



Mounting instructions for Elstein EBF Infrared Constructional Units

Table of contents

	Page		Page
Description, technical data	1	Temperature controlling	4
Safety precautions	1	Explosion protection	5
Wiring	2	Temperature limits	5
Protective earthing	3	Accessories	5
Radiation distance	3	Maintenance	5
Mounting and arrangement	4	EBF assembling	6

Description

Elstein EBF Infrared Constructional Units are modules for the generation of medium to long wave infrared radiation. They are used for warming up and drying different goods. Applications are various and reach of keep warm of food over thermoforming from plastics to soldering in the electronic industry. Our catalogue Ceramic Infrared Radiators contains more details regarding characteristics and possibilities.

Safety precautions

The company installing the radiation elements is always responsible for their qualified use observing the manufacturer's instructions and all other applicable regulations (such as regulations issued by electrotechnical associations or local power-supply companies). See also section mounting and arrangement, page 4.

The radiation elements, especially when hot, cannot be regarded as having protective insulation. For this reason, in accordance with EN 60 335-1 standards, the installation must always be provided with an all poles disconnecting device with a minimum clearance between open contacts of 3 mm per pole. If required, protection against accidental touch must be installed or a warning sign in the operator's language must be put up.

Important: By using of HSR-radiators a protection against accidental touch is **always** required because of the non-insulated heating wire.

In order to protect temperature-sensitive materials when a web rips, for example, the power supply of the radiation elements should be coupled with the drive mechanism. If it is also necessary to interrupt the residual heat, a screen between the radiation elements and the materials to be heated is sufficient, or the radiation panel may be lifted. Installing a cooling fan is another possibility.

Apart from our instructions the regulations for the individual application must be observed, for example the regulations of the employer's association regarding insurance, the EN regulations or any other regulations applicable in the user's country.

The radiation elements are intended for operation in dry industrial or production buildings.

Protect radiation elements against impact, shock, or damp.

Replace damaged radiation elements immediately.

Wiring

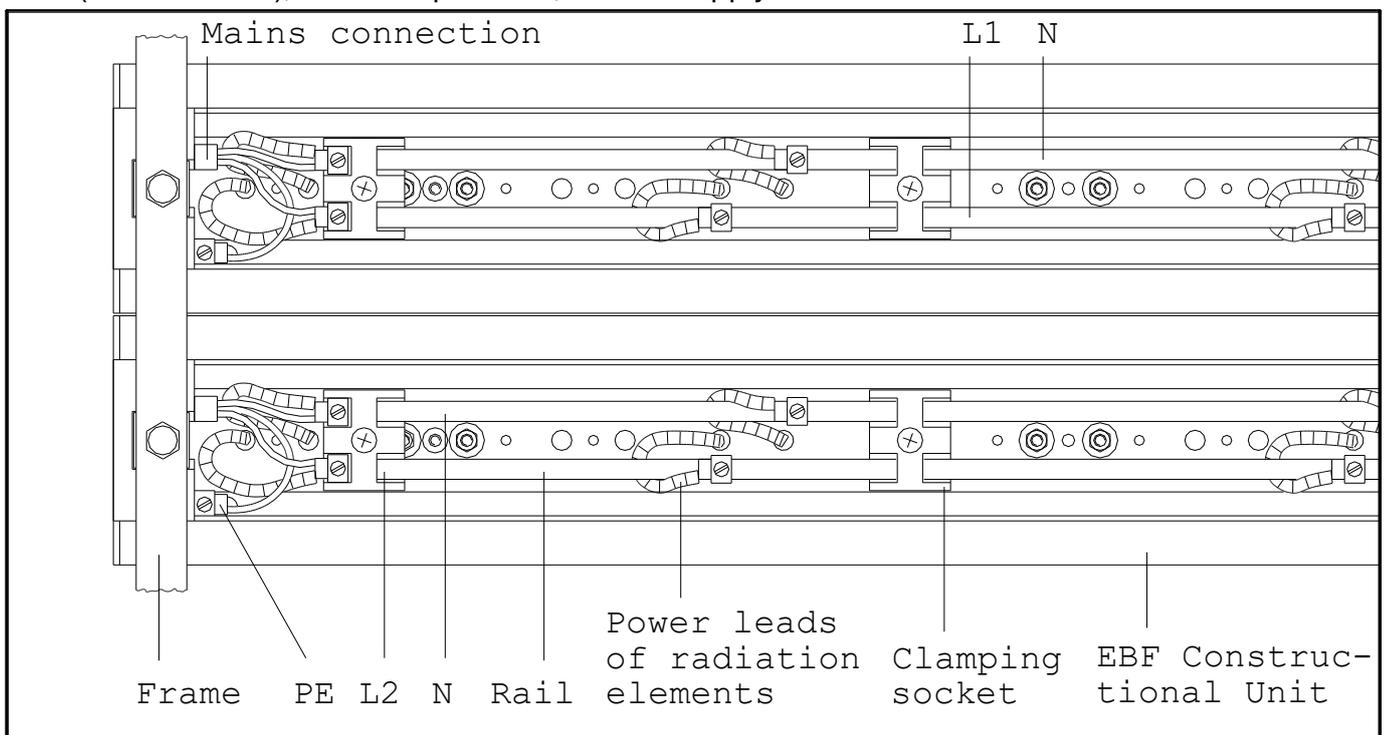
The wiring work is to be accomplished by an electrical specialist. Subsequently, safety inspections must be made among other things considering the standards EN 60 204-1 and EN 60 519-1.

Elstein Infrared Radiation Elements are generally designed for a voltage of 230 V. In 230/400 V three-phase mains they are connected between the neutral and outer conductor.

For the wiring of Elstein Infrared Radiation Elements we supply stranded nickle wire (litz wire), with cross section of 2.5 mm². The stranded nickle wire can be used for temperatures up to 500 °C. The load should not exceed 11 A. For higher temperatures in the wiring space bare chrome nickle busbars (rails) can be used, for example (see picture 1). Remark, due to the increased specific resistance of chrome nickle, compared to copper, the current must correspondingly be dimensioned lower. Our 2-pole ceramic terminal clamps can be used to connect the radiation elements among each other. The mains connection must be located so far from the hot wiring space that it can be made with normal wires.

Good contact of all electrical connections must be ensured. Retighten of all terminal clamps after initial operation of the infrared equipment is obligatory.

Rails (8 mm x 2 mm), shown in picture 1, we can supply as accessories.



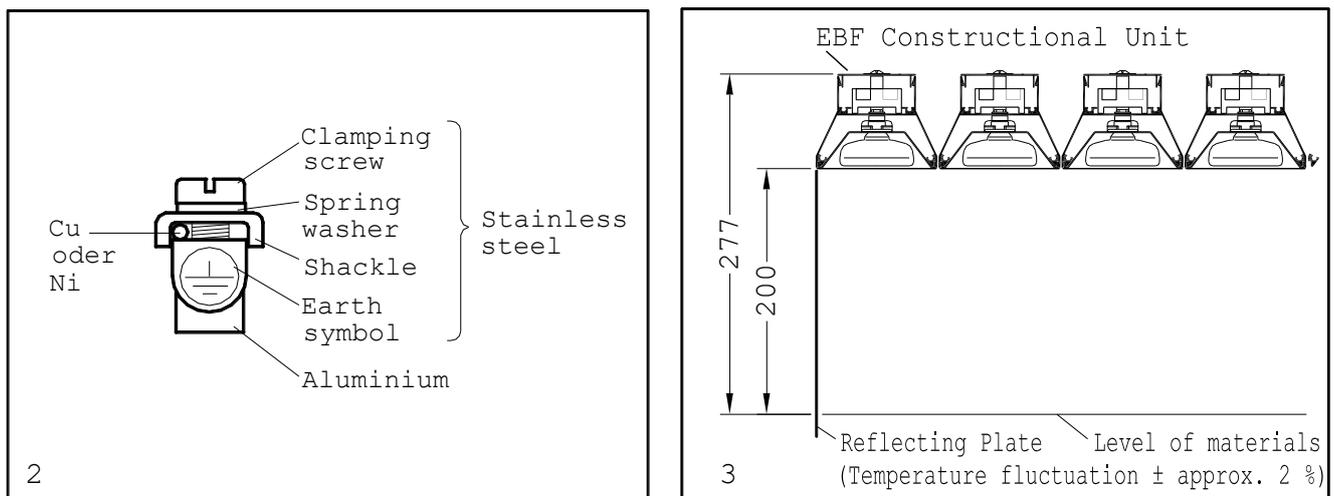
1

There are two M16-holes on each end of the EBF units for screw fittings to connect the power supply.

Protective earthing

To the earthing conductor to the earthing conductor terminal in the EBF, make sure that the copper is not directly clamped against the aluminium for reasons of contact corrosion (picture 2).

All parts of the system built by the customer (such as the frame) must be connected to the earthing conductor. If the reflectors or the radiation elements are used alone, an appropriate earthing connection must also be provided by the customer.



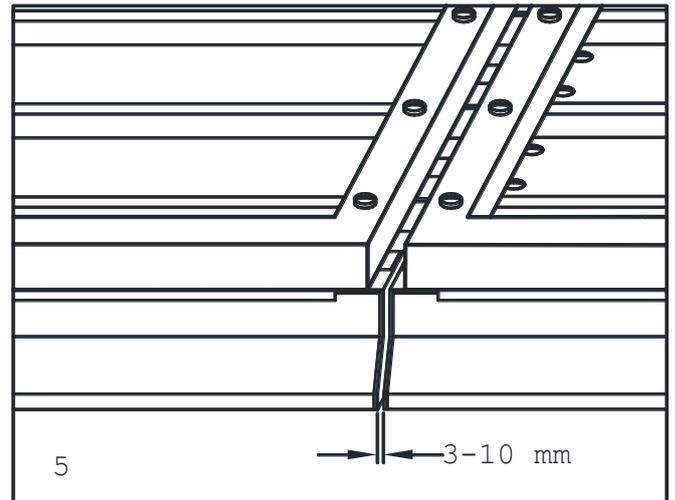
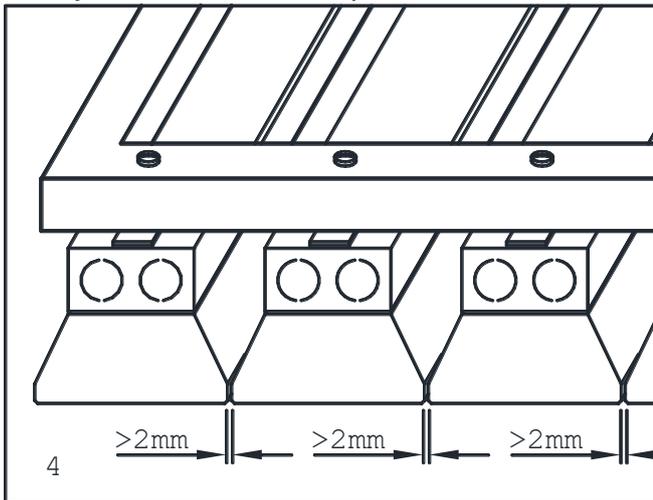
Radiation distance

A radiation distance of 200 mm should be provided for **stationary** material if local uniformity of the radiation intensity is desired. In order to prevent a decrease in intensity at the edges of the radiation field, the radiation surface should be surrounded with reflecting sidewalls (made of polished aluminium, for example; see Picture 3). A similar effect can also be achieved by placing radiation elements with higher ratings in the edge zones.

For **moving** materials (such as running webs) a considerably smaller radiation distance can be chosen (minimum: 50 mm); if the units, as is usual, are positioned diagonally to the direction of transport. Reflecting sideplates should also be provided.

Mounting and arrangement

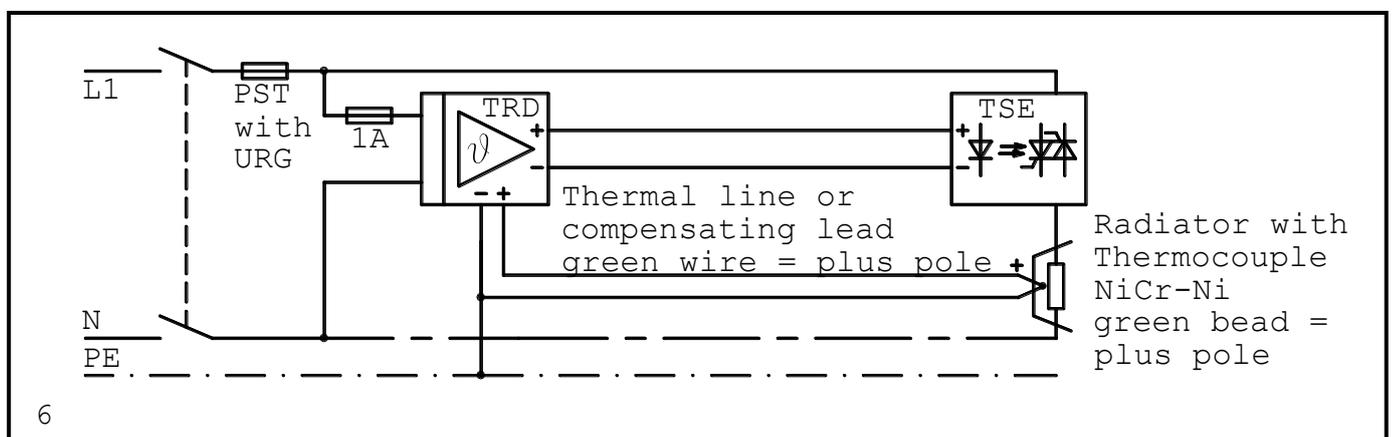
The units can be arranged together so that they form radiation panels of the desired size. For this purpose they must be attached to a support frame by using M8 bolts. M8 bolts of appropriate length must be chosen so that after mounting the threads do not extend beyond the slide nut, which is 10 mm high. If units are placed in a row or parallel, sufficient clearance must be provided where the units join to allow heat expansion.



Under adverse operation conditions beads can melt off if a radiation element fails. If delicate materials are placed under the radiation elements, the latter must be arranged in a way that the material to be heated cannot get into contact with particles dropping from the area of the radiation equipment. This can be realized by radiation from the bottom or from the side.

Temperature controlling

In order to achieve optimal heating results it is necessary to control the temperature of the infrared radiation elements. For this purpose we supply infrared radiation elements with integrated NiCr-Ni thermocouple as well as electronic Temperature Controllers TRD and Thyristor Switching Units TSE. Temperature control unit inputs have to be free of potential. Wiring is carried out according to picture 6.



Explosion protection

Questions relating to explosion protection are covered in our Technical Leaflet M1.1, which we are glad to send you on request.

Temperature limits

The service life of the radiation elements, particularly those with the highest power ratings, can considerably be reduced if the maximum permissible surface temperatures are exceeded. Increased surface temperatures must be expected if reflected or external radiation hits the radiation elements. This must be observed particularly if the radiation elements are installed in closed heat-insulated cabinets. For this reason, we urgently recommend to install heating elements with a typical operating temperature more than 600 °C, see data sheet, always with temperature control systems. For reasons of stability, temperatures in excess of 250 °C at the aluminium profiles of the EBF units must be avoided. For such applications our stainless steel construction elements EBI are usable.

Accessories

Temperature controller TRD

Thyristor Switching Units TSE 20 A. Current max. 20 A

Thyristor Switching Units TSE 40 A. Current max. 40 A

Fuse holder PST 10 or PST 14; high-speed fuses URG 20 A or URG 50 A

Thermo line for the connection controller-thermocouple radiation element, up to 400 °C, made of NiCr-Ni, 2 x 1 mm_c.

Compensating line for NiCr-Ni thermocouples to be installed in the cold area up to 100 °C, 2 x 1.5 mm_c stranded.

Nickel wire, max. 500 °C, single core 2,5 mm_c, max. 11 A

Universal rails 8 x 2 mm_c, VA 1580 mm long, 19 x M4 thread

Further accessories can be found in the Elstein catalogue "Ceramic Infrared Radiators".

Maintenance

In order to prevent radiation losses, the reflectors and all reflecting parts must be cleaned when soiled. The use of water for cleaning the radiation panel is not permitted. If cleaning with liquid is absolutely necessary, this may only be done with a wet cloth and without using aggressive cleaning agents. After cleaning the system is to dry by short heating by a temperature of 80°C max. Attention: For all kinds of cleaning or maintenance work all the poles of the system must be disconnected from the mains. This must be pointed out for example by warning and information signs.

EBF assembling

