BOSS™ Copperad®

BOSS™ COPPERAD FAN CONVECTOR

Instruction, Operation and Maintenance Manual

OVER
100 YEARS
OF QUALITY

Contents

1.1 GENERAL Description

This manual covers the BOSS™ Copperad Fan Convector range of fan-assisted hot water heaters. The units are cabinet type available in a range of styles to suit floor, high wall and ceiling mounting. A hideaway chassis type unit is also available for concealed installation.

The approximate weights of the units are shown in the table below. A full description of unit features are available in the technical catalogue.

Nominal unit width (mm)	700	900	1200	1500
Weight (kg)	34	39	44	53

1.2 GENERAL Receipt and Preparation

The units are wrapped and display the BOSS™ Copperad works order number, model reference, site reference (where appropriate), and site details.

On receipt, check that all details are correct to the customer schedules prior to opening the packaging. Damages should be reported to your local BSS branch and to the BOSS™ Copperad Technical Department immediately (see back page for contact details).

It is recommended that the packaging is kept in place and the units stored in a safe dry area until the necessary services are complete in order to avoid the possibility of site damage.

2.1 INSTALLATION Removal of access panel

Note. Units must be electrically isolated prior to removal of the access panel.

The panel will be dropped into slots in the base of the unit and held in place by screw fixings at the upper grille. The majority of units will have key fixings to replace the screws and these can be locked/unlocked when the keys are given a quarter turn.

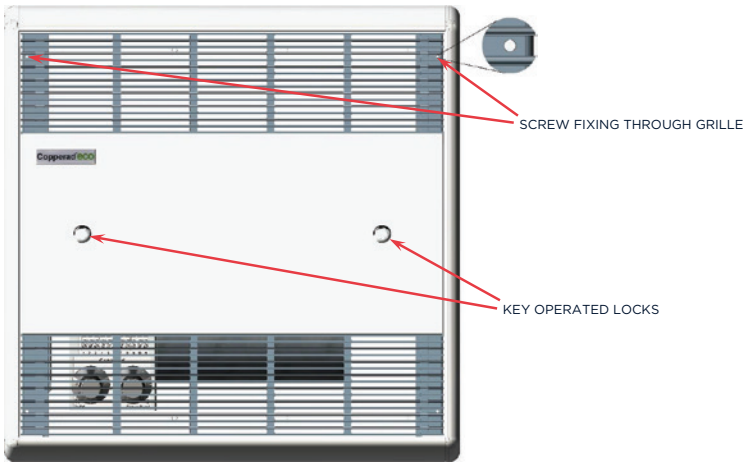

Figure 1. Access Panel

2.2 INSTALLATION
Fixing plinth

If a plinth was ordered with a floor standing unit then it will be supplied separately packaged. Remove from the packaging and line up with the base of the unit. Mark the required hole positions in the base of the unit and drill holes to suit self-tapping screws. The plinth can then be screwed to the base of the fan convector through the 5mm clearance holes in the plinth flanges.

2.3 INSTALLATION
Removing motor plate

- Remove access panel as above
- Disconnect section of terminal block marked LTC
- Disconnect earth wire
- Remove seal plate by loosening two M5 bolts
- Slide out the motor plate

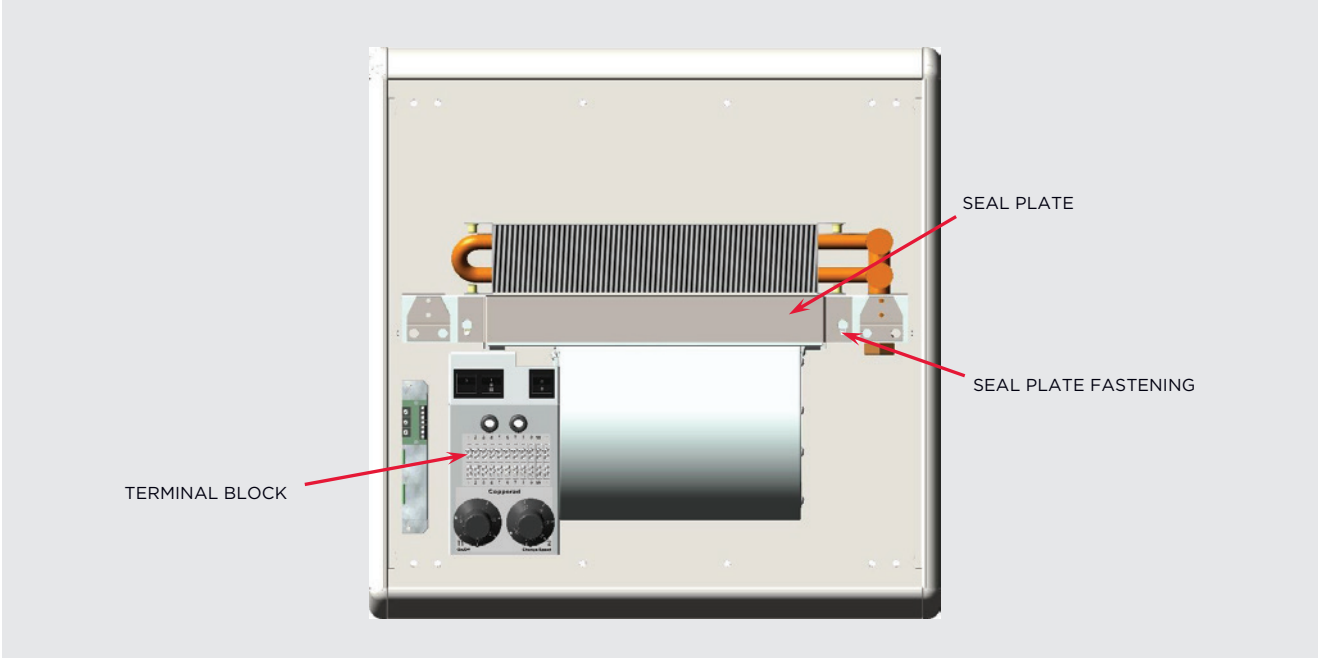

Figure 2. Seal plate & terminal box

Note. On ceiling mounted units ensure that the motor plate and seal plate are adequately supported prior to releasing the bolts.

2.4 INSTALLATION
Changing handing

Unless specified otherwise all units will have the heat exchanger pipe connections on the right hand side when looking at the front of the unit. If opposite is required then it is possible to change on site as follows:

- Remove access panel and motor plate as above
- Unbolt the two M6 screws holding the heat exchanger and the M5 screw holding the connection blanking plate. Lift the heat exchanger clear taking care not to damage the fins.
- Release the M5 screw holding the LTC blanking plate in place.
- Turn the coil around and refit
- Switch the blanking plates around and refit

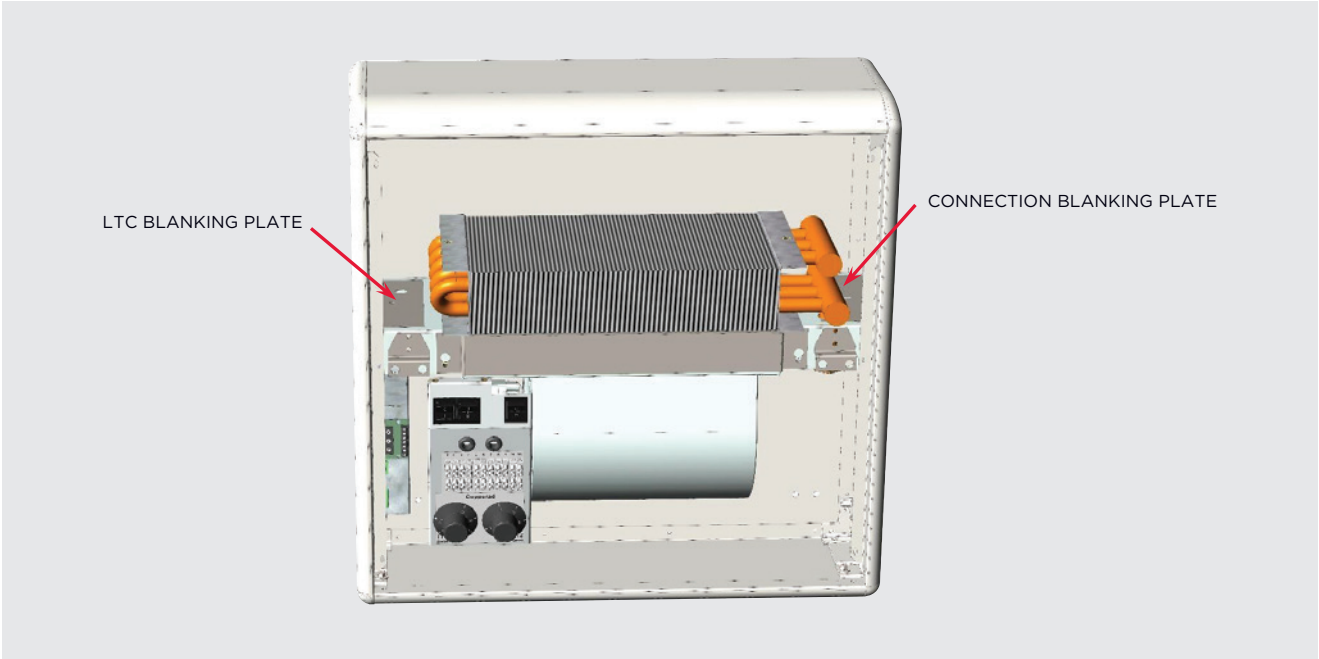

Figure 3. LTC & connection blanking plate

2.5 INSTALLATION
Changing pipe orientation

By default the units will be supplied with pipe connections pointing downwards. If required these can be reversed on site so as to point upwards. The process is as that for reversing the handing but rather than turning the heat exchanger around it is just flipped upside down.

If coils are swapped out for alternatives with different numbers of rows etc or just replaced then this same process should be followed after draining the system.

2.6 INSTALLATION
Mounting

Units are supplied with the appropriate array of predrilled stiffening plates in the back panel. Holes are predrilled in the back panel and these should be used to mark the wall or ceiling that the units are to be fitted against. The wall/ceiling should then be drilled and suitably plugged.

If units are to be hung below ceiling level then they need to be supported on threaded rods and secured against the back panel.

Floor mounted units may be supplied with plinths (see earlier for plinth fitting details) but will need to be secured to the wall as described above.

Hideaway units are intended for concealed fitting and can be secured using the steel flanges on the unit. If ducting is fitted to the spigots of units then it's length should be minimised to offer only the equivalent of 25Pa resistance.

If units are fitted in concealed spaces then ensure that they are not subject to short-circuiting of air between outlet and inlet.

2.7 INSTALLATION
Pipework connections

Standard heat exchanger pipework connections point downwards and are suitable for pipework entering the unit from the bottom of the casing; this can be covered by a plinth if supplied. Alternatively, pipework can enter from the top of the unit if the coil heat exchanger is flipped around as described above. Side entry pipework can be realised by using elbow fittings. Whichever orientation the pipes enter the casing suitable holes will need to be cut in the bottom/top/side of the case to allow entry. Standard two row heat exchangers have ¾" connections as do three row enhanced coils; three row low flow coils, however, have ½" connection pipes.

The coil pipe connections are BSP parallel female designed to mate to a taper male threaded fitting using suitable threading compound/string/tape. When tightening up it is imperative that you hold off on the coil connection; there is a hexagonal nut on the fitting to allow this.

When using the three row low flow coil (this is what you have if your coil heat exchanger has ½" female connectors) the flow connection should be made on the leaving airflow side of the coil, for a vertical unit, with the coil above the fan, this means that the upper of the two connection assemblies needs to be the flow.

The coil heat exchangers are equipped with brass vent plugs; these should be used during system filling/commissioning to ensure there is no trapped air.

2.8 INSTALLATION
Wiring

Note: Please refer to the wiring diagram supplied with your unit.

Note. All electrical work must be undertaken by qualified personnel in line with the latest version of the IET wiring regulations.

Note. Units must always be electrically isolated prior to working on them.

The table below gives the relevant power draw figures for the units.

Speed		L			M			H		
Performance		Airflow (l/s)	Power draw (W)	SFP (W/l/s)	Airflow (l/s)	Power draw (W)	SFP (W/l/s)	Airflow (l/s)	Power draw (W)	SFP (W/l/s)
Size	700	80	11	0.14	101	16	0.16	126	27	0.21
	900	95	15	0.16	155	53	0.34	212	84	0.40
	1200	108	18	0.17	208	34	0.16	205	73	0.36
	1500	162	22	0.14	260	58	0.22	296	80	0.27

Operating speeds will have been considered during selection, typical noise levels (NR) are as below:

Speed		L	M	H
Size	700	32	38	45
	900	35	41	46
	1200	32	37	43
	1500	35	40	46

Units should be supplied with a dedicated fcu (fused spur box) located adjacent to the unit from which a single phase L/N/E feed is taken to the same terminals inside the unit. A suitable hole needs to be cut in the casing to allow cable entry and this should be glanded or fitted with a suitable grommet. If remote controls are being used then these should enter the unit via a dedicated, grommetted/glanded hole and they will run to the terminal block inside the unit.

Within the casing solid wires are used for 230V ac and twin coloured wires for the low voltage (10V dc) signals from the EC fan motor used for controls. The wiring diagrams that follow show the various options and links that are used.

The basic wiring shown in Figure 4 is for a unit without optional control equipment fitted—as such it is set to run continuously at the medium speed setting. Note that the wires in a single solid colour are subject to 230V ac while the twin colour cables and yellow links are the 10V dc control wires.

The optional switch and thermostats which can be inbuilt are shown together with the arrows and numbers indicating the connecting wire and terminal block positions that they would occupy if fitted.

When required to operate with remotely mounted controls, units will be supplied wired for medium speed running as shown in Figure 5.

Remote options are wired using the same rules as internal options. For all units, we recommend a 3 amp fuse is fitted.

IMPORTANT: Isolate unit electrically at mains controls before carrying out any work.

The remote switch and thermostats required should be fitted to the removable sections of the terminal block as shown below.

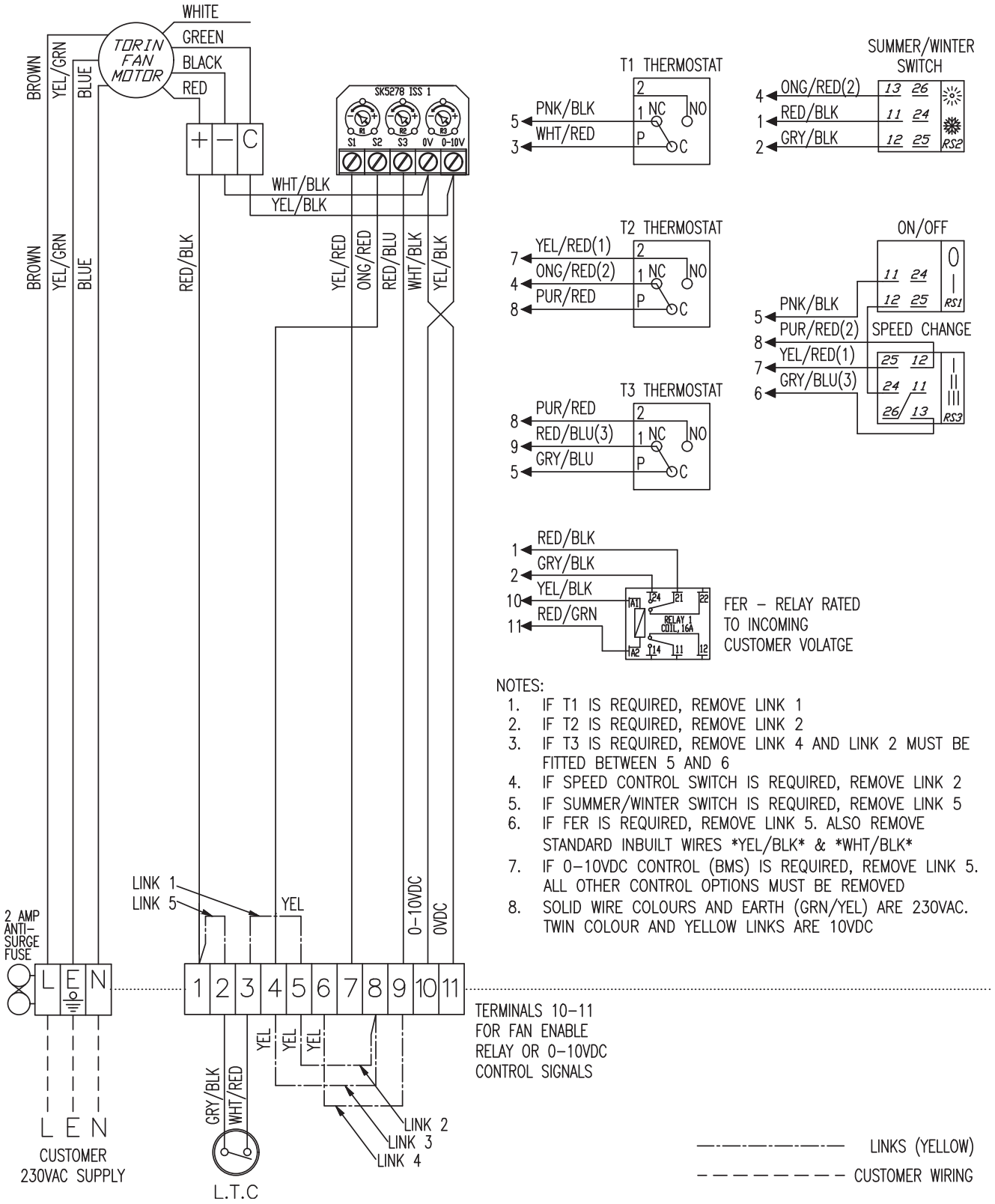

Figure 4. Wiring diagram 1

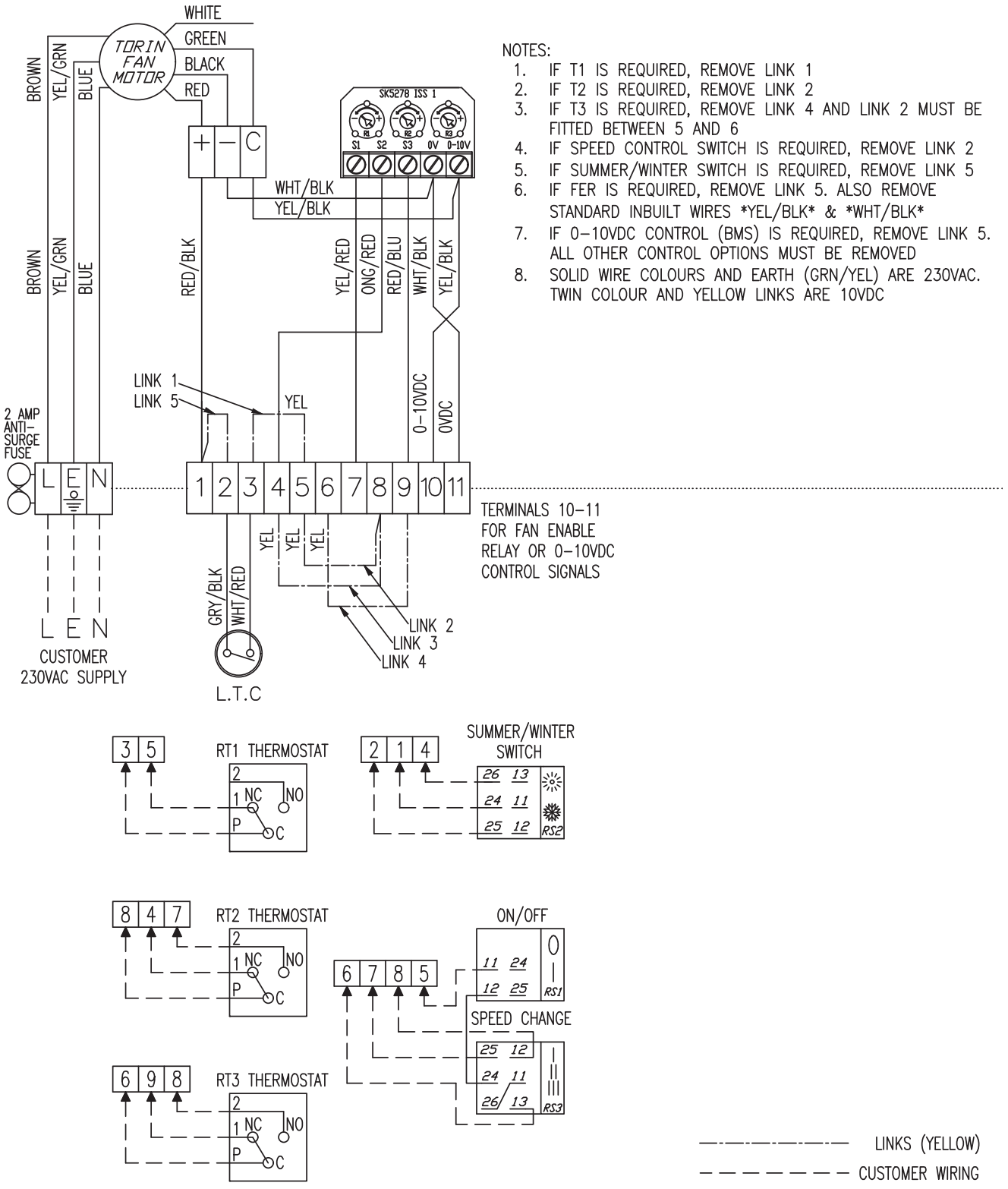

Figure 5. Wiring diagram 2

3 OPERATION

A number of options for controlling fan convectors are available as described below. Fan convectors are controlled on the airside by varying the rotational speed of the fan motor.

3.1 OPERATION
Manual

Control of the fan convector can be manual via on/off and change speed switches either built-in to the unit or supplied on a remote switchplate. Manual control may be augmented via the use of an LTC (low water temperature switch) which is capable of coupling the operation of the fan convector to the operation of the boiler/heat pump to which it is connected. When the hot water temperature increases above 35°C the fan is enabled and when it drops significantly below this level (suggesting that the boiler/heat pump has switched off) then the fan is disabled. The standard LTC has a fixed temperature and is fitted directly to the coil heat exchanger. An alternative adjustable version (ALTC) is available; this clips to the pipework leading to the unit and is variable between 20 and 90°C.

3.2 OPERATION
Automatic (thermostatic)

Thermostats are available to automatically control the operation of the fan and can be either built-in or remotely mounted. Remote mounted thermostats give better control as they measure a temperature more representative of that pertaining in the space, they do, however, require to be hard-wired back to the fan convector terminal block.

T1 is an on/off thermostat which switches off the fan when the setpoint temperature is reached. T2 is a change speed thermostat which switches from medium to low speed as the temperature approaches setpoint (switching point of T2 needs to be set below T1 by, typically 4°C). T3 is similar to T2 but switches from high to medium speed.

Modulo proportional thermostats can optionally be used for a more energy efficient control. These supersede the more coarse on/off and change speed thermostats providing proportional control between setpoint and 4°C below.

A summer/winter override switch is available. This overrides the thermostats (including LTC) when set to summer override mode so that the fan convector can circulate unheated air.

3.3 OPERATION
Supervisory system (BMS) control

Fan convectors can be supplied suitable for full control via a BMS system. In this incarnation, the fan convector would take a 0-10V signal from a BMS to provide complete control of the fan speed. When a control signal below 1.5V is sent the fan is stationary, ramping up to its maximum speed at 10V. Alternatively, the BMS can be arranged to just supply an enable/disable signal with speed control determined locally.

3.4 OPERATION
Master/slave

If several units are installed in the same zone then they can be arranged in a master/slave set-up such that they all respond to the switches/stats/signals that are wired to a unit nominated as the master.

All the slaves need their own power supply and two control wires are taken from the master or daisy chained from other slaves.

4.1 MAINTENANCE
Filter

If the unit is supplied with a filter then this should be periodically removed and cleaned to ensure that the unit performs to its maximum capability.

The filter will be either fitted behind the inlet grille or at the motor plate. The access panel needs to be removed and the instructions above must be followed. The filter is washable with mild detergent but must be allowed to fully dry prior to replacement.

The rate at which the filter should be cleaned is very dependent upon the environment in which the unit is operating. It is advised that the filter be initially checked on a monthly basis until a suitable maintenance schedule for it can be developed.

4.2 MAINTENANCE
Fan

The fan is directly coupled to the motor which has sealed for life bearings and is maintenance free.

4.3 MAINTENANCE
Coil heat exchanger

The heat exchanger is virtually maintenance free, particularly if the unit is equipped with a filter. If debris does build up on the coil then it can be softly brushed or vacuumed clean. Take care not to damage the fins which are fragile.

4.4 MAINTENANCE
Spares

Please contact your BSS branch quoting the BSS order number wherever possible.

5 COMMISSIONING

Commissioning of Fan Convectors requires the following:

- Check rotation of all fans
- Check leaving air temperature
- Check operation of any controls
- Check no excessive and/or unexpected noise

6 FAULT FINDING

Note: All electrical investigations must be performed by a qualified electrician.

Below is a list of common faults and the steps required to resolve them.

Fault	Remedy
Fan not running	Check fuse in FCU (fused spur)
	Check fuse on unit motor plate
	Check power supply
	Check any split connectors are properly joined
	Check there is hot water to the unit (fan will be held off by LTC if not)
	Check thermostats are correctly wired and set at correct temperatures
	Check switches are in the correct positions
	Check any signals for BMS
	Check fan impellers can run freely
Leaving air not warm	Check coil is properly vented
	Check temperature of flow pipe
	Check temperature of return pipe (large temperature drop indicates lack of water flow)
	Check no upstream valves are closed

7 DISPOSAL

Units have a heat exchanger from copper tubes and aluminium fins. The units include fan assemblies from mixed materials and electrical components which should be disposed of separately in line with WEEE directives. Casing are from mild steel either painted or pre-galvanised. It is not recommended that the units are disposed of with domestic waste but that the components are recycled as far as possible.

BOSS™ Copperad®

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