

the future of space conditioning

Frenger Electric

radiant heating





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Energostrip



Energostrip Radiant Heater

Introduction

The Energostrip is an electric radiant heater that will supply gentle, even and comfortable heat in various applications from small stores or bathrooms to large industrial units. The heaters can be used to provide general heating, or to raise the temperature in certain areas (spot heating).

The heat is concentrated in the occupied area, thus minimising energy losses through the stratification of heated air. The system is simple and inexpensive to install and maintenance free.

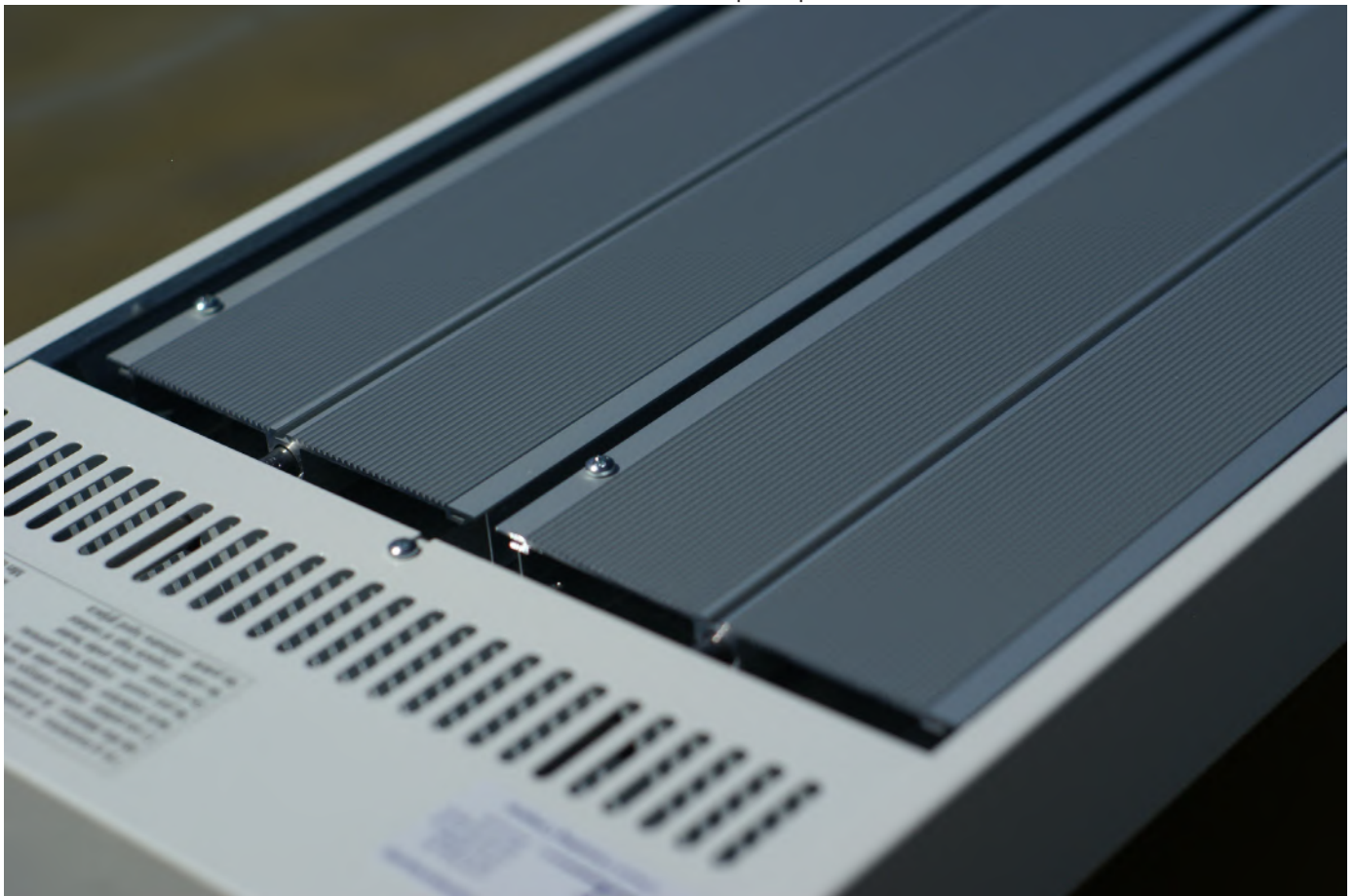
Energostrip emits a gentle, pleasant radiant heat (infrablack, long wave), not to be confused with high - temperature shortwave infrared heat. The product is consequently ideal to use for general heating of small or large areas where installation heights are between 2 - 40m from floor height.

Benefits of Radiant Heating

- Possible to maintain 3 - 6°C lower air temperature than with conventional heating.
- Concentrates heat to the occupied zone.
- Minimising warm - up times.

Benefits of Energostrip

- No moving parts equates to reduced maintenance costs.
- Ceiling mounted unit frees up wall and floor space.
- Suitable for mounting between 2 - 40m from floor level.
- Large selection of outputs available.
- Splash proof IP44.



Technical Data

Part No.	Heating Capacity (W)	Voltage (V)	Heating Element	Size (LxWxD) mm	Weight (Kg)
EE6	600	230	1	960 x 160 x 50	5.0
EE10	1000	230	1	1680 x 160 x 50	8.5
EE8	800	230	2	650 x 290 x 50	6.0
EE12	1200	230	2	960 x 290 x 50	8.5
EE16	1600	230	2	1360 x 290 x 50	11.5
EE20	2000	230	2	1680 x 290 x 50	14.0
EE24	2400	230	3	1360 x 430 x 50	16.5
EE36	3600	400	3	1680 x 430 x 50	20.0

Control

Frenger can supply a range of suitable thermostats to be used with EnergoStrip at an additional cost. Should you require any assistance in selection please contact our technical sales department.

Design

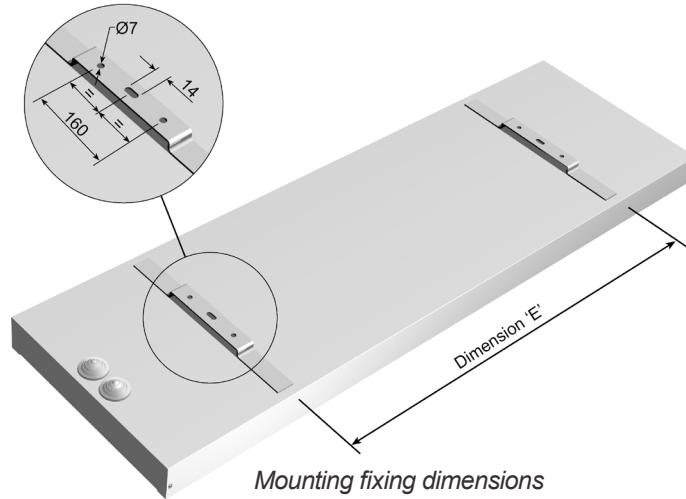
The EnergoStrip is a discreet aesthetically pleasing heater that offers easy installation with the included mounting brackets. The EnergoStrip casing is made of white powder coated sheet steel except EE36 where the casing is manufactured from naturally galvanised sheet steel.



Mounting & Installation

The EnergoStrip offers easy installation with the included mounting brackets. Alternatively panels can be installed with drop rods or chain (supplied by others), however we would recommend the EE24 and EE36 units are installed with the fixing brackets provided.

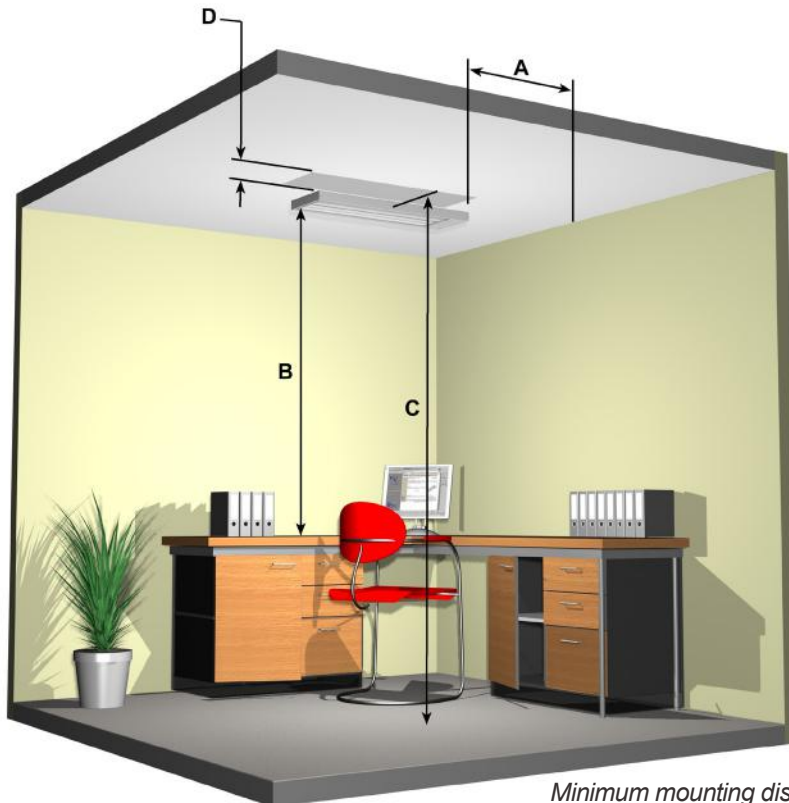
Part No.	EE6	EE10	EE8	EE12	EE16	EE20	EE24	EE36
Dimension 'E' (mm)	600	1030	370	600	820	1030	820	1030



Minimum Mounting Distances

	Description	Minimum Distance
A	Heater to wall	150mm (250mm EE36)
B	Heater to flammable material	EE6-EE20 - 300mm, EE24-EE36 - 800mm
C	Heater to floor	2300mm *
D	Heater to ceiling	EE6-EE10 - 70mm, EE8-EE20 - 70mm, EE24-EE36 - 120mm

* Dependant on model. Contact Frenger's technical department for further information.



Minimum mounting distances





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Energocassette

Introduction

The Energocassette is an electric radiant heater that will supply gentle even and comfortable heat in various applications. The heaters can be used to provide general heating, or to raise the temperature in certain areas (spot heating).

As the Energocassette uses radiant heat, the heat is concentrated in the occupied area, thus minimising energy losses through stratification of heated air. The system is simple and inexpensive to install and maintenance free.

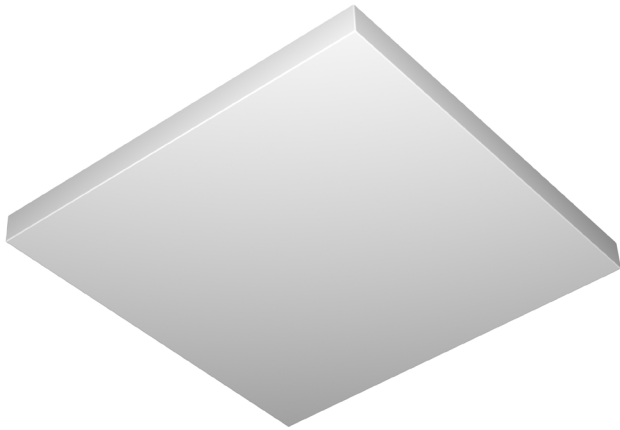
Energocassette emits a gentle, pleasant black radiant heat (long wave), not to be confused with high - temperature shortwave infrared heat and the low surface temperature makes the Energocassette ideal to use for general heating of small or large areas where installation heights are between 2 - 3.5m from floor height.

Benefits of Radiant Heating

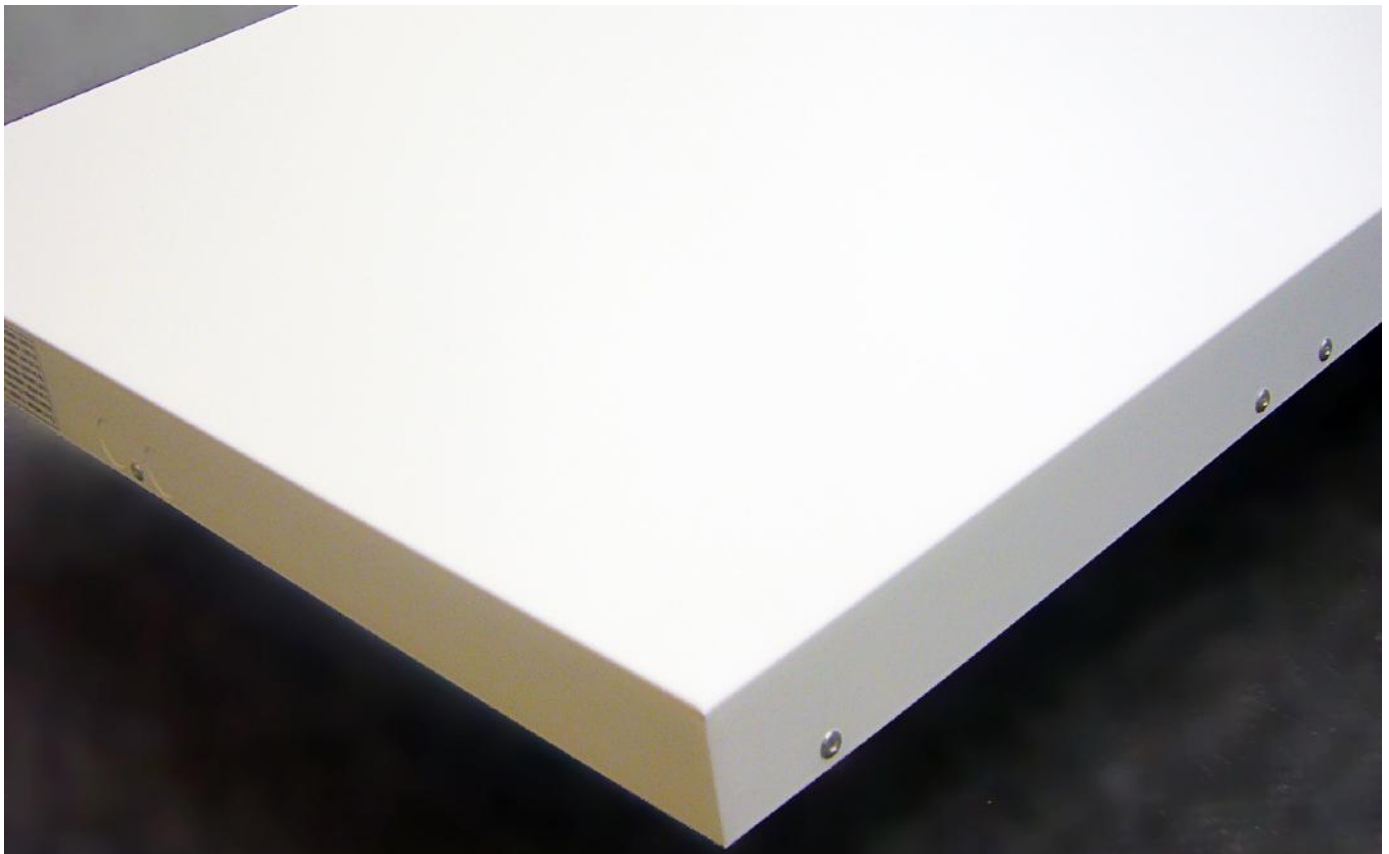
- Possible to maintain 3 - 6°C lower air temperature than with conventional heating.
- Concentrates heat to the occupied zone.
- Minimising warm - up times.

Benefits of Energocassette

- No moving parts equates to reduced maintenance costs.
- Ceiling mounted unit frees up wall and floor space.
- Can be integrated into a 600 x 600 suspended ceiling system.
- Contemporary design with flat plate.
- Splash proof IP55.



Energocassette Radiant Heater



Technical Data

Part No.	Heating Capacity (W)	Voltage (V)	Size (LxWxD) mm*	Weight (Kg)	Surface Temperature
ENC300	300	230	600 x 600 x 45	5.5	Upto 100°C
ENC600	600	230	1200 x 600 x 45	10.0	Upto 100°C

*Size is nominal less 7mm to suit a standard 600x600mm ceiling grid.

Control

Frenger can supply a range of suitable thermostats to be used with EnergoCassette at an additional cost. Should you require any assistance in selection please contact our technical sales department.

Design

The EnergoCassette consists of a heating coil encased in a white painted steel panel. The unit is approved to IP55 (jet proof) making it suitable to use in wet, dry and fire hazardous areas.

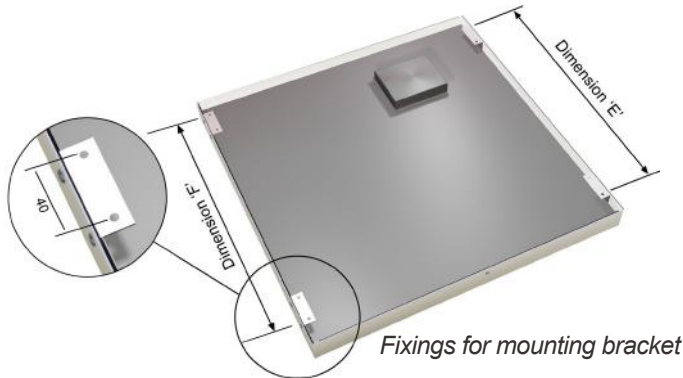


Mounting & Installation

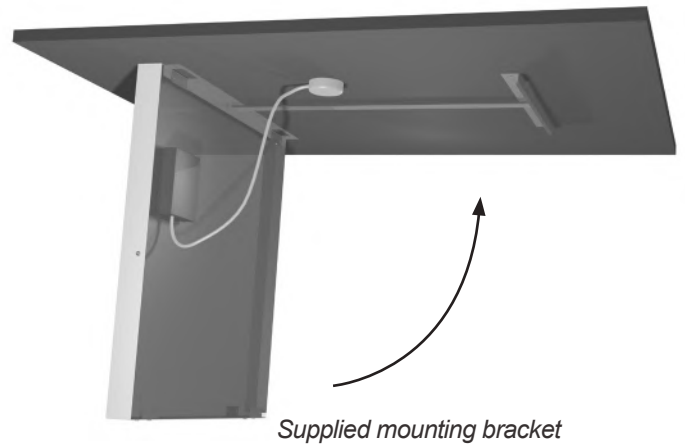
The EnergoCassette is a universal model designed for fitting flush into a T-bar (15-24mm) suspended ceiling, or mounted directly onto the ceiling with the supplied mounting brackets thus freeing valuable floor and wall space.

For vertical mounting instructions please contact Frenger's Technical department.

Part No.	ENC300	ENC600
Dimension 'E' (mm)	550	740
Dimension 'F' (mm)	350	540



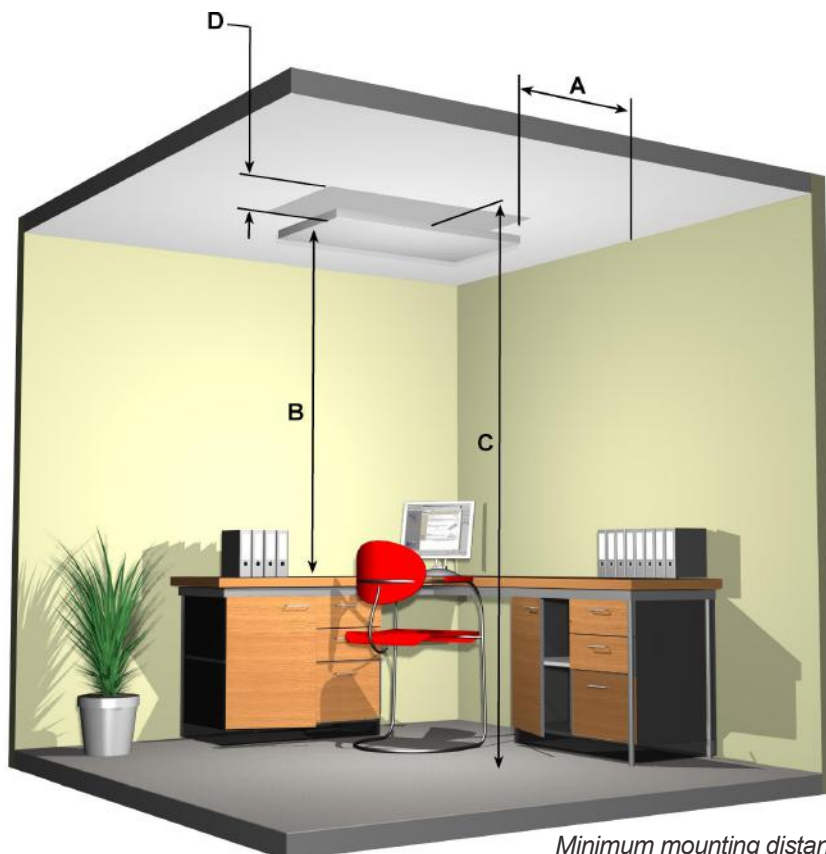
Fixings for mounting bracket



Supplied mounting bracket

Minimum Mounting Details

	Description	Minimum Distance
A	Heater to wall	50mm
B	Heater to flammable material	200mm
C	Heater to floor	2100mm
D	Heater to ceiling	45mm



Minimum mounting distances



Introduction

The Energolnra is a versatile and effective infrared heater. The output and format of the heater makes it ideal for installations in conservatories, balconies, patios and outdoor restaurants as well as being a good alternative for general heating of industrial buildings with high heat losses or air infiltration losses. The Energolnra is also often used to provide spot heating to loading bays, manufacturing facilities and various agricultural buildings.

The heaters are approved to IP44 and can as such be used in wet and dry areas alike.



Energolnra Radiant Heater

Benefits of Radiant Heating

- Possible to maintain 3 - 6°C lower air temperature than with conventional heating.
- Concentrated heat to the occupied zone.
- Minimising warm-up times.

Benefits of Energolnra

- No moving parts equates to reduced maintenance costs.
- Suitable for mounting between 2 - 5m from floor level.
- Suitable for wall or ceiling mounting with included brackets.
- Suitable for outdoor applications.
- Splash proof IP44.



Technical Data

Part No.	Heating Capacity (W)	Voltage (V)	Size (LxWxD) mm	Weight (Kg)
EIR500	500	230	700 x 75 x 40	1.5
EIR1000	1000	230	1170 x 75 x 40	2.0
EIR1500	1500	230	1680 x 75 x 40	3.0

Control

Frenger can supply a range of suitable thermostats to be used with the EnergoInfra at an additional cost. Should you require any assistance in selection please contact our technical sales department.

Design

The EnergoInfra consists of a heating element and shiny anodised aluminium reflectors encased in a stainless steel casing to ensure optimum corrosion resistance yet still being aesthetically pleasing.

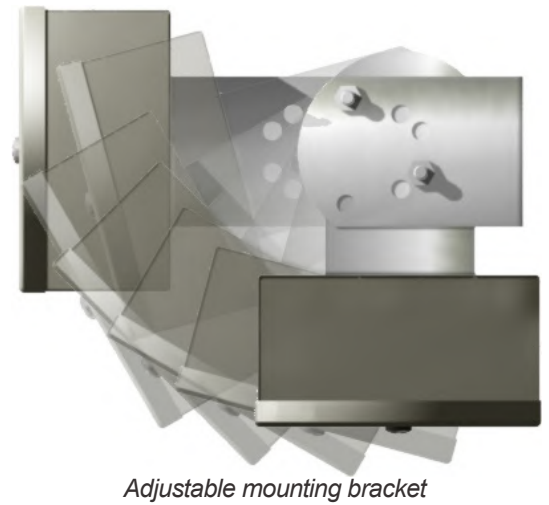
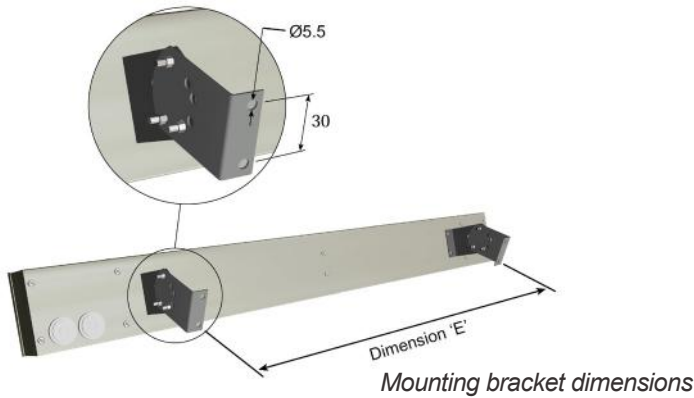


Mounting & Installation

The Energolnfra offers easy installation using the included adjustable mounting brackets. The Brackets can be adjusted to angle the heater in different positions enabling direction of the heat to the desired areas.

The heaters can also be suspended from chains, wires etc... (suspension equipment by others)

Part No.	EIR500	EIR1000	EIR1500
Dimension 'E' (mm)	500	810	1100



Adjustable mounting bracket

Minimum Mounting Distances

	Description	Minimum Distance
A	Heater to adjacent wall	300mm
B	Heater to flammable material	800mm
C	Heater to floor	2300mm
D	Heater to ceiling	150mm



Minimum mounting distances



Introduction

The Energolnra Industry provides energy efficient heating for most applications and working environments with high ceiling heights (approx. 3 - 40m or 3.5m in zone heating applications). Heat accumulation in floors, walls and other surfaces means that the air temperature can be lowered giving 25 - 50% energy savings and yet achieving the same ambient temperature. The Energolnra Industry is also often used to provide spot heating to loading bays, manufacturing facilities and various agricultural buildings.

The heaters are approved to IP44 and can as such be used in wet and dry areas alike.

Benefitis of Radiant Heating

- Possible to maintain 3 - 6°C lower air temperature than with conventional heating.
- Concentrates heat to the occupied zone.
- Minimising warm - up times.

Benefits of Energolnra Industry

- No moving parts equates to reduced maintenance costs.
- Ceiling mounted unit frees up wall and floor space.
- Suitable for mounting between 5 - 40m from floor level.
- Robust design.
- Splash proof IP44.



Energolnra Radiant Heater



Technical Data

Part No.	Heating Capacity (W)	Voltage (V)	Size (LxWxD) mm	Weight (Kg)
EIR3000	3000	400	1030 x 300 x 80	7.0
EIR4500	4500	400	1360 x 300 x 80	7.0
EIR6000	6000	400	1680 x 300 x 80	8.5

Control

Frenger can supply a range of suitable thermostats to be used with the Energolnra Industry at an additional cost. Should you require any assistance in selection please contact our technical sales department.

Design

The Energolnra Industry consists of a heating element and shiny anodised aluminium reflectors encased in a galvanised sheet steel in grey finish (not colour coated) offering a robust design.



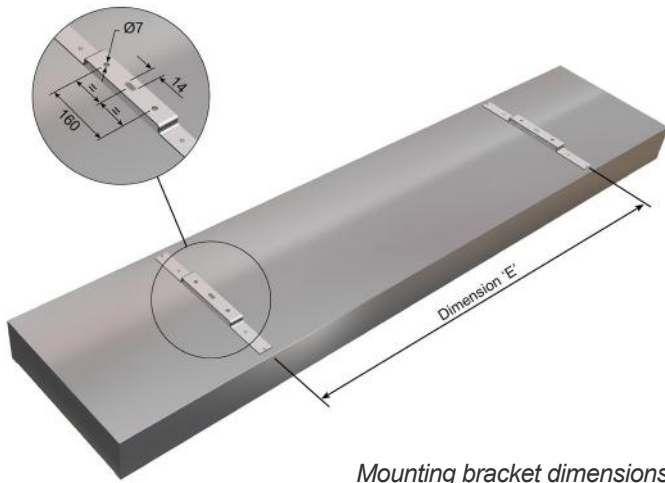
Mounting & Installation

Bracket Distances

The Energolnra Indsutry offers easy installation using the included adjustable mounting brackets. The Brackets can be adjusted to angle the heater in different positions enabling direction of the heat to the desired areas.

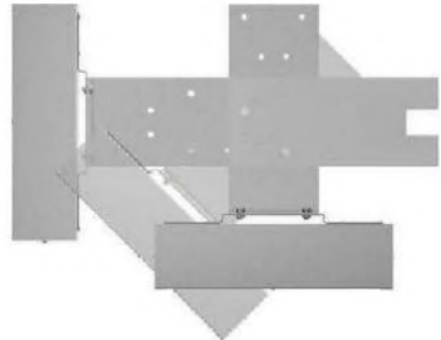
The heaters can also be suspended from chains, wires etc.. (suspension equipment by others)

Part No.	EIR3000	EIR4500	EIR6000
Dimensions 'E' (mm)	650	820	1030



Mounting bracket dimensions

Supplied bracket maintains the minimum mounting distance for the selected product (distance D, below)



Adjustable mounting bracket

Minimum Mounting Distances

	Description	Minimum Distance
A	Heater to wall	500mm
B	Heater to floor (spot heating)	2500mm *
B	Heater to floor (total heating)	4500mm *
C	Heater to flammable material	1500mm
D	Heater to ceiling	200mm - if wall mounted, 300mm - if ceiling mounted

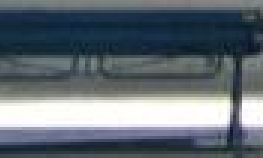
* Dependant on model. Contact Frenger's technical department for further information.



Minimum mounting distances

EH & GH

EH & GH



Air Curtains



Introduction

Frenger also offer an extensive range of heated, ambient and water fed Air Curtains which can be surface mounted or recessed and are suitable for opening heights of up to 4m.

Air curtains increase energy efficiency and improve comfort in retail, commercial, architectural and industrial applications. They can be installed in any frequently used entrance, but typical applications include: High Street Stores, Shopping Centres, Hospitals and Hotels etc.

Technical Data for surface Mounted Air Curtain

All Frenger Air Curtains are designed with energy efficiency in mind and with the introduction of Ecopower technology, end users can now benefit from energy saving and climate enhancing innovation.

Our Air Curtains are available in two models;

- FRA model - Suitable for opening heights of up to 3.0m
- FRB model - Suitable for opening heights of up to 4.0m

Ambient Air Curtain

Part No.	Heat output (kW)	Loading (A)	Max velocity (l/s)	Max air volume (m ³ /h)	Weight (Kg)	Size (LxWxH) mm	Supply (50Hz)	dB (A) @3m**	Mounting Height (m)
Model A									
FRA-100 A-C1000A NT	-	0.7	9	1250	15	1137 x 275 x 198	230V ~ 1 P & N	55	2-3
FRA-150 A-C1500A NT	-	0.9	9	1800	21	1669 x 275 x 198	230V ~ 1 P & N	55	2-3
FRA-200 A-C2000A NT	-	1.1	9	2500	31	2200 x 275 x 198	230V ~ 1 P & N	56	2-3
Model B									
FRB-100 A-PHV1000A-NT	-	1.3	12	2880	29	1196 x 377 x 255	230V ~ 1 P & N	59	3-4
FRB-150 A-PHV1500A-NT	-	1.8	12	4020	43	1746 x 377 x 255	230V ~ 1 P & N	60	3-4
FRB-200 A-PHV2000A-NT	-	2.7	12	5760	58	2246 x 377 x 255	230V ~ 1 P & N	61	3-4

Electric Air Curtain

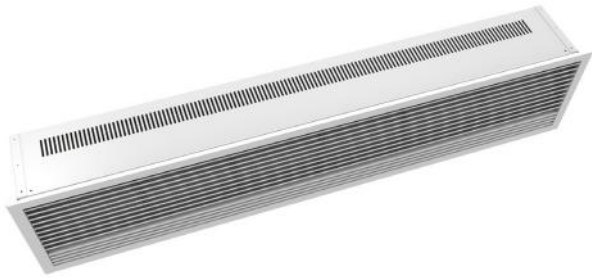
Part No.	Heat output (kW)	Loading (A)	Max velocity (l/s)	Max air volume (m ³ /h)	Weight (Kg)	Size (LxWxH) mm	Supply (50Hz)	dB (A) @3m**	Mounting Height (m)
Model A									
FRA-100 E-C1000E NT	4.5 / 9	13.7	9	1250	16	1137 x 275 x 198	400V ~ 3 P & N	55	2-3
FRA-150 E-C1500E NT	6 / 12	18.3	9	1800	23	1669 x 275 x 198	400V ~ 3 P & N	55	2-3
FRA-200 E-C2000E NT	9 / 18	27.2	9	2500	33	2200 x 275 x 198	400V ~ 3 P & N	56	2-3
Model B									
FRB-100 E-PHV1000E-NT	6 / 12	18.7	12	2880	32	1196 x 377 x 255	400V ~ 3 P & N	59	3-4
FRB-150 E-PHV1500E-NT	9 / 18	27.9	12	4020	45	1746 x 377 x 255	400V ~ 3 P & N	60	3-4
FRB-200 E-PHV2000E-NT	12 / 24	37.5	12	5760	62	2246 x 377 x 255	400V ~ 3 P & N	61	3-4

LTHW Air Curtain

Part No.	Heat output (kW)	Loading (A)	Max velocity (l/s)	Max air volume (m ³ /h)	Weight (Kg)	Size (LxWxH) mm	Supply (50Hz)	dB (A) @3m**	Mounting Height (m)
Model A									
FRA-100 W-C1000W NT	6	0.7	8.5	1180	18	1137 x 275 x 198	230V ~ 1 P & N	55	2-3
FRA-150 W-C1500W NT	9	0.9	8.5	1700	26	1669 x 275 x 198	230V ~ 1 P & N	55	2-3
FRA-200 W-C2000W NT	12	1.1	8.5	2360	37	2200 x 275 x 198	230V ~ 1 P & N	56	2-3
Model B									
FRB-100 W-PHV1000W-NT	12	1.3	11	2630	35	1196 x 377 x 255	230V ~ 1 P & N	59	3-4
FRB-150 W-PHV1500W-NT	18	1.8	11	3670	47	1746 x 377 x 255	230V ~ 1 P & N	60	3-4
FRB-200 W-PHV2000W-NT	24	2.7	11	5260	64	2246 x 377 x 255	230V ~ 1 P & N	61	3-4

*Output based on a Water Flow / Return Temperature of 82 / 71°C with an air entering temperature of 20°C.

**Sound pressure levels (dBA) at 3m, as given in our brochure, are for a single air curtain mounted at its maximum mounting height, operating in a room with average acoustic characteristics as defined in CIBSE Guide B5 (reverberation time 0.7s) and a room size equivalent to 8 air changes per hour (ac/h). Care needs to be taken when selecting air curtains for an installation as noise levels can be several dB higher if the mounting height is reduced, if the room is more "live" (i.e. hard surfaces, no furnishings or absorbent materials), if the room is smaller than 8 ac/h equivalent or a combination of these factors. Noise levels will also increase if more than one air curtain is installed at the same doorway (e.g. + 3dBA for 2 equal point sources: direct field).



Technical Data for Recessed Air Curtain

Features

- Low sound levels.
- Corrosion proof housing finished in RAL 9010.
- Option of non - standard colours.
- Optimized airflow technology.
- Units can be mounted together to create longer runs.
- IP21 Rated.
- Available in electric, water or ambient versions.
- Supplied with tangential fans.
- 3 way valve supplied with water units.
- FRA model with optional filter on surface mounted water and ambient units.
- FRA models includes low inertia high efficiency energy heating coils in electric heating units.
- FRB models available with 82 / 71°C and 60 / 40°C low-grade water coils.

Ambient Air Curtain

Part No.	Heat output (KW)	Loading (A)	Max Velocity (l/s)	Max Air Volume (m³/h)	Weight (Kg)	Size (LxWxH) mm	Grill Size (mm)	Supply (50Hz)	dB (A) @3m**	Mounting Height (m)
Model A										
FRA-100A R-C1000AR NT	-	0.7	9	1190	19	1200 x 301 x 206	1209 x 353	230V ~ 1 P & N	55	2 - 2.75
FRA-150A R-C1500AR NT	-	0.9	9	1730	25	1600 x 301 x 206	1609 x 353	230V ~ 1 P & N	55	2 - 2.75
FRA-200A R-C2000AR NT	-	1.1	9	2380	35	2100 x 301 x 206	2120 x 353	230V ~ 1 P & N	56	2 - 2.75
Model B										
FRB-100A R-PHV1000A-R	-	1.3	11.5	2750	33	1150 x 436 x 296	1104 x 436	230V ~ 1 P & N	59	2.75 - 3.75
FRB-150A R-PHV1500A-R	-	1.8	11.5	3840	47	1650 x 436 x 296	1604 x 436	230V ~ 1 P & N	60	2.75 - 3.75
FRB-200A R-PHV2000A-R	-	2.7	11.5	5500	63	2240 x 436 x 296	2190 x 436	230V ~ 1 P & N	61	2.75 - 3.75

Electric Air Curtain

Part No.	Heat output (KW)	Loading (A)/phase	Max Velocity (l/s)	Max Air Volume (m³/h)	Weight (Kg)	Size (LxWxH) mm	Grill Size (mm)	Supply (50Hz)	dB (A) @3m**	Mounting Height (m)
Model A										
FRA-100E R-C1000ER NT	4.5 / 9	13.7	9	1190	20	1200 x 301 x 206	1209 x 353	400V ~ 3 P & N	55	2 - 2.75
FRA-150E R-C1500ER NT	6 / 12	18.3	9	1730	27	1600 x 301 x 206	1609 x 353	400V ~ 3 P & N	55	2 - 2.75
FRA-200E R-C2000ER NT	9 / 18	27.2	9	2380	37	2100 x 301 x 206	2120 x 353	400V ~ 3 P & N	56	2 - 2.75
Model B										
FRB-100E R-PHV1000E-R	6 / 12	18.7	11.5	2750	37	1150 x 436 x 296	1104 x 436	400V ~ 3 P & N	59	2.75 - 3.75
FRB-150E R-PHV1500E-R	9 / 18	27.9	11.5	3840	53	1650 x 436 x 296	1604 x 436	400V ~ 3 P & N	60	2.75 - 3.75
FRB-200E R-PHV2000E-R	12 / 24	37.5	11.5	5500	71	2240 x 436 x 296	2190 x 436	400V ~ 3 P & N	61	2.75 - 3.75

LTHW Air Curtain

Part No.	Heat output (KW)	Loading (A)/phase	Max Velocity (l/s)	Max Air Volume (m³/h)	Weight (Kg)	Size (LxWxH) mm	Grill Size (mm)	Supply (50Hz)	dB (A) @3m**	Mounting Height (m)
Model A										
FRA-100W R-C1000WR NT	6	0.7	8.5	1120	22	1200 x 301 x 206	1209 x 353	230V ~ 1 P & N	55	2 - 2.75
FRA-150W R-C1500WR NT	9	0.9	8.5	1630	30	1600 x 301 x 206	1609 x 353	230V ~ 1 P & N	55	2 - 2.75
FRA-200W R-C2000WR NT	12	1.1	8.5	2240	41	2100 x 301 x 206	2120 x 353	230V ~ 1 P & N	56	2 - 2.75
Model B										
FRB-100W R-PHV1000W-R	12	1.3	10	2250	40	1150 x 436 x 296	1104 x 436	230V ~ 1 P & N	59	2.75 - 3.75
FRB-150W R-PHV1500W-R	18	1.8	10	3150	55	1650 x 436 x 296	1604 x 436	230V ~ 1 P & N	60	2.75 - 3.75
FRB-200W R-PHV2000W-R	24	2.7	10	4510	73	2240 x 436 x 296	2190 x 436	230V ~ 1 P & N	61	2.75 - 3.75

*Output based on a Water Flow / Return Temperature of 82 / 71°C with an air entering temperature of 20°C.

**Sound pressure levels (dBA) at 3m, as given in our brochure, are for a single air curtain mounted at its maximum mounting height, operating in a room with average acoustic characteristics as defined in CIBSE Guide B5 (reverberation time 0.7s) and a room size equivalent to 8 air changes per hour (ac/h). Care needs to be taken when selecting air curtains for an installation as noise levels can be several dB higher if the mounting height is reduced, if the room is more "live" (i.e. hard surfaces, no furnishings or absorbent materials), if the room is smaller than 8 ac/h equivalent or a combination of these factors. Noise levels will also increase if more than one air curtain is installed at the same doorway (e.g. + 3dBA for 2 equal point sources: direct field).

T60-EH Controller

Frenger's T60-EH controller allows for the control of the Electric Radiant Heaters (not applicable for Frenger's Air Curtain range) to create a balanced and ideal indoor climate to suit your needs.

Frenger's T60-EH controller is a 5-day plus weekends electronic programmable **colour touch screen controller with an in-built Thermostat and Humidity Sensor**. The controller has three programming modes to help improve efficiency of the system:

- Weekday/Weekend
- Seven Day
- 24-hour mode

The controller is suitable for flush mounting and requires a minimum 35mm deep junction box which is recessed into the wall.

The 'Away Mode' is a shortcut button to easily change to a preset temperature when leaving the premises. The range is 7-35°C, default setting is 7°C. In 'Away Mode', the T60 controller will only turn the heating ON if/when the room temperature drops below a set 'Away Temperature'.

This set temperature can be changed in the settings to suit your needs.

Integrated within the controller is a Humidity Sensor, which when selected on the controller shows the air humidity in the indoor environment as well as temperature.

The T60 controller features a Hold mode which allows the user to manually override the current operating program and set a different temperature for a desired period. The temperature range for this function is 5°C to 45°C.

Holiday mode is another key feature of the T60 controller. When activated the unit will maintain the temperature for the duration of the holiday time entered and will then automatically return to the program mode on the users return.

Finally, the Schedule setting on the T60 controller allows the user to set certain temperatures at four pre-determined time sections: Morning, Day, Evening, and Night. This feature helps the user to create a comfortable and ideal indoor climate environment for the benefit of building occupants.







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