



HEAT INDUSTRIAL

**Installation, Operation & Maintenance
Instructions Manual
HEF Increased Safety
Anti-Condensation Heater**



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EXHEAT Industrial can provide versions of this manual in German, French, Italian, Spanish, Portuguese, Polish, Chinese and Russian. These versions can be requested at support@exheat-industrial.com

To maintain the equipment warranty and, if applicable, the Hazardous Area Certification, the instructions contained within this manual must be complied with in full.



Fitting any other device invalidates the hazardous area certification.

1. Contact Details

Sales Enquiries

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2. Description of Equipment

The EXHEAT Industrial Ltd HEF type increased safety anti-condensation heater is designed for anti-condensation or frost protection within control panels, cabinets and small enclosures in conjunction with a hazardous area thermostat or, on its own as a self-regulating heater.

Enclosure

- Formed 316 perforated stainless steel.

Connections

- The connection of this heater is made via the supplied 3-core up to 1.5mm² supply cable (16AWG). The standard cable is 1.0mtr long (longer available at request) and it is the responsibility of the installer/end user to connect to suitable connectors/joint. Refer to Section 7.
- The internal earth connection is made via the supply cable (internal earth strapped to the enclosure within the heater) the heater internals are sealed and non-accessible. The external earth derives from the fixing points either on a DIN rail or onto metallic base.

Controls

- The nature of the self-regulating cable within the HEF affords it to be a stabilised design type of heater, therefore there are no additional controls required.
- Should overall control of the temperature be required an EXHEAT Industrial Ltd certified thermostat may be used, such as the AFT, HFT (standalone thermostats) or the FXT range can be used for in-line variation.

Mounting

- Up to 4 off 6.2mm (Clearance) diameter mounting holes are provided with pressed feet. This product may be mounted in any orientation, please refer to the general arrangement drawing for dimensions of the fixing holes. Alternatively, there are central holes for DIN rail mounting (4.5mm).

Voltage

- The HEF range can be either 120V nominal or 230V nominal with a range between 110V to 277V, 50 or 60 Hz. Subject to Sales Approval.



CAUTION – Check that the voltage and current of the heater is compatible with the ratings of the supply or in line thermostat before energising.

3. Markings

ATEX Markings:

Cert No. ITS19ATEX104973X

 II 2 G

Ex eb IIC T4...T3 Gb

'db eb' when 'd' type in-line thermostat is used, 'eb mb when 'm' type in-line thermostat is used – See relevant thermostat IOM/Certs, markings and standards applied

Certified to (Heater):

EN 60079-0:2018

EN 60079-1:2014

IECEx Markings:

Cert No. IECEx ITS 19.0024X

Ex eb IIC T4...T3 Gb

Certified to (Heater):

IEC 60079-0:2018 Ed 7

IEC 60079-1:2014-06 Ed 7

Operating Ambient Temperature

-55°C ≤ Tamb ≤ +80°C when QTVR cable is used

-55°C ≤ Tamb ≤ +80°C when HTSX cable is used

-50°C ≤ Tamb ≤ +80°C when either cable is used with an in-line thermostat (d or m type).

CEC & NEC Markings:

Cert No. 70117806 for division label and CSA17.70117806U for zone label

(CAN-CEC / US-NEC)

Class I Division 2. Groups A, B, C & D. T4...T3

US (NEC):

Class I Zone 1 AEx e IIC T4...T3 Gb

CAN (CEC):

Ex e IIC T4...T3 Gb

Operating Ambient Temperature

-55°C ≤ Tamb ≤ +80°C

CSA Classes C2848-01, C2848-81

Optional in-line thermostats may be connected with the HEF (Known as HEF-T), please refer to the relevant thermostat IOM for the thermostat details

4. Preservation and Storage Instructions

Storage

- Store the equipment in an inside location that is dry, clean and well ventilated.



CAUTION – The following preservation instructions must be adhered to, failure to do so could result in the equipment warranty being invalidated:

- Store the equipment at between the temperatures as indicated on the nameplates.
- Ensure that the equipment is not subjected to direct sunlight at ambient temperatures above +30°C.
- Do not store the equipment for more than 3 months unless packed for long term storage.
- Protect the equipment against external sources of vibration and/or impact.
- If practically possible, leave the equipment in its original sealed packaging until required for installation.

5. Pre-installation Instructions

Pre-Installation Inspection

- Each heater (and heater with in-line thermostat) is manufactured to the highest standard with great care and quality materials. All the goods are thoroughly inspected and tested before leaving the manufacturing plant, and they must be handled with care during storage and installation. Before the installation starts it is advised that the heater is checked to ensure the insulation resistance reading is above 2MΩ per element at no less than 500 volts dc.
- Should the Anti-Condensation heater fail this test contact the technical help on our website: www.exheat-industrial.com/contact/support
- Inspect the heater for visible signs of damage, paying particular attention to the supply cable, as this may get damaged during transport, also ensure that the heater is not bent or squashed and that the fixing holes are free from obstruction.

Compliance with these instructions is a warranty requirement. Documented evidence must be maintained in the form of a signed checklist. Copies of completed checklists and records will be required in the event of any warranty claim.

Insulation Resistance

- The Insulation Resistance Test should be applied between the phase(s) and earth. A reading of greater than 2MΩ at no less than 500 volts dc should be recorded.
- If the HEF heater has an in-line thermostat connected, the thermostat must be closed for this test to be undertaken.

6. Installation Instructions



Should deviation from original design parameters occur, or change of original design structure be required, please refer back to EXHEAT Industrial Ltd for consultation prior to installation.

- Refer to the relevant code of practice for the equipment:
 - *IEC/EN 60079-14* for selection and installation or the relevant global equivalent.
 - *IEC/EN 60079-17* for inspection and maintenance of electric apparatus for use in potentially explosive atmospheres or the relevant global equivalent.
- Carefully remove the packaging from each product and check for damage. Immediately report any damage to EXHEAT Industrial Ltd. (please keep this IOM and the additional certification booklet for future reference).
- Ensure that the product is correctly installed in a suitable location by authorised and competent persons.
- The HEF heater should be securely fixed in position using the pre-drilled fixing holes, or the Din rail brackets, adhering to the correct orientation if applicable, and all client made terminal connections checked for tightness before energising. (The HEF type unit (including the in-line d or m version) is a sealed heater and must not be opened)
- Before operating the equipment, have the installation approved by the site authorised person who is responsible to ensure that the installed system is safe for operation.
- Ensure compliance with any instructions and information provided in this manual and on the drawings/certification supplied, also be aware of any additional warning that may be present on the product on any warning labels.
- The installer and the end user shall ensure that the unit has free and unrestricted air flow to allow natural convection to occur at all times. **DO NOT COVER** the Anti-Condensation heater and do not allow anything to rest on or against it. Please allow a minimum 50 – 100mm free air in front of the heater when installed.
- The product shall only be energised within its allowed ambient parameters, please check the sales literature and certification for the product ambient temperature range.
- Before energising the product, ensure that the supply conforms to the specified voltage on the products nameplate at a nominal variance of +/- 5% of the specified voltage.



It is the client's responsibility to ensure that safe systems of work are used by all personnel operating and maintaining the equipment, including testing when 'live'.



If there is any uncertainty about these points, contact EXHEAT Industrial Ltd for advice.



Failure to comply could result in the Hazardous Area Certificate being invalidated.

Electrical Supply Connection

- Refer to wiring diagrams in Section 13.
 - There are no cable entries on the HEF Anti-Condensation heater. Connection is to be made via the manufacturer installed 3 core supply cable.
 - Connections to this heater are to be made via the 3-core flex. The flex is to be installed into suitable rated terminals/joint box, crimped and terminated correctly.
 - Refer to Section 7.
- Before connection ensure that the supply corresponds with that specified on the nameplate label, and that the sizes and types of cables to be used are suitably rated for the load and temperature of the product.
- Each heater circuit must be protected by a suitably rated over current device and earth leakage circuit breaker device. See below for earth connection details.
- The HEF heater is not designed to be taken apart and inspected as all of the internal connections are sealed.



- **CAUTION** – Check nameplate for correct voltage and classification.

Earth Connection



WARNING – These heaters **MUST BE EARTHED**.

- The internal earth connection on the HEF range is obtained by the connection of the 3-core supply cable. The external earth connection is to be made via one of the heaters fixing methods. No additional earth connections are required.
- Should a thermostat be used, please refer to the thermostats IOM for earth connection points.

Earth-fault Protection

For safety reasons, it is essential to limit the magnitude and duration of earth-fault currents. It is impractical to cover all possible systems, however note that, regardless of which system is used, the heater must be protected by a suitable device wired to shut down the heater in the event that a heater element fails to earth. Suitable devices include a residual current device (RCD) – this is the preferred method and should be used whenever possible – or an insulation monitoring device.

- Maximum recommended setting for the RCD: 300mA/10mS. The duration time of 10mS (ten milliseconds) ensures that any fault is detected within a single cycle of a thyristor system (where applicable).
- Maximum recommended setting for the insulation monitoring device: Insulation resistance is not greater than 50 ohms per volt of rated voltage.

Ensure that the equipment is earthed in accordance with the plant earthing philosophy.

If fitted, an anti-condensation heater must be protected by a 30mA earth leakage circuit breaker. Recommended systems are available from EXHEAT Industrial Ltd upon request.

Before commissioning the equipment, the completed installation should be approved by an authorised & competent person to ensure that it has been carried out correctly and that the system is safe for commissioning.

Before switching the Anti-Condensation heater circuit on, ensure that all of the relevant requirements, and any special conditions of use requirements have been adhered to. Refer to Section 7.

7. Special Conditions of Use

Please adhere to the warnings within this IOM and on the heater/thermostat nameplates, when using the equipment. Please also note the special conditions of use as listed below:

- The HEF type heater (with or without an additional in-line thermostat) must be installed within an enclosure with the minimum of IP54 protection.
- The Flying lead on the HEF type heater (with or without an additional in-line thermostat) must be connected to suitably rated terminals, either within a safe area or within Ex e type terminal box – as a minimum.
- The equipment is not field serviceable by the user and shall not be opened.
- The equipment shall be installed so that pulling, flexing or mechanical damage of the cable is prevented.
- The equipment has non-conductive surfaces which are a potential electrostatic charging hazard – see the instructions for guidance.
- The equipment shall be supplied via a fuse that is mounted externally in a safe area and rated at 277 V ac, 6 A maximum. The fuse shall have a breaking capacity which exceeds the prospective short circuit current of the supply

8. Operating Instructions

General

Electrical equipment must be designed, tested and installed such that, when it is used correctly, health and safety risks are kept to a minimum. The client must be provided with information about any necessary safety conditions, warned of any possible hazards that may arise during normal operation and told how to avoid them.

- The HEF heater is to be designed to self-regulate the temperature within the cabinet or enclosure by means of the internal self-limiting cable installed within it. Should overall temperature regulation be required it can be wired in series with an EXHEAT Industrial Ltd thermostat, such as the AFT, HFT or the FXT range.
- There is no temperature adjustment required for this heater, it will self-regulate. Should a thermostat be installed, refer to the relevant thermostat IOM for temperature setting instructions.
- The HEF range is designed to operate in ambient temperatures of up to +80°C and the user must ensure that this maximum ambient temperature is not exceeded at any time. Refer to section 3.



CAUTION – If a thermostat is used, check that the voltage and current of the HEF to be controlled by the thermostat is compatible with the ratings of the thermostat before energising.

The user must ensure that the following is adhered to:

- Any employees working on the equipment are authorised & competent in the proper working procedures in order to ensure their and others safety. The plant must be maintained in a safe condition.
- Carefully remove all protective packaging and visually inspect product for any transit damage.
- The heaters must be handled with care and stored in clean and dry conditions, as per Section 4.
- All prevailing rules, regulations and bylaws in force at the time and place of installation must be observed.
- The heater should be securely fixed in position (adhering to the correct orientation if applicable) and all the client made terminal connections checked for tightness before energising.
- Refer to the relevant code of practice for the equipment:
 - IEC/EN 60079-14 for selection and installation or the relevant global equivalent.
 - IEC/EN 60079-17 for inspection and maintenance of electric apparatus for use in potentially explosive atmospheres or the relevant global equivalent.
- Ensure that any special conditions for use detailed on the Hazardous Area Certification are complied with (see additional certification booklet supplied with this product).

Any modification not carried out by EXHEAT Industrial Ltd could invalidate certification and warranty.

Provided the above conditions are adhered to, the equipment should be safe for use under normal operating conditions.

It is virtually impossible to achieve conditions which are completely hazard-free when working on energised circuits. Responsibility for safe conduct of the authorised & competent person or persons operating on the equipment rests with those under whose authority they act.

9. Maintenance Instructions

General Safety Precautions

The end user must ensure that maintenance, installations, commissioning and testing of the equipment is only carried out by authorised and competent persons.

The following rules must be adhered to:

- All prevailing site safety regulations shall be adhered to at all times.
- Check for hazardous gases before and during any maintenance activity.
- Fully isolate the equipment from the electrical supply before and whilst any work is being carried out.
- Before removing the terminal enclosure lid/doors, allow sufficient time for the internal HEF range heater to cool down after electrical isolation.
- Comply with safe working conditions.
- Do not work alone on the equipment when it is energised.
- Familiarise all persons working on the equipment with the instructions and information provided within this manual.
- Be aware of hazards which may arise when working on energised equipment and take all necessary precautions.

The following preventative maintenance should be carried out at the intervals shown below, for any replacement parts, please contact EXHEAT Industrial Ltd.

Compliance with these maintenance instructions is a mandatory requirement. Documented evidence must be maintained in the form of a signed checklist. Copies of completed checklists and records will be required in the event of a warranty claim. Refer to Section 14.



If the HEF heaters are not used for more than three months they must be tested for insulation resistance.

Three-monthly Maintenance Inspections

- Generally, inspect the equipment for external damage.
- Ensure that the product is clear of obstruction and that the airflow remains unrestricted.

Six-monthly Maintenance Inspections

The following should be undertaken every six months with the addition to the three-monthly maintenance inspections above:

- Isolate the electrical supply as per Section 6.
- The HEF heater and thermostats should be clean, dry and free from debris.
- Ensure that electrical terminations and cable glands are undamaged and secure.
- Measure the overall insulation resistance of the heater. Use a 500V dc megohmmeter to take a reading between the earth and the phase terminals. The reading should be greater than 2 megohm. If it is not, refer to Section 5.
- Earth continuity must be maintained between all earth points and the main structure, ensure that any earth conductors are correctly and securely fitted between all earth points and main structure.
- Ensure all trip devices are working properly.

Annual Inspections and Long-Term Storage Inspections

Ensure that the following inspections are carried out if equipment is in storage or in use for a year or more:

- Undertake the recommended three-monthly and six-monthly inspections as above.
- Inspect for low insulation resistance, as Section 5.
- Only EXHEAT Industrial Ltd can undertake any replacements in hazardous area equipment, any unauthorised modifications will invalidate the hazardous area certification and any warranty.
- If equipment is being left unused for a period greater than three months, undertake the 6-monthly maintenance before energizing.



Only EXHEAT Industrial Ltd or approved Services Representative are authorised to replace HEF related components. The hazardous area certification and warranty will be invalidated if this requirement is not strictly observed.

10. Fault Finding, Correction and Spares

All HEF Type Heaters

See Maintenance instructions for procedures relating to these faults.

Fault	Check	Resolution
Heater fails to achieve required design air temperature	<ul style="list-style-type: none"> Isolated power supply. Supply fuses. Is the ambient temperature greater than that required (thermostat has turned off). (if thermostat installed) The designed heating output is less than the required amount, or is there greater heat loss due to a change in location. 	Contact EXHEAT Industrial Ltd for advice.
Air temperature too high	<ul style="list-style-type: none"> Temperature control device set points correct? Does the compartment have a thermostat switch? If so is it switching the heater correctly? 	Check with the installer.
Earth leakage trip	Limiting earth-fault currents (magnitude and/or duration) is essential for safety. The earth-fault protection device is intended to provide critical safety protection if there is current leakage to earth. Fully investigate and rectify any trip condition before resetting the system and operating the unit again.	Where an earth leakage trip has occurred, isolate the unit and: <ul style="list-style-type: none"> Check insulation resistance is according to Section 4. Check settings of earth leakage protection device are according to Section 5.
In-line thermostat not switching	Ambient temperature against the temperature set point of the thermostat	Refer to the thermostat IOM for further diagnosis assistance.

Spares

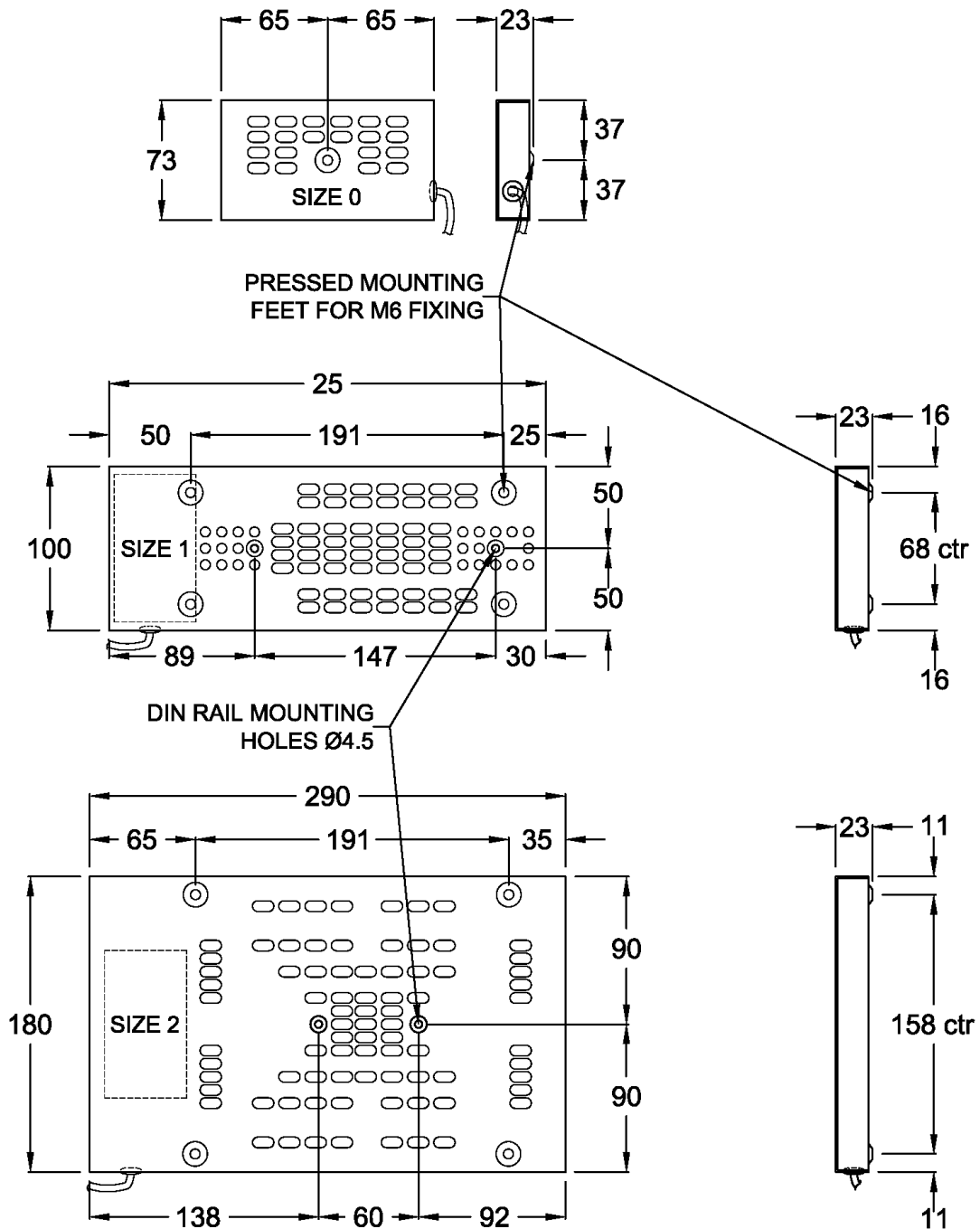
There are no spares available for the HEF range (including the in-line thermostat options). Should any item be damaged or not working correctly, it will need to be sent back to EXHEAT Industrial Ltd for any remedial work. Contact us via www.exheat-industrial.com/contact/support

11. COSHH Statement

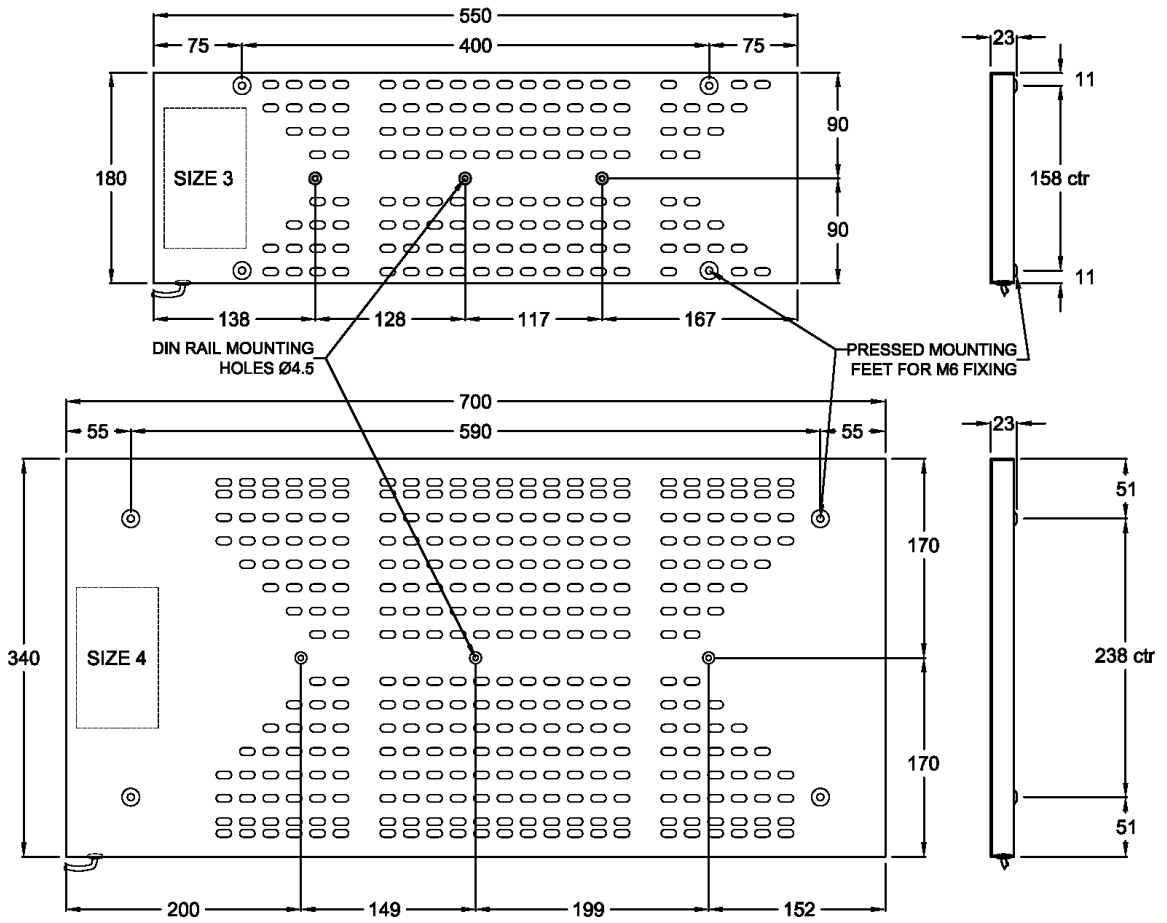
Health and Safety Information

There are no hazardous or toxic substances applied with this order as defined in COSHH (control of substances hazardous to health) regulations (2002).

12. General Arrangement Drawings



HEF_iom_dwg_1



HEF_iom_dwg_2

ALL MODEL DESIGNATIONS AND T CLASSES/SIZES

<u>MODEL</u>	<u>OUTPUT</u>	<u>SIZE OF CASING</u>	<u>WEIGHT</u>	<u>ATEX & IECEx TYPE</u>	<u>CSA T3 TYPE</u>	<u>CSA T4 TYPE</u>
HEF 30	30W	SIZE 0	0.4 KG	T4	T3	NOT AVAILABLE
	30W	SIZE 1	1.0 KG	NOT AVAILABLE	NOT AVAILABLE	T4
HEF 50	50W	SIZE 1	1.0 KG	T4	T3	NOT AVAILABLE
	50W	SIZE 2	1.5 KG	NOT AVAILABLE	NOT AVAILABLE	T4
HEF 100	100W	SIZE 2	1.5 KG	T4	T3	NOT AVAILABLE
	100W	SIZE 3	3.0 KG	NOT AVAILABLE	NOT AVAILABLE	T4
HEF 200	200W	SIZE 3	3.0 KG	T4	T3	NOT AVAILABLE
	200W	SIZE 4	6.5 KG	NOT AVAILABLE	NOT AVAILABLE	T4
HEF 500	500W	SIZE 4	6.5 KG	T4	T3	NOT AVAILABLE

13. Wiring Diagrams

There are no wiring diagrams with the HEF range of heater, due to then heater having a pre-installed supply cable, which is what the installer uses to connect to a suitable connection, See Section 7.



- **CAUTION** – Check nameplate for correct voltage and classification.

14. Routine Maintenance Inspection Records

EXHEAT Industrial Ltd
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ROUTINE MAINTENANCE INSPECTION RECORD HEF Anti-Condensation Heater



Serial No					
Description					
PO No					
Reference No					
Inspection Checklist		Status Codes	Name	Date	Comment
	<u>3 Monthly Inspection</u>				
a	Check equipment for external damage or signs of deterioration				
b	Check for dust build up or restricted air flow and clean				
	<u>6 Monthly Inspection (in addition to 3 Monthly Inspection)</u>				
c	Check that there is no dirt, debris, loose items or moisture within the enclosure/cabinet the heater is installed within				
d	Check that all electrical connections are undamaged and tight.				
e	Check the heater insulation resistance				
f	Check all trip devices are set and functioning correctly				
g					
	<u>12 Monthly Inspection (in addition to 3 & 6 Monthly Inspections)</u>				
h	Check heater load resistance values				
i					
<i>Carry out the inspection in accordance with relevant standards concerning inspection and maintenance of electrical installations in non-hazardous or hazardous areas whichever is applicable.</i>					
Verified	Installation	Energised	EXHEAT Industrial Ltd		
Name					
Signature					
Date					

Document: HEF Inspection Check List

EXHEAT Industrial Ltd
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CHECK RECORD

Insulation Resistance



Serial Number														
Description														
PO No														
Reference No														
	Insulation Resistance M.ohm										Supplier	Fabrication	Energised	Megger Test Date
	Stage to Stage								Phase to Earth					
Stage	1	2	3	4	5	6	7	8	L1					
1														
2														
3														
4														
5														
6														
7														
8														
Verified	Installation					Energised					EXHEAT Industrial Ltd			
Name														
Signature														
Date														

15. Certification

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