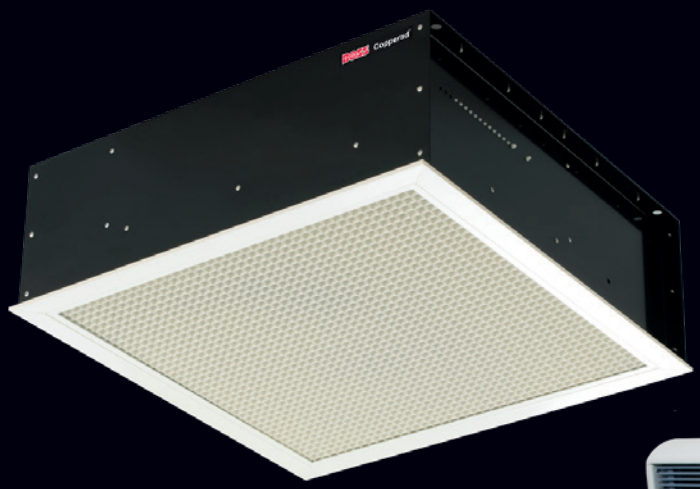
BOSS™ Copperad®

BOSS™ COPPERAD FAN CONVECTOR RANGE



OVER
100 YEARS
OF QUALITY

Contents

1 BOSS™ COPPERAD FAN CONVECTOR RANGE

BOSS™ Copperad offers a high-performance range of Fan Convectors and Ceiling Tile (CT) Heaters, designed to provide efficient, responsive heating for commercial and industrial applications.

Fan Convectors

Designed for fast and effective heat distribution, our Fan Convectors are available in wall-mounted, floor-standing, and concealed options. Ideal for offices, schools, and healthcare settings, they offer:

- Quick, consistent warmth with fan-assisted air circulation.
- Low Surface Temperature (LST) models for safety-sensitive environments.
- Advanced control options, including BMS integration.
- Compatible with low water temperatures, ideal for use with heat pumps and decarbonisation systems.

Ceiling Tile (CT) Heaters

The CT Unit is a discreet heating solution for suspended ceilings, delivering quiet, efficient heating while maintaining a low-profile appearance. Key features include:

- Seamless ceiling integration in standard grid systems.
- LPHW options to suit different needs.
- Easy access for maintenance and filter replacement.

Whether you need a compact wall-mounted solution or a discreet ceiling-integrated unit, BOSS™ Copperad's range of Fan Convectors and CT Heaters ensure a reliable, high-performance heating solution for any space.

2 SUSTAINABLE HEATING & DECARBONISATION

Modern heating systems based on heat pumps and condensing boilers increasingly operate at low hot water temperatures. The use of these heat sources allows greater energy efficiency with the greatest savings being associated with the lowest hot water temperatures. In order to realise the savings, the heat emitters must be redesigned to optimise their performance at these temperatures and hence the heat exchangers integral to the units increase in size and surface area.

Standard Fan Convectors

- Enhanced heat exchangers used to optimise the rate of heat output at low water temperatures
- Lowflow version heat exchangers available for low water temperatures combined with low water flowrates
- Adjustable heat output rates and a variety of controls are available
- High efficiency and controllable EC motors used throughout

CT Solo Plus Ceiling Tile

- A variation on the standard CT Solo unit designed to operate against low hot water temperatures
- Larger fan/EC motor increases the rate of airflow
- High surface area heat exchanger optimises heat transfer efficiency at low hot water temperatures
- Adjustable heat output rates and a variety of controls are available

3 | BOSS™ COPPERAD FAN CONVECTORS

The BOSS™ Copperad standard Fan Convector range comprises sizes and styles suitable for incorporation in a wide variety of applications. With additional options for control of the units, an off the shelf or bespoke solution to your requirements will always be at hand.

Rates of heat output can be varied to suit the rate of space heat losses via change of the rotational speed of the fans and by selection of longer or shorter units. The number of fans varies with unit length but all are powered by EC (brushless DC) motors providing the latest in energy efficiency and controllability.

Unit styles available to suit the application as below:

- Low level exposed wall mounted with bottom inlet and top outlet grilles
- High level exposed wall mounted with top inlet grille and bottom outlet grilles blowing downwards into the space
- Exposed ceiling mounted
- Concealed or partly concealed units whereby the inlet and/or outlet grilles are replaced by spigots
- Hideaway units which are chassis type rather than decoratively cased; can be ducted and are suitable for fully concealed installation
- Extended height units available for both exposed and concealed/partly concealed installation

3.1 SELECTION CRITERIA & GUIDE

Selecting the right Fan Convector depends on heat output, unit placement, and controls. This guide provides key factors to consider when choosing a unit.

Key Selection Factors

- **Heat Output Requirements:** Determine the required kW output based on the room's heat loss.
- **Number of Units Required:** As a guide, one unit per 30m² ensures optimal air mixing.
- **Mounting Styles Available:**
  - Low-level exposed (wall-mounted): Bottom inlet, top outlet.
  - High-level exposed (wall-mounted): Top inlet, bottom outlet (blows downwards).
  - Ceiling-mounted (CT Units): Fits into standard suspended ceiling grids for discreet heating.
  - Concealed or partially concealed: Uses inlet/outlet spigots instead of grilles.
  - Hideaway (chassis-type): Ducted for full concealment.
- **Medium Flow & Return Temperatures:** Common options include:
  - 80/70°C, 60/40°C, 50/40°C, and other LPHW settings.
- **Mounting Height:** Max recommended height: 3m.

Control Options

- **Manual Control:**
  - RS13R-B on/off & change speed switch coded 50080624 other manual switch options also available.
- **Built-in Thermostats:**
  - T1: On/off thermostat.
  - T2: Speed control (low to medium).
  - T3: Speed control (medium to high).
- **Remote Thermostats:** Required for ceiling and high-wall units, available as:
  - RT1: Remote wall-mounted on/off thermostat
  - RT2: Remote wall-mounted low/medium speed thermostat
  - RT3: Remote wall-mounted medium/high speed thermostat
- **Tamperproof:**
  - CMT1: Tamperproof remote wall-mounted on/off thermostat
  - CMT2: Tamperproof remote wall-mounted low/medium speed thermostat
  - CMT3: Tamperproof remote wall-mounted medium/high speed thermostat
- **Modulo Controller:** Provides on/off plus proportional fan speed control remotely.
- **Master/Slave Control:** Enables multiple units to operate from a single thermostat.

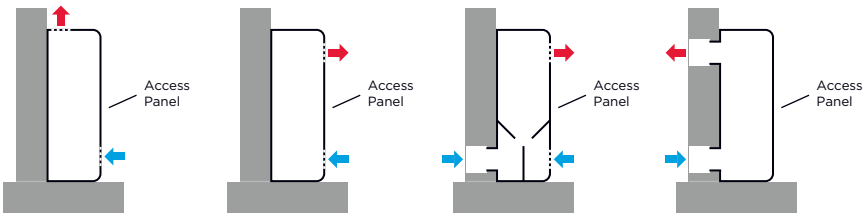
Additional Consideration

- **Noise Sensitivity:**
  - Low speed: Recommended for quiet areas.
  - Medium speed: Standard selection for most spaces.
  - High speed: Not recommended for constant use (best for quick warm-up).
- **Ducting Considerations:**
  - External resistance should not exceed 25Pa, as it affects airflow and performance.
- **Correction Factors:**
  - When operating at non-standard water or air temperatures correction factors can be applied. See section 3.5 for a discussion of their application. BSS should be contacted for accurate selection.

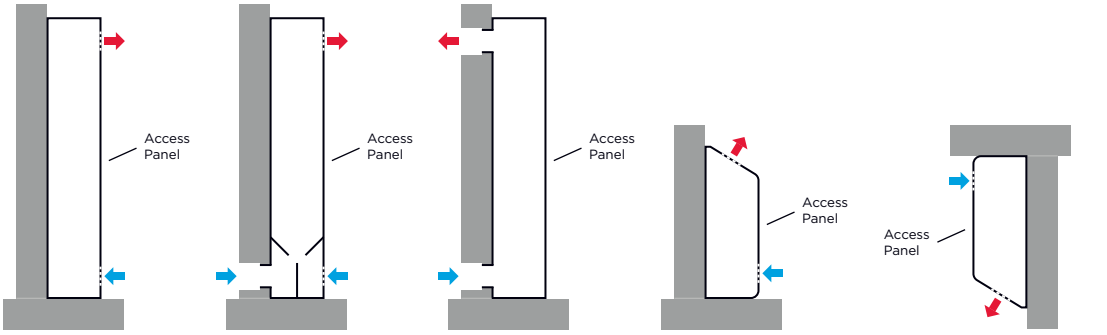
3.2 CASING STYLES (INCLUDING CT & NON-STOCKED SPECIALS)

The drawings below show the essential features of the available styles within the standard range of BOSS™ Copperad Fan Convector units. Standard units have a powder coated casing with the panels finished in RAL 9002 and grilles RAL 7000.

Free standing styles

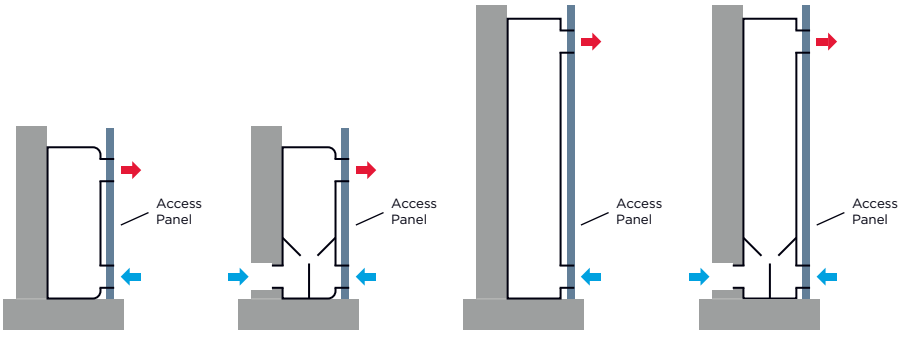


11 21* 25 27



30 32 33 SS* SS INV/RAF*

Concealed styles



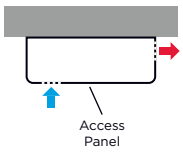
41 43 50 52

***Stocked Units**

Stocked models for floor or low level wall mounting styles 21 and SS have fitted key locks to access panel, CS speed control, T1 thermostat and LTC as standard.

Stocked models for ceiling or high level wall mounting styles SS and DS will require control at low level via a rocker switch (RS13R-B or wall mounted thermostat (CMT1/RT1)

Horizontal styles



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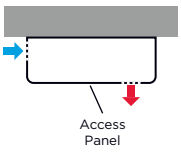

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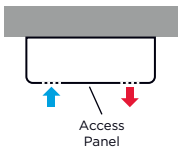

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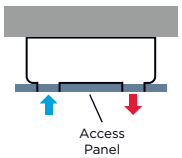

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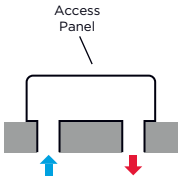

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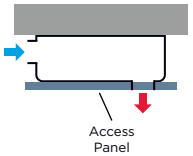

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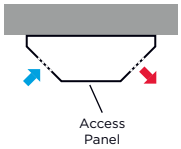
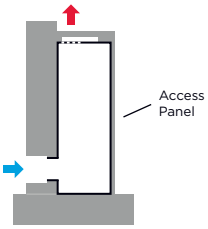
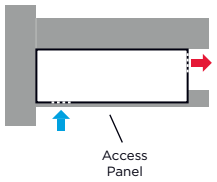


DS

Hideaway styles

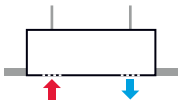


90 Vertical

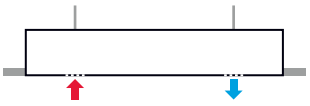


90 Horizontal

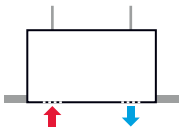
CT Unit styles



CT Solo



CT Duo



CT Solo Plus

***Stocked Units**

Stocked models for floor or low level wall mounting styles 21 and SS have fitted key locks to access panel, CS speed control, T1 thermostat and LTC as standard.

Stocked models for ceiling or high level wall mounting styles SS and DS will require control at low level via a rocker switch (RS13R-B or wall mounted thermostat (CMT1/RT1)

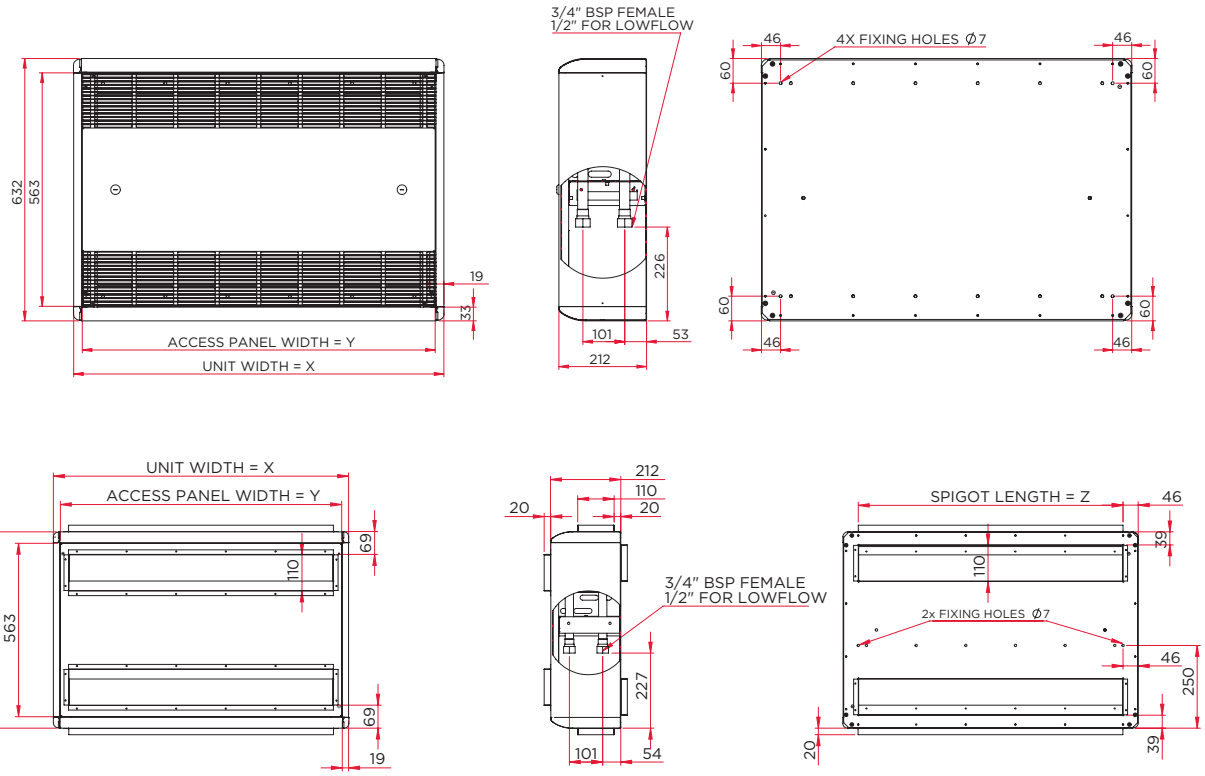
3.3 DIMENSIONS

See the drawings below for an indication of the pertinent unit dimensions. The table below shows the weights of standard units based on their width.

Unit width (mm)	700	900	1200	1500
Approx. weight (kg)	34	39	44	53

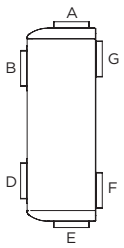
Table 1 - Unit weights

Standard units (styles 11, 21, 25, 27, 41, 43, 70, 74, 75, 81, 82 & 83)



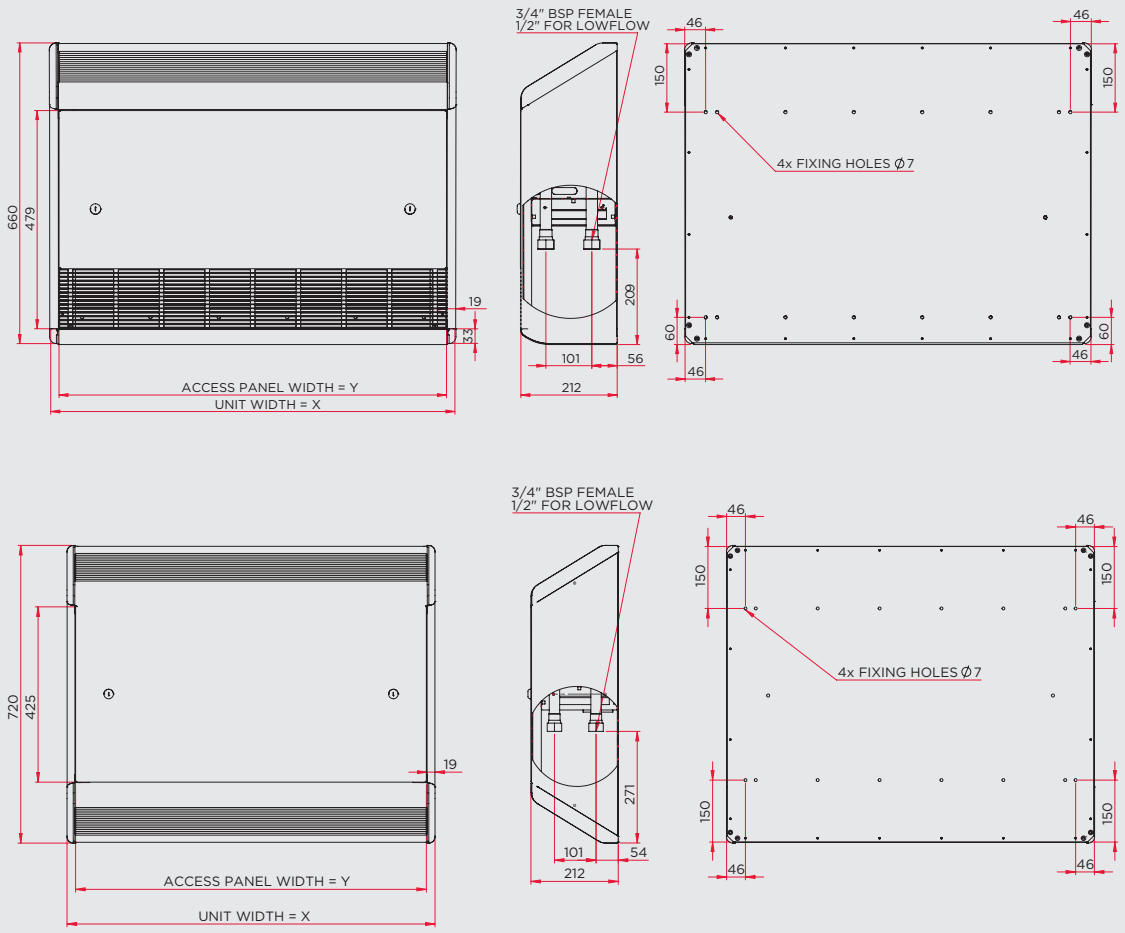
Dimensions	Unit Size (mm)			
	700	900	1200	1500
X	692	892	1192	1492
Y	654	854	1154	1454
Z	600	800	1100	1400

	25, 32*	33*, 82	41, 50*, 81	43, 52*	83
Spigot Location	F	FG	BD	BDF	BE



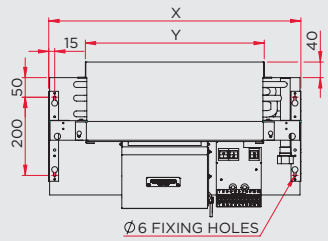
NOTE: * represents tall units, see page 12 for dimensions

SS & DS Styles



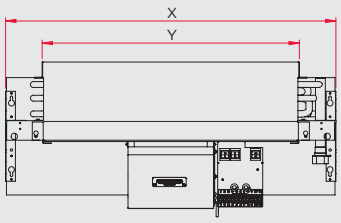
Dimensions	Unit Length (mm)			
	700	900	1200	1500
X	692	892	1192	1492
Y	654	854	1154	1454

Hideaway Unit

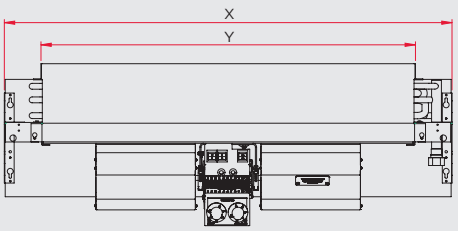


700mm unit

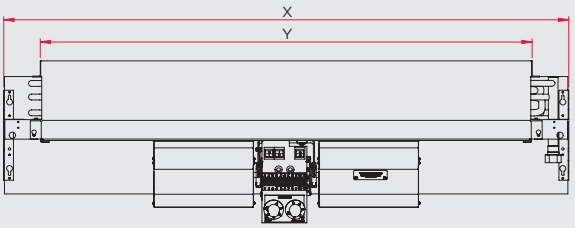
Diagram of hideaway 700 shows standard fixing positions for all units.



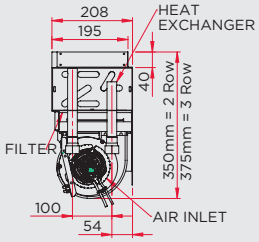
900mm unit



1200mm unit



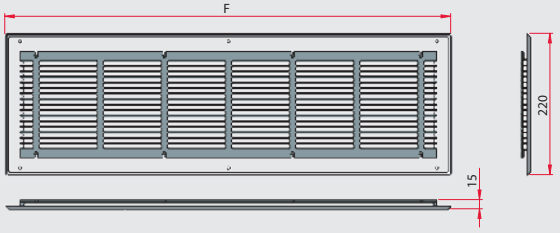
1500mm unit



Dimensions	Unit Size (mm)			
	700	900	1200	1500
X	645	820	1145	1445
Y	455	655	955	1255

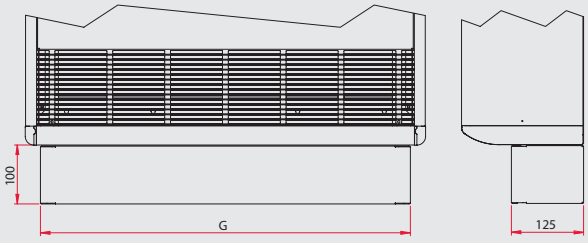
Loose Grilles

LOOSE GRILLES



Loose Grill	Unit Size (mm)			
	700	900	1200	1500
F	686	886	1186	1486

PLINTH



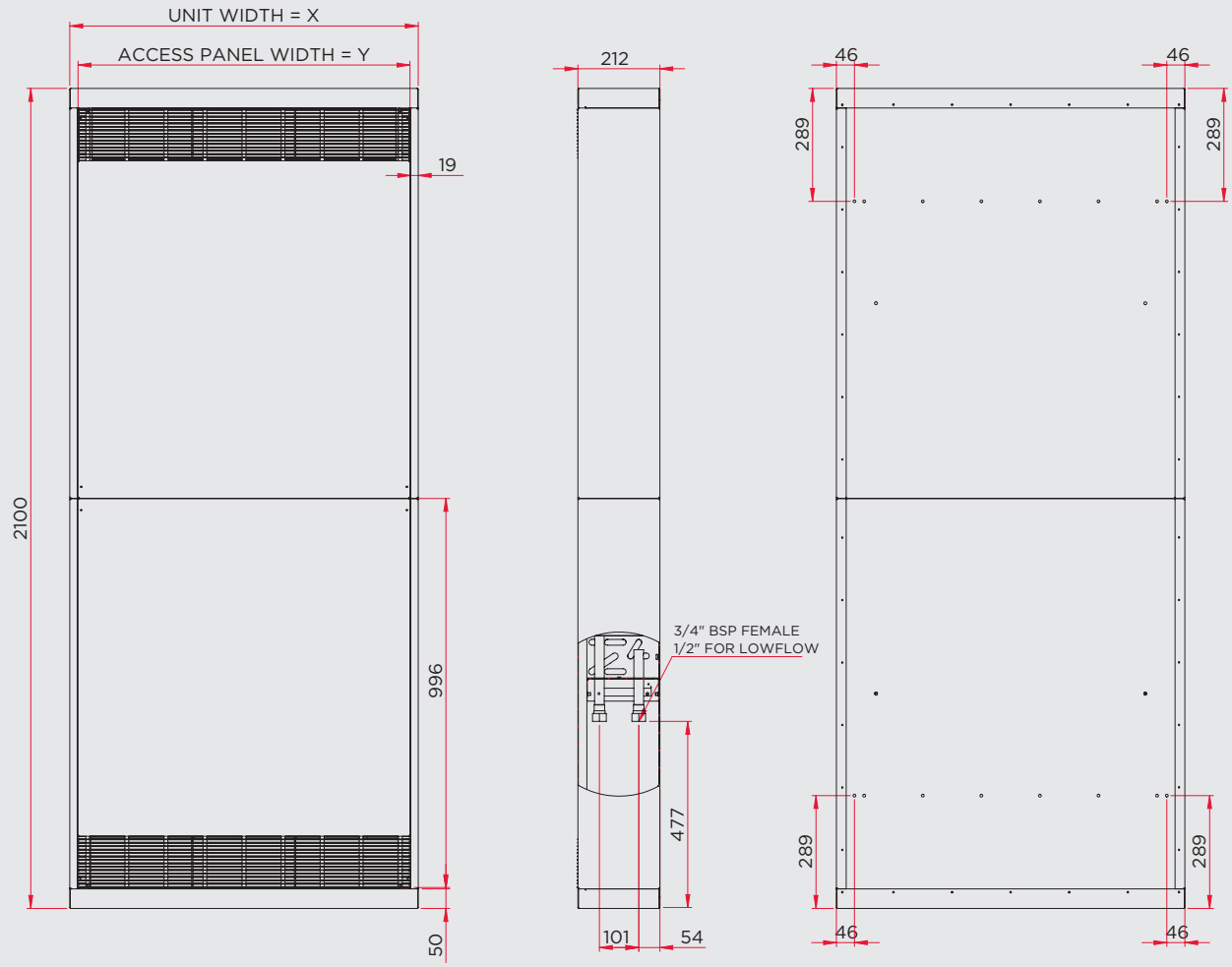
Plinth	Unit Size (mm)			
	700	900	1200	1500
G	640	840	1140	1440

Use Number 8 countersunk screws.
Typical loose grille arrangement.

Note 1: Dimensions are to the outside of the spigot. The optional loose grille can be used with these units by fitting a change section duct or butting the spigot up to the underside of a builders work sealing panel, thus forming a plenum chamber between the spigot and the grille. Builders work access panel size to be overall length less 50mm by 300mm high. Heat exchanger connections – screwed 3/4" BSP Female.

Note 2: Aperture for spigot to be spigot size + 10mm.

Tall units (Extended Height Units, styles 30, 32, 33, 50 & 52)



Dimensions	Unit Length (mm)		
	600	900	1200
X	592	892	1192
Y	554	854	1154
Z	500	800	1100

3.4 PERFORMANCE DATA

The tables below give details of unit performance against a variety of flow and return LTHW temperatures which are associated with water delivered by conventional boilers. Hot water temperatures are increasingly reducing in line with the introduction of high efficiency condensing boilers and heat pumps. Please refer to the data given lower in the document for outputs available from alternative coil heat exchangers designed for use against these lower hot water temperatures.

Size	700			900			1200			1500		
Speed	L	M	H	L	M	H	L	M	H	L	M	H
Airflow (l/s)	80	101	126	95	155	212	108	208	285	162	260	296
Duty (kW)	3.9	4.5	5.2	4.8	6.7	8.1	5.6	8.7	10.6	9.4	13.4	14.7
LAT (°C)	59.6	57.1	54.4	62.1	56.0	50.7	63.2	54.9	51.0	68.4	62.9	61.4
Water flow (l/s)	0.09	0.11	0.11	0.12	0.16	0.19	0.13	0.21	0.25	0.22	0.32	0.35
Water PD (kPa)	0.6	0.9	1.0	0.9	1.8	2.4	1.5	3.5	4.7	4.1	8.4	9.5

Table 2 - Performance, 'standard' coil 80/70°C water, 20°C air

Size	700			900			1200			1500		
Speed	L	M	H	L	M	H	L	M	H	L	M	H
Airflow (l/s)	80	101	126	95	155	212	108	208	285	162	260	296
Duty (kW)	3.1	3.7	4.5	3.6	5.1	6.1	4.6	7.3	8.6	8.1	11.4	12.6
LAT (°C)	52.3	50.5	49.8	51.6	47.4	44.0	55.5	49.2	45.1	61.7	56.5	55.5
Water flow (l/s)	0.05	0.06	0.07	0.04	0.06	0.07	0.05	0.09	0.10	0.10	0.14	0.15
Water PD (kPa)	0.2	0.3	0.4	0.2	0.3	0.4	0.3	0.7	0.9	0.9	1.7	2.1

Table 3 - Performance, 'standard' coil 80/60°C water, 20°C air. The 700 unit is based on water at 80/65°C, the water flowrate for this unit based on 80/60°C is below the minimum requirement

3.5 CORRECTION FACTORS

Table 4 below gives approximate correction factors for use with the standard coil and other conditions not given in the tables above. It is advised that the BOSS™ Copperad technical team be contacted for correct performance at non-standard conditions (see back page for contact details). A single set of correction factors cannot adequately characterise the full range of units and significant inaccuracies will occur at lower end of the size spectrum and at low water flowrates.

Do not base scheduled outputs on correction factors without taking confirmation. These correction factors should be applied to the performance above in table 2 (80/70°C water), multiply the correction factor by the datum output from table 2 to give the approximate corrected output.

Mean water (°C)		80			70			60			50		
Water temp. drop (°C)		5	10	20	5	10	20	5	10	20	5	10	20
Entering air (°C)	-5	1.46	1.40	1.36	1.27	1.24	1.15	1.11	1.05	0.98	0.92	0.86	0.75
	0	1.38	1.36	1.27	1.20	1.17	1.08	1.02	0.96	0.88	0.83	0.79	0.63
	5	1.30	1.26	1.19	1.12	1.08	1.00	0.93	0.88	0.79	0.75	0.70	0.52
	10	1.23	1.18	1.11	1.02	1.00	0.92	0.85	0.81	0.69	0.67	0.61	-
	15	1.14	1.08	1.02	0.94	0.90	0.82	0.76	0.73	0.58	0.57	0.51	-
	20	1.05	1.00	0.94	0.87	0.82	0.73	0.67	0.63	0.46	0.49	0.42	-
	25	0.96	0.93	0.86	0.77	0.73	0.63	0.58	0.55	-	-	-	-

Table 4 - Correction Factors

3.6 ENHANCED/LOW FLOW COIL OPTIONS

Modern heating systems often operate at lower water temperatures (e.g., heat pumps, condensing boilers). To maintain heat output, BOSS™ Copperad offers enhanced heat exchanger options designed for these conditions.

Why Choose an Enhanced Coil?

- Designed for low temperature hot water applications.
- Increases heat output efficiency in older buildings with higher heat loss.
- Extended surface area improves heat transfer at lower water temperatures.

Coil Options

- **Standard (2-row):** For standard water flow rate, temperatures 80/70°c.
- **Enhanced (3-row):** Designed for flow temperatures below 65°C, associated with heat pumps or low-temperature systems.
- **Low Flow (3-row):** Best for low water flow rates and applications with a >15°C temperature drop.

All coils are interchangeable within unit casings, making it easy to upgrade for low-temperature heating systems.

The tables below give outputs for the 3 row 'enhanced' and 3 row 'low flow' coils at different conditions.

Enhanced Coil Options

Size	700			900			1200			1500		
Speed	L	M	H	L	M	H	L	M	H	L	M	H
Airflow (l/s)	72	91	113	86	140	191	97	187	257	146	234	266
Duty (kW)	1.8	2.2	2.6	1.1	2.9	3.7	2.5	4.3	5.4	4.4	6.6	7.2
LAT (°C)	40.8	40.1	39.2	30.7	37.3	36.1	41.5	39.2	37.5	45.1	43.5	42.6
Water flow (l/s)	0.06	0.07	0.09	0.03	0.07	0.09	0.06	0.11	0.13	0.11	0.16	0.17
Water PD (kPa)	0.4	0.6	0.8	0.1	0.6	0.9	0.5	1.4	2.0	1.7	3.6	3.9

Table 5 - Performance, 3 row 'enhanced' coil 50/40°C water, 20°C air. The 700 unit is based on water at 50/43°C; the water flowrate for this unit based on 50/40°C is below the minimum requirement

Size	700			900			1200			1500		
Speed	L	M	H	L	M	H	L	M	H	L	M	H
Airflow (l/s)	72	91	113	86	140	191	97	187	257	146	234	266
Duty (kW)	1.6	1.9	2.3	2.1	3.1	3.9	2.4	4.1	5.1	4.0	5.9	6.6
LAT (°C)	38.5	37.4	37.0	40.3	38.5	37.0	40.6	38.3	36.5	42.8	41.0	40.7
Water flow (l/s)	0.08	0.09	0.11	0.10	0.15	0.19	0.11	0.20	0.24	0.19	0.28	0.31
Water PD (kPa)	0.8	0.9	1.4	1.2	2.3	3.6	1.5	4.4	6.5	4.6	9.5	11.9

Table 6 - Performance, 3 row 'enhanced' coil 45/40°C water, 20°C air

Low Flow Coil Options

Size	700			900			1200			1500		
Speed	L	M	H	L	M	H	L	M	H	L	M	H
Airflow (l/s)	72	91	113	86	140	191	97	187	257	146	234	266
Duty (kW)	1.0	2.3	2.8	2.7	4.1	5.1	3.4	5.6	6.9	5.8	8.4	9.2
LAT (°C)	31.6	41.1	40.6	46.2	44.4	42.3	49.2	45.0	42.4	53.1	49.9	48.8
Water flow (l/s)	0.01	0.03	0.03	0.03	0.05	0.06	0.04	0.07	0.08	0.07	0.10	0.11
Water PD (kPa)	0.2	0.6	0.8	1.0	1.9	2.7	1.6	3.8	5.4	4.8	8.8	10.6

Table 7 - Performance, 3 row 'low flow' coil 60/40°C water, 20°C air

Size	700			900			1200			1500		
Speed	L	M	H	L	M	H	L	M	H	L	M	H
Airflow (l/s)	72	91	113	86	140	191	97	187	257	146	234	266
Duty (kW)	1.9	2.4	2.8	1.1	3.0	3.8	2.6	4.4	5.5	4.8	6.9	7.6
LAT (°C)	42.0	42.0	40.6	30.7	37.9	36.6	42.3	39.6	37.8	47.4	44.6	43.8
Water flow (l/s)	0.03	0.04	0.04	0.02	0.04	0.05	0.03	0.05	0.07	0.06	0.08	0.09
Water PD (kPa)	0.7	1.0	1.4	0.3	1.1	1.7	1.1	2.6	3.7	3.5	6.1	7.5

Table 8 - Performance, 3 row 'low flow' coil 55/35°C water, 20°C air. The 700 unit is based on water at 55/40°C, the water flowrate for this unit based on 55/35°C is below the minimum requirement

3.7 NOISE DATA

Table 9 gives noise data in terms of NR levels. The actual resultant sound pressure level will only match the below data if the actual space/volume and surfaces of the room match the parameters assumed in calculating the above; the figures should be assumed as being typical. If a value for dBA is preferred then this is approximately equal to the NR level plus 5dB.

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

Table 9 – Noise Data

3.8 ELECTRICAL DATA

The units incorporate brushless DC (EC) motors, electrical data and specific fan powers are as below:

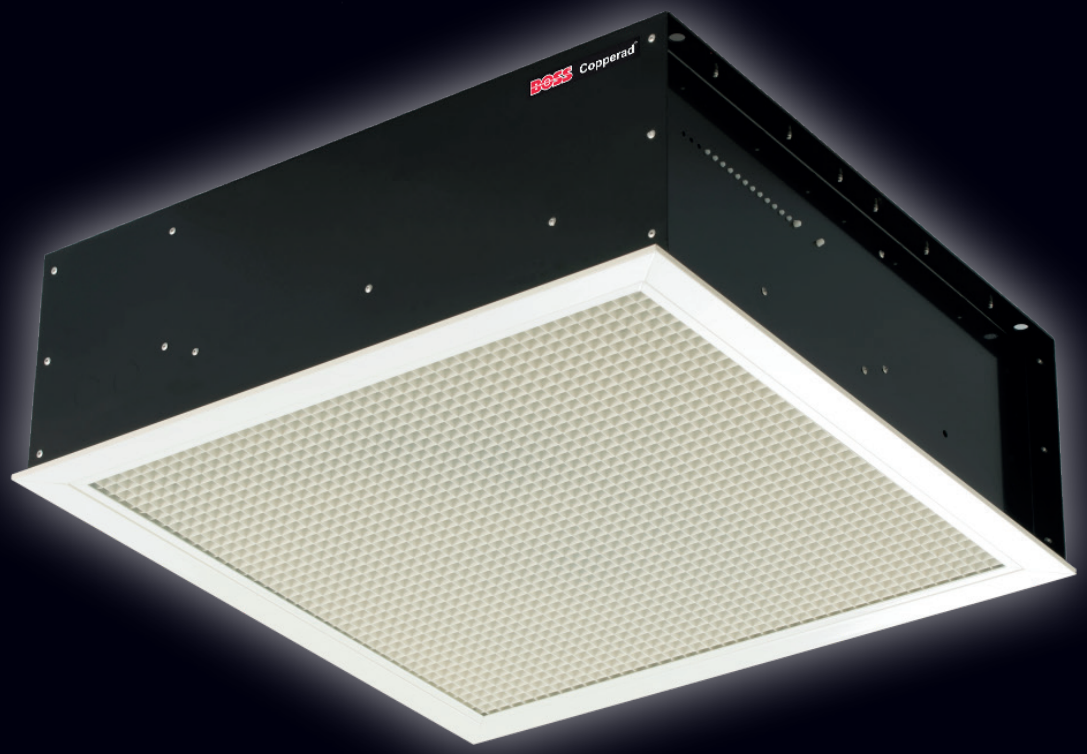
Speed		L			M			H		
Performance		Airflow (l/s)	Power draw (W)	SFP (W/l/s)	Airflow (l/s)	Power draw (W)	SFP (W/l/s)	Airflow (l/s)	Power draw (W)	SFP (W/l/s)
Size	700	80	11	0.14	101	16	0.16	126	27	0.21
	900	95	15	0.16	155	53	0.34	212	84	0.40
	1200	108	18	0.17	208	34	0.16	205	73	0.36
	1500	162	22	0.14	260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

230V/1Ph/50Hz single-phase power supply

Table 10 - Electrical Data

4 BOSS™ COPPERAD CEILING TILE (CT) FAN CONVECTORS

The CT (Ceiling Tile) Fan Convector is suitable for installation into suspended ceilings, both T bar type and plasterboard (can also be suspended from solid ceilings). They have nominal dimensions of 600x600mm or 600x1200mm to be able to act as replacements for Ceiling Tiles. Room air is drawn in upwards and blown out vertically downwards via a hinged eggcrate grille which also acts as the access panel. Grilles are finished in white powder coat.



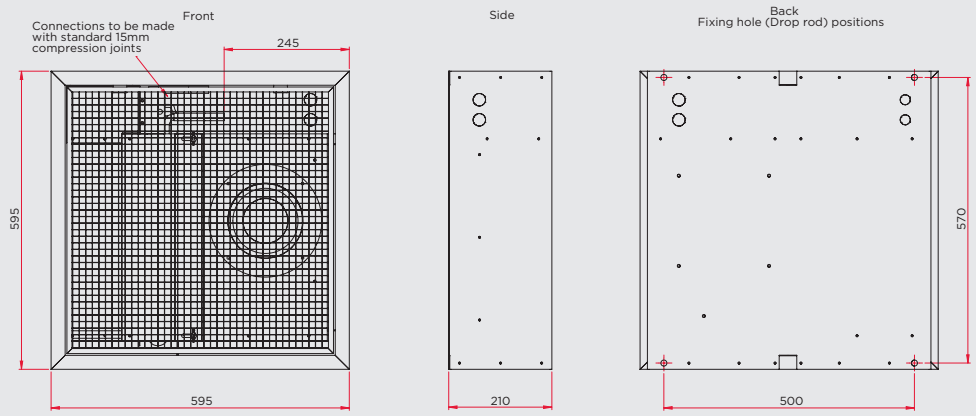
4.1 DIMENSIONS

Units have nominal sizes to fit standard ceiling grids and actual dimensions are as below.

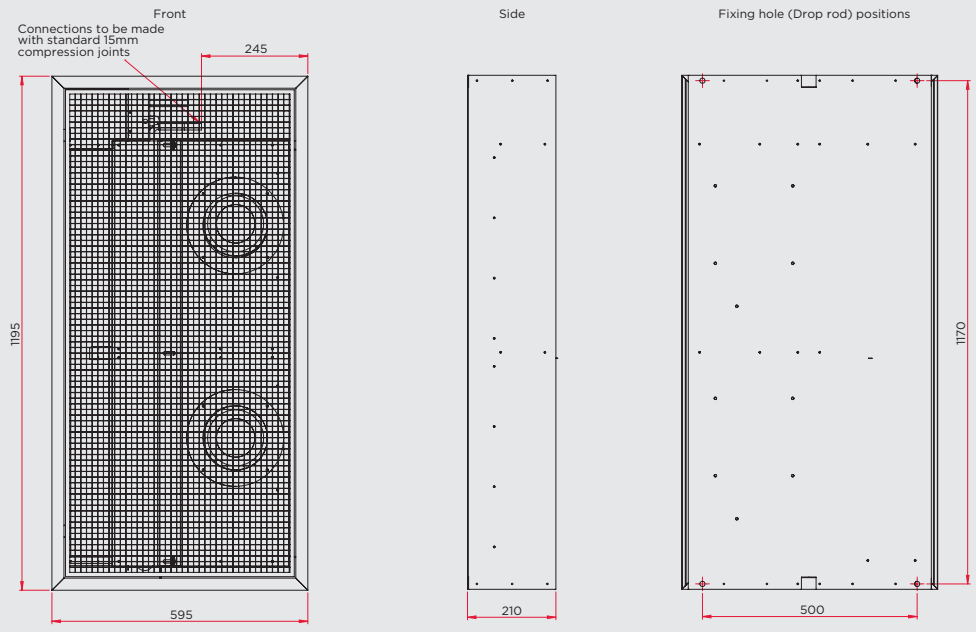
Model	CT Solo	CT Duo	CT Solo Plus
Length (mm)	595	1195	595
Width (mm)	595		
Depth (mm)	210		260
Weight (kg)	18	35	20

Table 11 - CT unit dimensional details

CT Solo



CT Duo



4.2 PERFORMANCE DATA

Outputs at a datum condition of 80/70°C water with space air at 20°C are shown along with 80/60°C. Also included is a table of correction factors. Also included is a table of correction factors.

Note that the correction factors only give estimates of the performance and care must be exercised in their use at extreme conditions. Please contact the BOSS™ Copperad technical team if detailed output information is required at non-standard conditions. Multiply the correction factor by the datum output from table 12 to give the approximate corrected output.

Size	CT Solo			CT Duo		
Speed	L	M	H	L	M	H
Airflow (l/s)	70	85	95	140	170	190
Duty (kW)	2.9	3.3	3.6	6.8	7.7	8.3
LAT (°C)	54.5	52.4	51.6	60.5	57.7	56.4
Water flow (l/s)	0.07	0.08	0.09	0.17	0.19	0.20
Water PD (kPa)	4.0	5.0	5.5	29.5	36.9	42.2

Table 12 - Performance, CT units at 80/70°C water, 20°C air

Size	CT Solo			CT Duo		
Speed	L	M	H	L	M	H
Airflow (l/s)	70	85	95	140	170	190
Duty (kW)	2.4	2.9	3.1	6.0	6.8	7.3
LAT (°C)	48.6	48.4	47.2	55.7	53.3	52.0
Water flow (l/s)	0.03	0.03	0.04	0.07	0.08	0.09
Water PD (kPa)	0.9	1.2	1.3	6.9	8.9	10.0

Table 13 - Performance, CT units at 80/60°C water, 20°C air

4.3 CORRECTION FACTORS

Mean water (°C)		80			70			60			50		
Water temp. drop (°C)		5	10	20	5	10	20	5	10	20	5	10	20
Entering air (°C)	10	1.22	1.19	1.11	1.03	1.00	0.92	0.86	0.81	0.69	0.67	0.61	-
	15	1.14	1.11	1.03	0.94	0.92	0.83	0.78	0.72	0.61	0.58	0.53	-
	20	1.06	1.03	0.94	0.86	0.83	0.75	0.67	0.64	0.50	0.50	0.44	-
	25	0.97	0.92	0.86	0.78	0.75	0.64	0.58	0.56	0.31	0.42	0.33	-

Table 14 - Approximate correction factors for CT units

Note that the same comments apply to the use of correction factors for CT units as for standard units, see Table 4 above and associated text.

4.3 NOISE DATA

Data for the CT units are shown below in terms of resultant NR levels.

Speed		L	M	H
Size	CT Solo	36	40	42
	CT Duo	38	42	44
	CT Solo Plus	34	38	40

Table 15 - CT unit NR levels based on a room volume that would normally be heated by a single unit of the size shown. Room reverberation time assumed to be 0.4s. Listener in middle of room

4.4 ELECTRICAL DATA

CT units have backward curved fans directly driven by EC motors. The power draw and specific fan powers are shown in the table below.

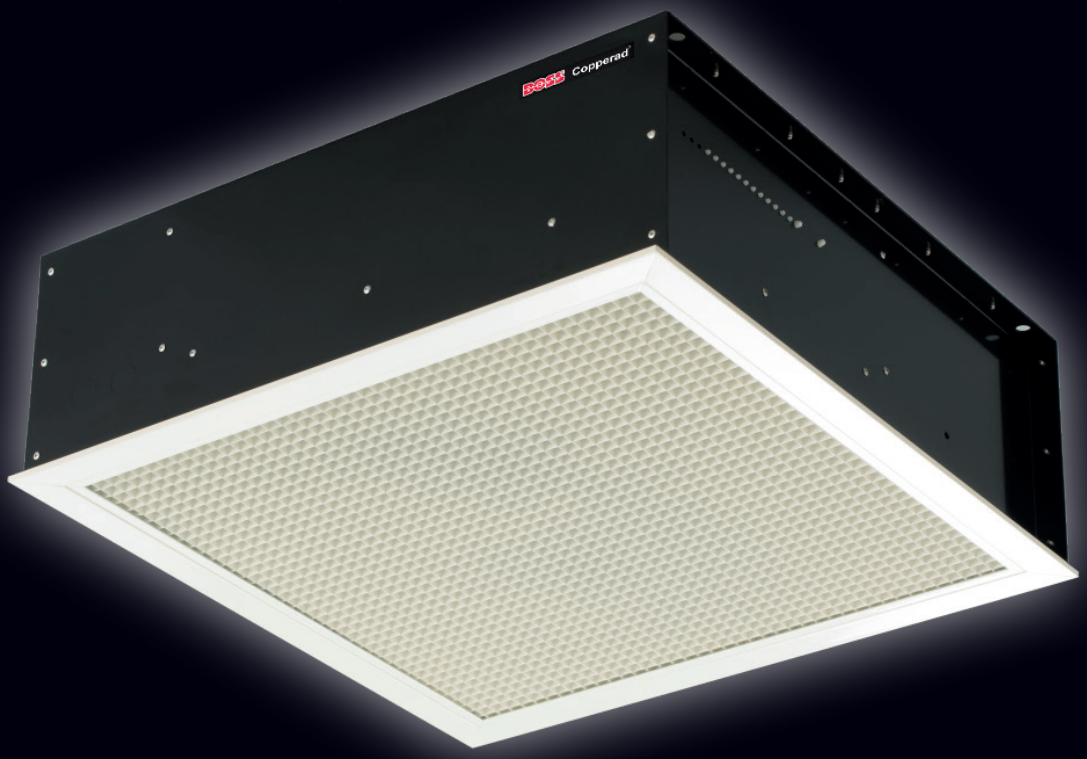
Speed		L		M		H	
Performance		Power draw (W)	SFP (W/l/s)	Power draw (W)	SFP (W/l/s)	Power draw (W)	SFP (W/l/s)
Size	CT Solo	12	0.17	14	0.16	18	0.19
	CT Duo	24	0.17	28	0.16	36	0.19
	CT Solo Plus	15	0.14	20	0.15	30	0.2

230V/1Ph/50Hz single-phase power supply

Table 16 - Electrical data for CT units

5 BOSS™ COPPERAD CEILING TILE PLUS (CT PLUS) FAN CONVECTORS

The Plus version of the Ceiling Tile (CT Plus) is available with a nominal size of 600x600 and shares the dimensions of the standard CT unit other than the depth being increased to 260mm. The CT Plus unit incorporates a more powerful forward curved blower and increased surface area coil in order to achieve meaningful outputs when operating against low temperature hot water from such as a heat pump. The unit is specifically designed to function in conjunction with lower hot water temperatures and should not be used against conventional boiler temperatures due to high leaving air temperatures.



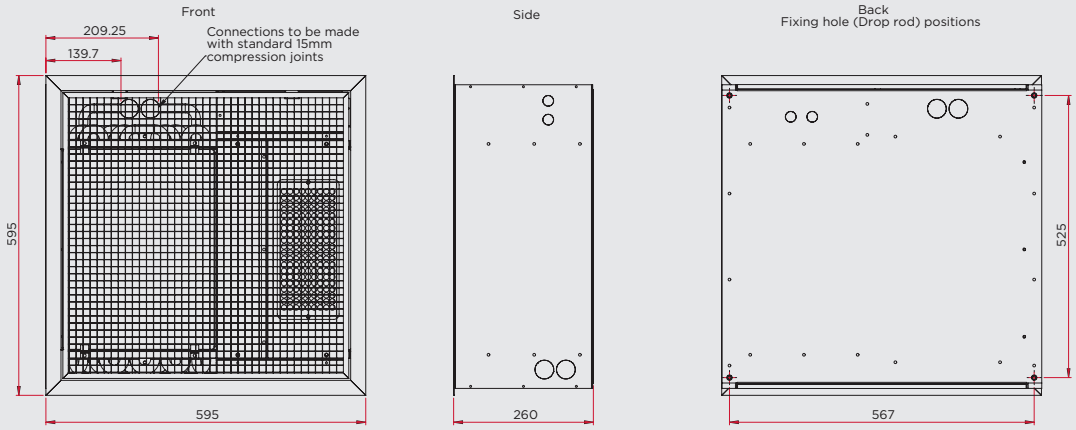
5.1 DIMENSIONS

Units have nominal sizes to fit standard ceiling grids and actual dimensions are as below.

Model	CT Solo	CT Duo	CT Solo Plus
Length (mm)	595	1195	595
Width (mm)	595		
Depth (mm)	210		260
Weight (kg)	18	35	20

Table 17 - CT unit dimensional details

CT Solo Plus



Data for the CT Plus unit is shown below, please contact BOSS™ Copperad for information regarding performance at other conditions as the use of correction factors is inappropriate for these units.

Speed	L	M	H
Airflow (l/s)	100	130	152
Duty (kW)	2.5	3.0	3.2
LAT (°C)	40.8	39.2	37.5
Water flow (l/s)	0.06	0.07	0.08
Water PD (kPa)	8.3	11.2	13.1

Table 18 - Performance, CT Plus units at 50/40°C water, 20°C air

Speed	L	M	H
Airflow (l/s)	100	130	152
Duty (kW)	2.2	2.7	3.0
LAT (°C)	38.3	37.5	36.5
Water flow (l/s)	0.10	0.13	0.14
Water PD (kPa)	23.8	33.1	40.0

Table 19 - Performance, CT Plus units at 45/40°C water, 20°C air

Speed	L	M	H
Airflow (l/s)	100	130	152
Duty (kW)	2.8	3.4	3.7
LAT (°C)	43.3	41.8	40.3
Water flow (l/s)	0.03	0.04	0.04
Water PD (kPa)	3.0	4.1	4.8

Table 20 - Performance, CT Plus units at 60/40°C water, 20°C air

Speed	L	M	H
Airflow (l/s)	100	130	152
Duty (kW)	2.2	2.6	2.9
LAT (°C)	38.3	36.7	35.9
Water flow (l/s)	0.03	0.03	0.03
Water PD (kPa)	1.8	2.6	3.1

Table 21 - Performance, CT Plus units at 55/35°C water, 20°C air

6 LST OPTION

The LST (Low Surface Temperature) option is designed for environments with vulnerable individuals, such as hospitals, care homes, and schools. It ensures that surface temperatures remain below 43°C, in line with NHS guidelines, to prevent burns or injury.

How It Works

- **Standard operation:** Low-temperature hot water (LTHW) systems naturally help maintain safe surface temperatures.
- **Active LST control:** When using conventional higher-temperature hot water, a leaving air temperature sensor regulates a waterside valve, ensuring the casing doesn't exceed 43°C.
- **Automatic response:** If air temperature rises too high, the valve restricts hot water flow to prevent overheating.

Key Features & Benefits

- **Safety compliance** – Meets NHS & building regulations for low surface temperature heating.
- **Consistent heat output** – Optimises performance while maintaining safe casing temperatures.
- **Automatic thermal regulation** – Prevents overheating while ensuring sufficient room heating.
- **Only available for floor-mounted units** – Ceiling and high-wall units do not pose a burn risk.

The limit on the leaving air temperature imposes an artificial limit on the rate of heat output and these are shown below based on units running at medium speed and fed with conventional hot water temperatures. The LST is an optional extra and is supplied loose for fitting on site in line with the instruction manual supplied with it.

Size	Airflow (l/s)	Capacity (kW)
700	101	2.8
900	155	4.3
1200	208	5.7
1500	260	7.2

Table 22 - Performance of LST units. Nominal conditions – '80/70°C water, 20°C air'

7 MODULO CONTROLLER

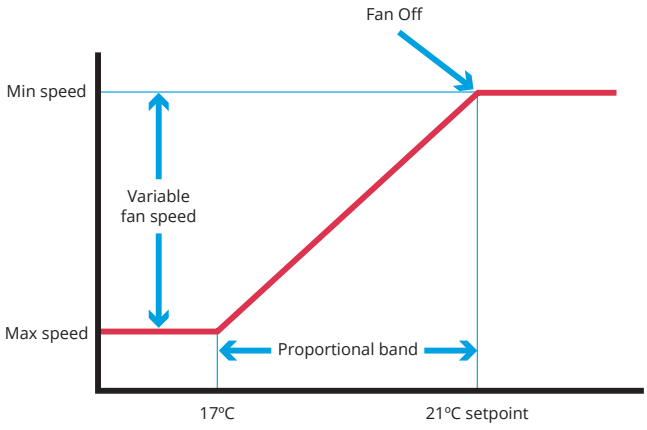
The Modulo Controller provides advanced fan speed modulation, offering precise temperature control and greater energy efficiency. Unlike traditional on/off thermostats, the Modulo adjusts fan speed proportionally based on room temperature, ensuring optimal comfort and minimal energy waste.

How It Works

- **Intelligent temperature control:**
  - When room temperature is 4°C or more below setpoint → fan operates at full speed.
  - As temperature approaches setpoint, fan speed gradually reduces to maintain comfort.
  - Once setpoint is reached, the fan switches off to save energy.
- **Automatic heat output matching:** Fan speed continuously adapts to heat loss, preventing overheating or unnecessary energy use.

Key Features & Benefits

- **Precise room temperature control** – Avoids rapid cycling and maintains stable room conditions.
- **Energy efficiency** – Reduces fan speed when full heating capacity is not required, saving electricity.
- **Proportional control (0-10V signal)** – Provides continuous, fine-tuned fan speed adjustment.
- **Wall-mounted design** – Can be installed in a central location for easy access.
- **Tamper-proof option** – lockable transparent, ventilated cover box available for secure settings.
- **Relay box option** – Controls waterside valve operation for enhanced efficiency.



8 CONTROLS ACCESSORIES AND OPTIONS

BOSS™ Copperad Fan Convectors can be controlled manually, automatically, or via a Building Management System (BMS). Various casing and accessory options are available to suit installation needs. The table below lists the available options in categories along with a brief description.

Control Options:

- **Manual Controls:**
  - Simple on/off switches
  - Fan speed control
  - Summer/winter settings (fan-only operation in summer)
- **Automatic Controls:**
  - Built-in or remote thermostats for temperature-based fan speed regulation
  - Master/slave configuration for multiple units, controlled by a single thermostat
- **Low Water Temperature Cut-Out (LTC):**
  - Prevents fan operation if the water temperature is below a set threshold. An adjustable version (ALTC) is available.
- **BMS Integration:**
  - Remote enable/disable control via 24V relay
  - 0-10V signal for proportional fan speed adjustment, optimising energy use

For further details on available options or specific combinations, contact the BOSS™ Copperad technical team.

Casing Options	
Option code	Description
K	Key opening access panel
VE	Extended air vent
SF	Switched fused spur box
LG700	Loose grille and frame for 700 unit
LG900	Loose grille and frame for 900 unit
LG1200	Loose grille and frame for 1200 unit
LG1500	Loose grille and frame for 1500 unit
PL700	Plinth for 700 unit
PL900	Plinth for 900 unit
PL1200	Plinth for 1200 unit
PL1500	Plinth for 1500 unit
INV	Inverted casing
RAF	Reverse air flow
SPF	Special paint finish (specify RAL no.)

Table 23 – Casing options

Control Options	
Option code	Description
T1	On/off in-built thermostat
T2	Low/medium speed built-in thermostat
T3	Medium/high speed built-in thermostat
CS	Built-in 3 speed and on/off switches
LTC	Low water temperature cut-out
ALTC	Adjustable low water temperature cut-out
FER	Fan enable relay 24V AC
RS1R	On/off remote mounted rocker switch
RS2R	Remote summer/winter rocker switch
RS3R	Remote 3 speed rocker switch
RS12R	Remote on/off and summer/winter rocker switches
RS13R	Remote on/off and change speed rocker switches
RS13R-B	Remote on/off 3 speed SW white box BOSS Copperad v2
RS23R	Remote summer/winter and change speed rocker switches
RS123R	Remote on/off, summer winter and change speed rocker switches.
RT1	Remote wall-mounted on/off thermostat
RT2	Remote wall-mounted low/medium speed thermostat
RT3	Remote wall-mounted medium/high speed thermostat
CMT1	Tamperproof remote wall-mounted on/off thermostat
CMT2	Tamperproof remote wall-mounted low/medium speed thermostat
CMT3	Tamperproof remote wall-mounted medium/high speed thermostat
Modulo	Proportional speed controller
BOX2S	Remote on/off and speed control

Table 24 - Control options

BOX2S: Remote on/off and speed control

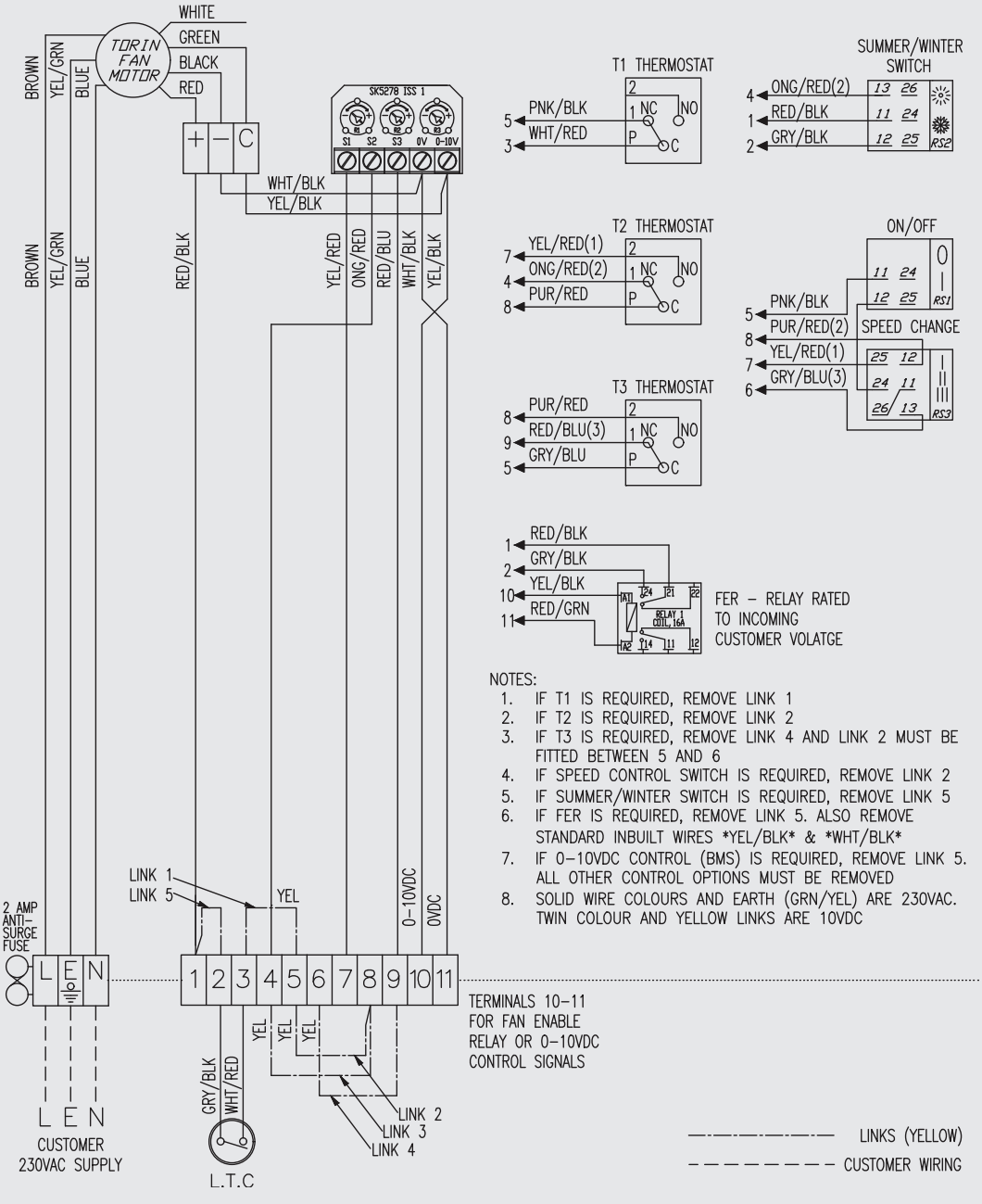
RT1: Remote thermostat

9 WIRING

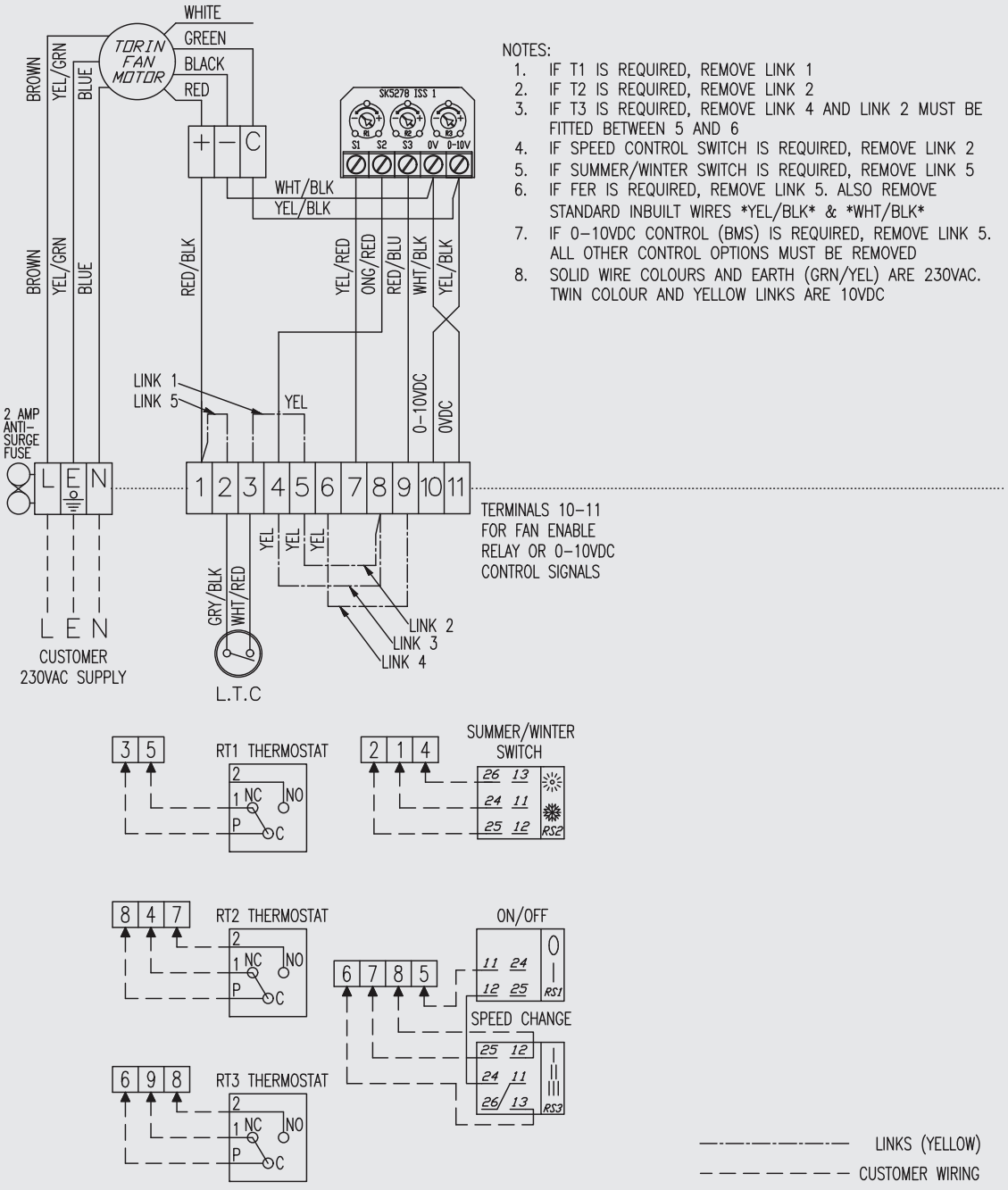
The diagrams below represent standard wiring arrangements. The actual wiring will depend on the combination of options and special wiring diagrams will be issued and delivered with the units whenever required. Wiring diagrams below cover standard arrangements with built-in controls, external controls and wiring for a CT unit.

Note. Wiring diagrams supplied with units will always supersede those shown below which are just for indication.

Fan Convector - Internal controls wiring



Fan Convector - External controls wiring



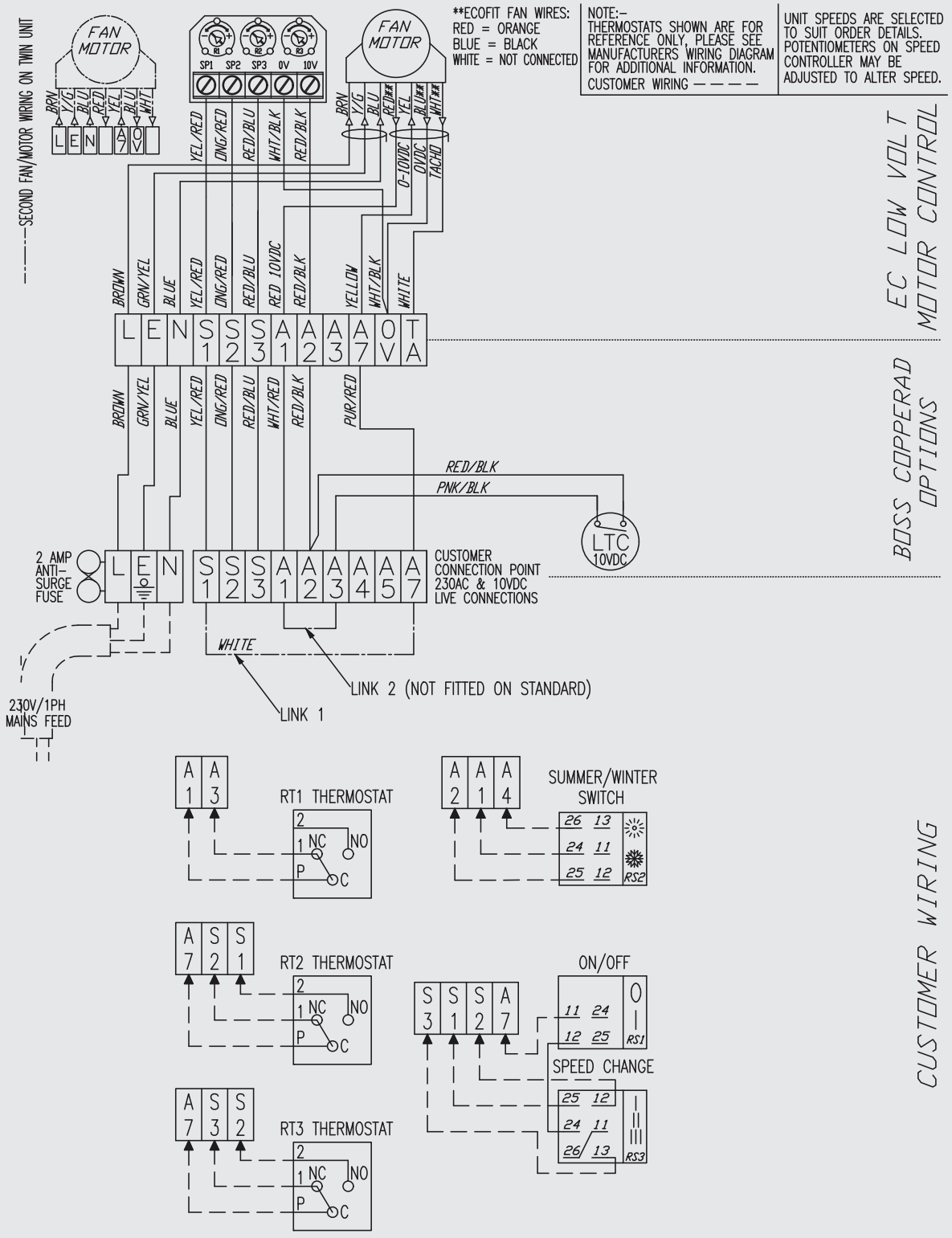
NOTES:

1. IF T1 IS REQUIRED, REMOVE LINK 1
2. IF T2 IS REQUIRED, REMOVE LINK 2
3. IF T3 IS REQUIRED, REMOVE LINK 4 AND LINK 2 MUST BE FITTED BETWEEN 5 AND 6
4. IF SPEED CONTROL SWITCH IS REQUIRED, REMOVE LINK 2
5. IF SUMMER/WINTER SWITCH IS REQUIRED, REMOVE LINK 5
6. IF FER IS REQUIRED, REMOVE LINK 5. ALSO REMOVE STANDARD INBUILT WIRES *YEL/BLK* & *WHT/BLK*
7. IF 0–10VDC CONTROL (BMS) IS REQUIRED, REMOVE LINK 5. ALL OTHER CONTROL OPTIONS MUST BE REMOVED
8. SOLID WIRE COLOURS AND EARTH (GRN/YEL) ARE 230VAC. TWIN COLOUR AND YELLOW LINKS ARE 10VDC

Electrical wiring colours

BK	BR	R	Y	BL	V	GR	W	P	G/Y
BLACK	BROWN	RED	YELLOW	BLUE	VIOLET	GREY	WHITE	PINK	GREEN/YELLOW

CT/CT Plus wiring



10 ENGINEERING SPECIFICATION

Heat Exchanger
A coil type heat exchanger shall be used of multiple tube rows to suit the hot water temperatures. The coil will be constructed of copper tubes expanded into aluminium fins all surrounded in a galvanised sheet steel casing. The tubes are joined using high temperature silver braze. Coils shall terminate in threaded BSPP female connections, diameter dependent on coil type. The heat exchangers are all pressure tested to 22 barg (320 psig) air under water.

Casing
The casing shall be self-supporting of sufficient stiffness to prevent distortion. All casings are constructed from heavy gauge steel with corners on some styles from cast aluminium. Casings are degreased, pretreated and finished in low gloss powder paint to RAL 9002 (grilles to RAL 7000). Other RAL colours are available to special order. A plinth may be supplied with floor mounted units and will be the same construction as the unit casing.

Grilles
Grilles shall be pencil proof aluminium extruded construction for styles incorporating inlet and outlet grilles. Some styles are supplied with spigots and for these optional loose grille assemblies are available with frames (grille in RAL 9002, frame in RAL 7000).

Motors
Motors shall be of the brushless DC type, electronically commutated (EC). All bearings will be sealed for life with no requirements for lubricating during the life of the motor. The motor shall takes a 230V AC supply which is reduced and rectified internally. The motor will generate a 10V DC signal which is used to control its rotational speed.

Fans
The fans shall be double inlet forward curved impellers c/w scroll. Smaller units have the fan directly couple to the EC motor while larger units have twin impellers coupled to a single EC motor. All fan and motor assemblies are prebalanced.

Motorplate
The fan(s), motor and controls will all be mounted on a single removable plate that can slide in/out of the casing after removing the access panel.

Controls
A range of control shall be available to regulate the rotational speed of the fan(s). Where specified the following shall be available: On/off switch, change speed switch, summer/winter switch (can be built-in or remote mounted). A low water temperature switch to prevent fan operation when the heat source is switched off (can be built in or supplied loose for fitting to pipework). Automatic thermostats which can be built-in or remote mounted; T1 on/off thermostat, T2 low/medium change speed thermostat, T3 medium/high change speed thermostat, Modulo proportional speed controller. Master/slave control should be used for multiple units in a single zone.

Filters
Filter shall be constructed of washable flame retardant bonded polyester material.

Connection Handings
The pipe connections shall be arranged, as standard, to be on the RHS when looking at the face of the unit. LHS connections may be specified or the handing can be reversed on site.

Maximum Working Pressure
All hot water units are suitable for operation against pressures up to 10 barg. Low pressure hot water fan convector units have a maximum working temperature of 90°C.

Performance
Fan Convectors shall be rated in accordance with BS4856.

Packaging
All Fan Convectors shall be individually packed in a purpose made carton and contain all necessary installation instructions and wiring diagrams. The packaging will be marked with all references required of the order.

Quality Assurance
The manufacturer of Copperad products shall have been inspected and hold all current documentation in line with ISO9001.

11 BSS PRODUCT CODES

BSS Code	Part Ref	Description
50041004	21-700-R/STD/CS/T1/LTC	21-700-R/STD/CS/T1/LTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041015	21-700-R/ENH/CS/T1/ALTC	21-700-R/ENH/CS/T1/ALTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041026	21-700-R/LF/CS/T1/ALTC	21-700-R/LF/CS/T1/ALTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041037	21-900-R/STD/CS/T1/LTC	21-900-R/STD/CS/T1/LTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041048	21-900-R/ENH/CS/T1/ALTC	21-900-R/ENH/CS/T1/ALTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041059	21-900-R/LF/CS/T1/ALTC	21-900-R/LF/CS/T1/ALTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041070	21-1200-R/STD/CS/T1/LTC	21-1200-R/STD/CS/T1/LTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041081	21-1200-R/ENH/CS/T1/ALTC	21-1200-R/ENH/CS/T1/ALTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041092	21-1200-R/LF/CS/T1/ALTC	21-1200-R/LF/CS/T1/ALTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041100	21-1500-R/STD/CS/T1/LTC	21-1500-R/STD/CS/T1/LTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041111	21-1500-R/ENH/CS/T1/ALTC	21-1500-R/ENH/CS/T1/ALTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041122	21-1500-R/LF/CS/T1/ALTC	21-1500-R/LF/CS/T1/ALTC ECO FAN CONVECTOR BOSS™ COPPERAD
50041207	SS-700-R/STD/CS/T1/LTC	SS-700-R/STD/CS/T1/LTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041218	SS-700-R/ENH/CS/T1/ALTC	SS-700-R/ENH/CS/T1/ALTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041229	SS-700-R/LF/CS/T1/ALTC	SS-700-R/LF/CS/T1/ALTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041240	SS-900-R/STD/CS/T1/LTC	SS-900-R/STD/CS/T1/LTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041251	SS-900-R/ENH/CS/T1/ALTC	SS-900-R/ENH/CS/T1/ALTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041262	SS-900-R/LF/CS/T1/ALTC	SS-900-R/LF/CS/T1/ALTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041273	SS-1200-R/STD/CS/T1/LTC	SS-1200-R/STD/CS/T1/LTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041284	SS-1200-R/ENH/CS/T1/ALTC	SS-1200-R/ENH/CS/T1/ALTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041295	SS-1200-R/LF/CS/T1/ALTC	SS-1200-R/LF/CS/T1/ALTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041303	SS-1500-R/STD/CS/T1/LTC	SS-1500-R/STD/CS/T1/LTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041314	SS-1500-R/ENH/CS/T1/ALTC	SS-1500-R/ENH/CS/T1/ALTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041325	SS-1500-R/LF/CS/T1/ALTC	SS-1500-R/LF/CS/T1/ALTC ECO FAN CONVECTOR LL BOSS™ COPPERAD
50041410	SS-700-R/STD/LTC	SS-700-R/STD/LTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041421	SS-700-R/ENH/ALTC	SS-700-R/ENH/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041432	SS-700-R/LF/ALTC	SS-700-R/LF/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041443	SS-900-R/STD/LTC	SS-900-R/STD/LTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041454	SS-900-R/ENH/ALTC	SS-900-R/ENH/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041465	SS-900-R/LF/ALTC	SS-900-R/LF/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041476	SS-1200-R/STD/LTC	SS-1200-R/STD/LTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041487	SS-1200-R/ENH/ALTC	SS-1200-R/ENH/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041498	SS-1200-R/LF/ALTC	SS-1200-R/LF/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041506	SS-1500-R/STD/LTC	SS-1500-R/STD/LTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041517	SS-1500-R/ENH/ALTC	SS-1500-R/ENH/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041528	SS-1500-R/LF/ALTC	SS-1500-R/LF/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041602	DS-700-R/STD/LTC	DS-700-R/STD/LTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041613	DS-700-R/ENH/ALTC	DS-700-R/ENH/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041624	DS-700-R/LF/ALTC	DS-700-R/LF/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041635	DS-900-R/STD/LTC	DS-900-R/STD/LTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041646	DS-900-R/ENH/ALTC	DS-900-R/ENH/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041657	DS-900-R/LF/ALTC	DS-900-R/LF/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041668	DS-1200-R/STD/LTC	DS-1200-R/STD/LTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041679	DS-1200-R/ENH/ALTC	DS-1200-R/ENH/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041690	DS-1200-R/LF/ALTC	DS-1200-R/LF/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041709	DS-1500-R/STD/LTC	DS-1500-R/STD/LTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041720	DS-1500-R/ENH/ALTC	DS-1500-R/ENH/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041731	DS-1500-R/LF/ALTC	DS-1500-R/LF/ALTC ECO FAN CONVECTOR HL BOSS™ COPPERAD
50041805	21-700-R/LST/RT1/ALTC	21-700-R/LST/RT1/ALTC ECO FAN CONVECTOR LST BOSS™ COPPERAD
50041816	21-900-R/LST/RT1/ALTC	21-900-R/LST/RT1/ALTC ECO FAN CONVECTOR LST BOSS™ COPPERAD
50041827	21-1200-R/LST/RT1/ALTC	21-1200-R/LST/RT1/ALTC ECO FAN CONVECTOR LST BOSS™ COPPERAD
50041838	21-1500-R/LST/RT1/ALTC	21-1500-R/LST/RT1/ALTC ECO FAN CONVECTOR LST BOSS™ COPPERAD
50072526	CTSOLO	CT SOLO ECO CEILING TILE FAN CONVECTOR BOSS™ COPPERAD 600MM
50072537	CTDUO	CT DUO ECO CEILING TILE FAN CONVECTOR BOSS™ COPPERAD 1200MM
50072559	CTSOLOPLUS	CT SOLO PLUS ECO CEILING TILE FAN CONVECTOR BOSS™ COPPERAD

Control Options Table

BSS Codes	Option	Description
50072548	T1*	On/off in-built thermostat
50072548	T2	Low/medium speed built-in thermostat
50072548	T3	Medium/high speed built-in thermostat
POA	CS*	Built-in 3 speed and on/off switches
50021335	LTC*	Low water temperature cut-out
50021247	ALTC**	Adjustable low water temperature cut-out
POA	FER	Fan enable relay 24V AC
POA	RS1R	On/off remote mounted rocker switch
POA	RS2R	Remote summer/winter rocker switch
POA	RS3R	Remote 3 speed rocker switch
POA	RS12R	Remote on/off and summer/winter rocker switches
POA	RS13R	Remote on/off and change speed rocker switches
50080624	RS13R-B	Remote on/off 3 speed SW white box BOSS Copperad v2
POA	RS23R	Remote summer/winter and change speed rocker switches
POA	RS123R	Remote on/off, summer winter and change speed rocker switches
50080646	RT1	Remote wall-mounted on/off thermostat
50080646	RT2	Remote wall-mounted low/medium speed thermostat
50080646	RT3	Remote wall-mounted medium/high speed thermostat
50080657	CMT1	Tamperproof remote wall-mounted on/off thermostat
50080657	CMT2	Tamperproof remote wall-mounted low/medium speed thermostat
50080657	CMT3	Tamperproof remote wall-mounted medium/high speed thermostat
POA	Modulo	Proportional speed controller
POA	BOX2S	Remote on/off and speed control

** Included as standard on models 21 & SS standard 2 row coil*

*** Included as standard on models 21, SS & SS INV/RAF 3 row enhanced and low flow*

BOSS™ Copperad reserves the right to amend specification without any notice, whilst pursuing a policy of continual improvements in performance and design

BOSS™ Copperad®

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