanced warning that replacement will be required imminently. Eventually when the battery is very low, the unit will fail to operate correctly. This is normally indicated by the LEDs on the W-SBT-S blinking quickly in an alternating fashion for 2 seconds when the pushbutton is pressed, or even no response from the unit at all. At this point the W-SBT-S is likely to be completely unable to communicate with the W-SBT-C and so thermostatic control will be lost. The W-SBT-C will indicate it has lost communications with the W-SBT-S by blinking the illuminated LED off every 3 seconds as described in the 'Communications Failure' section.

Technical Specification	
Power supply:	220V - 240V AC 50Hz (live/neutral)
Output switch rating:	10A, 250V AC (resistive)
Output switch type:	Changeover relay (volt-free)
Temperature control:	[high set-point]: +12°C to +26°C [low set-point]: 0°C to 14°C below the high set-point
Temperature differential:	±0.5°C fixed
Sensor drift:	0.15°C over 5 years
Set-back delay:	0.25 hours to 8 hours
Battery (W-SBT-S):	CR2477 3V lithium cell 4 to 6 years typical life
Radio Frequency:	433MHz, ETSI EN 300 220 compliant
Guarantee:	5 Years
Weight:	[W-SBT-C]: 150g [W-SBT-S]: 68g
Dimensions mm:	[W-SBT-C]: 87mm x 87mm x 50mm [W-SBT-S]: 80mm x 80mm x 22mm

Product Accessories	
MSD-155	M.S. Electronics tamperproof screwdriver TX
MSD-155/B	M.S. Electronics tamperproof screwdriver TX insert bit
MSD-154	Tamperproof TX screws (x2)
MSD-156	3V lithium battery (for W-SBT-S)
W-SBT-S	Wireless setback thermostat (sensor unit only)
W-SBT-C	Wireless setback thermostat (control unit only)

Technical Support

For further help or information on this and the other products in the ms electronics range visit www.mselectronics.co.uk or call 0333 666 1176.

Alternatively, email techsupport@mselectronics.co.uk
Additional copies of this product guide can be downloaded from our website.

Product Warranty

M.S. Electronics guarantees all their products against manufacturing defects for 5 years from the purchase date. If your product is found to be faulty, M.S. Electronics will, at their discretion, repair or replace the product free of charge.

Note

Any modification or damage to the outer casing of the thermostat, as well as any damage to the product due to abuse or incorrect wiring may invalidate the guarantee.



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