



**Installation, Operation and
Maintenance Manual**

MFH-SA, Non-Hazardous Area Air Warmer



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2.0 Contact Details

Sales Enquiries

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3.0 Description of Equipment

The MFH-SA portable fan heater range offers a compact high-capacity air heating solution that is suitable for small and medium sized premises, and is designed for flexibility, allowing it to be supplied according to our clients' capacity and power supply requirements.

Model	Duty - kW	Voltage	Max Current	Phase	Delta T
MFH-SA-15-440	11.2 / 12.5 / 13.5 / 15.0	380 / 400 / 415 / 440	19 / 20 / 21 / 22	3Ph	?°C
MFH-SA-12.5-690	9.5 / 12.5	600 / 690	12 / 13		44°C
Performance Data	440v		690v	440v	690v
	@ 50Hz			@ 60Hz	
Average Air Velocity (m/s)	?		4.8	?	5
Volumetric Flow Rate (m ³ /hr)	?		1050	?	1260
Fan Speed (min ⁻¹)	?		1380	?	1460
Motor Rating (kW)	0.55				
Sound Pressure (dBA)	?		65	?	68
Dimensions (mm)	L475 x W470 x H530				
Weight (kg net)	21kg +/- 2kg				
Ingress Protection	IP65				

- All fasteners are made from Stainless Steel or Brass to prevent corrosion.

Performance Data is not known at the time of publication.
This document is to be updated after testing has been completed.
The above data is theoretical for a 15kW 690V

4.0 Preservation and Storage

The following instructions are for both pre & post operation.



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

- Do not remove the heater from its packing until you are ready to assemble and operate it for the first time.
- Store the equipment in an inside location that is dry, clean and well ventilated.
- Always allow the heater to cool (approx. 30min) before moving it to operate in another location, transport, or store. (Alternatively, run the heater in cool mode so that the casing cools faster allowing the heater to moved sooner).



CAUTION – The heater casing does heat up when initially de-energised. Allow to cool for 30 minutes after use to reduce risk of burns.

- Suitable preservation materials, such as silica gel bags or equivalent, have been placed inside the packaging and inside the enclosure. Additionally, spare silica gel bags, or equivalent, can be purchased by contacting EXHEAT Industrial Ltd.
- Store the equipment at between -40°C and +40°C.
- Do not store the equipment for more than 3 months unless packed for long term storage.
- If the equipment is stored beyond 3 months, ensure that preservation materials are inspected and replaced if required.



CAUTION – It is the client’s responsibility to ensure that, if the terminal enclosure, as well as the control switch box is opened prior to installation, when refitting the enclosures lids, please ensure the gaskets are not damaged or moved in any way.

- Protect the equipment against additional external sources of vibration and/or impact.

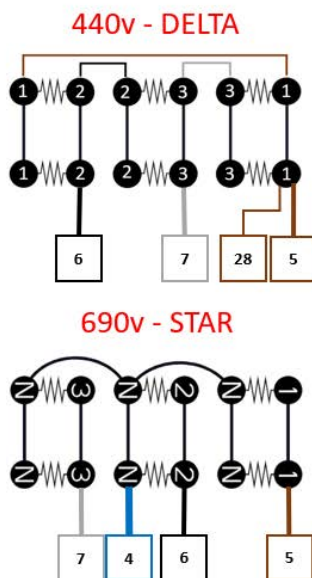
5.0 Installation Instructions

5.1 Unpacking

- 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).
- Remove the heater using the handle provided and place on the ground, remove any optional extras from the box and discard the packaging responsibly.
- Visually inspect the heater casing for damage. Again, report any damage to EXHEAT Industrial Ltd straight away.
- Carefully lift the heater onto a bench or workspace then gently lay the heater on its side to gain access to the enclosures underneath.

5.2 Insulation Resistance Check

- Before connection and use, it is advised that the product is checked to ensure the insulation resistance is above $2M\Omega$ when tested at no less than 500 volts dc. To do this, remove the element enclosure lid, turn the over current protection switch off and connect the neutral cable (generally black) to any part of the steel enclosure, connect the live (generally red) cable to 3 element live terminals in turn and test for a minimum of 30 seconds.



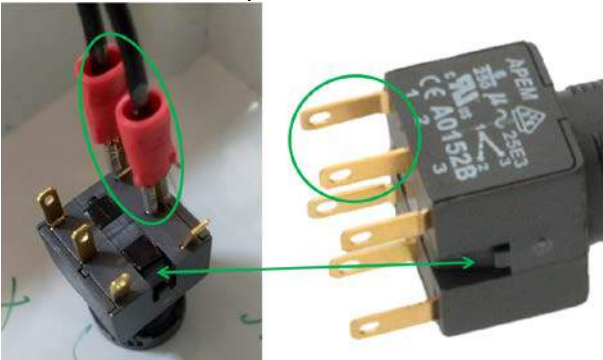
- Should the product fail this test, please contact the technical help via our website: www.exheat-industrial.com/contact/support

5.3 Connecting

- The nylon IP gland provided is suitable for incoming power cable outer diameters ranging from 10 to 14mm.
- The control switch is designed to accept 2x 2.5mm² conductors tightened to 0.6Nm, therefore it is advised that proprietary crimps are used so that larger conductor sizes may be connected. (Please see photographs below).
- With the heater on its side, remove the 3 screws securing the switch box to the heater mounting bracket.



- Slide the switch box out from the heater and undo the 4 fixings holding the two halves of the switch box together.
- Mark the E-Stop switch terminals so they can be reconnected with confidence. The 2 terminals on the switch are specific but the wires are not polarity sensitive.



- Unscrew and remove the switch control knob, carefully remove the decal faceplate and unscrew the 4 switch bezel securing screws.

Note: The switch shaft and the decal bezel keyways both need to be at the 12 O'clock position.



- Connect supply cable and earth to the 3-position switch and earth terminal as per wiring diagram and point to point in sections 7 & 8.



**690 Volt 20 Amp
Switch Pictured**

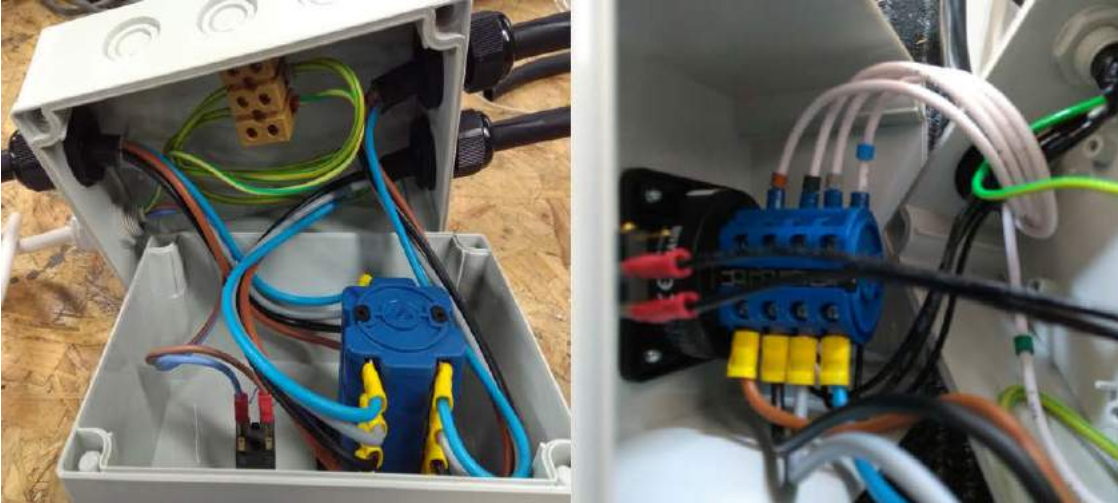


440 Volt
 2 = Live 1 (Brown)
 6 = Live 2 (Black)
 10 = Live 3 (Grey)
 14 = Neutral (Blue)
**Mandatory Incoming
 Neutral Connection**

690 Volt
 4 = Live 1 (Brown)
 8 = Live 2 (Black)
 12 = Live 3 (Grey)
 16 = Neutral (Blue)
 Optional Neutral

- Reattach the switch to the enclosure lid reversing the previous instructions. Route your wires so that as little stress is placed onto them as possible and so that when the box is reassembled there is no risk of trapping.

- Double check the E-Stop is connected.



- Reassemble the enclosure and switch fascia checking that the switch operates smoothly and that it has been aligned correctly during refitting.
- Refit the switch box to the heater bracket, be careful not to over tighten these fixing screws.
- Using an ohm meter check that you do not have less than $2M\Omega$ between any of your phases and earth and between neutral and earth when neutral is connected, with the switch in all three positions. (Incoming supply neutral connection is mandatory on 440v variants).
- To finish, ensure a suitably rated plug is connected to the opposite end of the supply cable and that the supply is protected – see considerations and warnings.

5.4 General Installation Instructions

With the power supply cable connected please complete these remaining instructions before energising.

- Place the heater on its feet in the desired operational location and make further minor adjustments to each foot as required to prevent the heater from rocking. Failure to do so could cause damage to the heater.
- 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 heater and do not allow anything to rest on or against it when in operation.

6.0 Maintenance

6.1 General Safety Precautions

The 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.
- Do not work on the equipment when it is energised.
- Fully isolate the equipment from the electrical supply before and whilst any work / maintenance is being performed.
- Before removing the terminal enclosure, allow sufficient time for the internal components to cool down after electrical isolation.
- Familiarise all persons working on the equipment with the instructions and information provided within this manual.

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.



If the heaters are not used for more than three months, they must be tested for insulation resistance before being energised.

6.2 Motor

- Maintenance shall be performed only by qualified people in accordance with the IEC/EN 60079-17 or national standards (latest edition).
- Every 3000 hours of service verify and restore, if necessary, the grease on the radial seals.
- Periodically (depending on environment and duty) verify:
 - Motor cleanliness and free passage of cool air.
 - Free motor running with low vibration and absence of anomalous noises, where there is high vibration and/or noise, verify the motor fastenings, balance and that the bearings are in good condition.

6.3 Every Use

- The fan guards, impeller and heating elements for any residual dust build up. Anything noted must be removed with a damp cloth.
- Check the impeller blades for signs of damage, and that there is at least 2mm of clearance to the casing. Generally inspect the equipment for external damage or signs of deterioration.
- Ensure that the product is clear of obstruction and that the airflow remains unrestricted.
- Check casing and the guard. Any damage should be reported to EXHEAT Industrial Ltd and the heater taken out of service.
- Check the casing for any signs of contact from the impeller. Any scuffs or marks made by the impeller should be reported to EXHEAT Industrial Ltd and the heater taken out of service.

6.4 Six Month & Annual Maintenance Inspections

The following should be undertaken every six months in addition to the maintenance inspections above:

- Ensure the 5mm grub screws and 13mm hex bolt that attach the impeller to the motor are tight.
- Remove the fan guard and ensure the blades rotate unimpeded and that there remains a gap of at least 2mm all the way around.
- Isolate the electrical supply and remove the element enclosure cover, as per section 4.2.
- Internals should be clean, dry and free from debris, clean using a damp cloth.
- Ensure that electrical terminations are undamaged and secure.
- As detailed in section 4.2, measure the insulation resistance.
- Ensure that the gasket is in good condition and replace if required. Carefully refit the covers using only the fixings provided, as per 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.

6.5 Long-Term Storage Inspections

- If equipment has been left unused for a period greater than three months, undertake the 6-monthly maintenance before energizing.

6.6 EXHEAT Maintenance

If you are unable to complete any of these maintenance checks, please contact EXHEAT Industrial Ltd to arrange for any of the relevant maintenance work to be undertaken.

If any problems are noted whilst maintenance checks are being carried out, please contact EXHEAT Industrial Ltd using the information provided at the beginning of this document.

6.7 Routine Maintenance Inspection Record

EXHEAT Industrial Ltd
Thrextton House
Thrextton Road Ind. Est.
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Tel: +44 (0) 1953 886 269
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ROUTINE MAINTENANCE INSPECTION RECORD

MFH-SA Fan Assisted Heater



Serial No					
Description					
PO No					
Reference No					
Inspection Checklist	Status Code	Name	Date	Comment	
6 Monthly Inspection					
01		Check equipment for external damage or signs of deterioration.			
02		Check for dust build up or restricted air flow.			
03		Check that impeller fittings are tight.			
04		Check the impeller can spin unimpeded and that there is at least 2mm clearance between blades and casing.			
05		Clean the casing and impeller blades with a damp cloth.			
06		Check that there is no dirt, debris, loose items or moisture within the terminal enclosure			
07		Check that all electrical connections are undamaged and tight including any spare unused terminals.			
08		Check the heaters/elements insulation resistance			
09		Check that enclosure gaskets are undamaged and fitted correctly			
10		Check that earth conductors are correctly fitted and undamaged			
		12 Monthly Inspection (in addition to 6 Monthly Inspections)			
01		Check resistance values, including individual element resistance if it's down on IR			
		Motor Maintenance			
01		3000 hours operation inspection of radial seal and re-application of grease.			
Carry out the inspection in accordance with relevant standards concerning inspection and maintenance of electrical installations in non-hazardous areas.					
Verified	Installation	Energised		EXHEAT Industrial Ltd	
Name					
Signature					
Date					

7.0 Special Considerations / Warnings:

7.1 Warnings

- All cable glands are to be suitable for the rating and size of the supply cables. IP washers are to be used where necessary.
- 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 MUST be connected to and protected by a suitably rated, C curve, over current device and a suitably rated, 30mA, earth leakage circuit breaker device.
- The MFH-SA heater must always be sufficiently earthed.

7.2 Special Considerations

- The E-Stop function / switch will only turn the product off when it is in heat mode.
- The E-Stop switch is normally open / make to turn off.
- **Mandatory Requirement:** This heater MUST always be plugged into a socket, spur or ring equipped with 30mA earth leakage protection.
- **Mandatory Requirement:** If this heater is a 440volt variant, it MUST have an incoming neutral supply connection. For 690v, neutral connection is optional.

If you require further assistance, please contact EXHEAT Industrial Limited.



8.0 Fault Finding, Correction and Spares

8.1 Fault finding & Correction

See Maintenance instructions for procedures relating to these faults.

Fault	Check	Resolution
Vibration	De-energise the heater <ul style="list-style-type: none"> - Ensure that all feet are properly seated on the ground and that the heater is positioned on a clear and level surface. - Visually inspect the impeller and check for centralised revolution. 	<ul style="list-style-type: none"> - Using a hand spanner, adjust the legs in turn until the heater sits on all four feet. - Remove the fan guards and casing lid and check that the impeller fixings are tight.
The Impeller does not spin	Isolate the power supply. <ul style="list-style-type: none"> - Check if the E-Stop switch is in the pressed position. - Open the terminal enclosure and check if the MCB is in the open position. - Inspect all electrical connections. 	<ul style="list-style-type: none"> - Reset the E-Stop switch - Switch the MCB to the closed position. - Tighten any loose connections.
The impeller spins clockwise (looking from fan end) (3 Phase heaters only)	Isolate the power supply. <ul style="list-style-type: none"> - Access the element enclosure and ensure that phase numbering is correct. 	<ul style="list-style-type: none"> - Swap the cables between two of the incoming phases, L1 and L2 only.
There is no heat	Isolate the power supply. <ul style="list-style-type: none"> - Repeat 'the Impeller does not spin' section above. - Isolate the MCB and check the resistance values of each phase. 	Ensure you are using the correct wiring diagram in sections 11 & 12. <ul style="list-style-type: none"> - Reset the E-Stop and the MCB. - Tighten any loose connections. - If an imbalanced reading is found, or an infinite value, contact EXHEAT Industrial Ltd.
The Heater suddenly de-energises	Isolate the power supply. <ul style="list-style-type: none"> - Check the ambient has not exceeded 40°C. - Check for any signs of damage. - Check for any electrical fault. - Open the Ex d enclosure and check if the MCB is in the open position. 	<ul style="list-style-type: none"> - Undertake a 6 monthly inspection of the equipment to ensure no fault. - Switch the MCB to the closed position.
A rattle or other unusual noise	Isolate the power supply. <ul style="list-style-type: none"> - Check all fasteners are tight. - Check for signs of scuffing between the impeller and casing. 	<ul style="list-style-type: none"> - Using hand tools, tighten any loose fasteners. - Take out of service and contact Exheat Industrial Limited.

8.2 Spares

(Anything not mentioned below will require the unit to be sent back to manufacturer)

Failure Type	Meantime Between Failures	Estimated Replacement Time	Spares Lead Time
Replacement Feet	When Required	10 minutes	1 week
Castors	When Required	10 minutes	1 week
Impeller	When Required	45 minutes	1 week
Thermocouple Sensor	When Required	60 minutes	1 week
Gaskets	When Required	Up to 2 hours	1 week
Handle / Lid	When Required	30 minutes	1 week
Motor / Seal Grease	3000 Hours	40 minutes	1 week

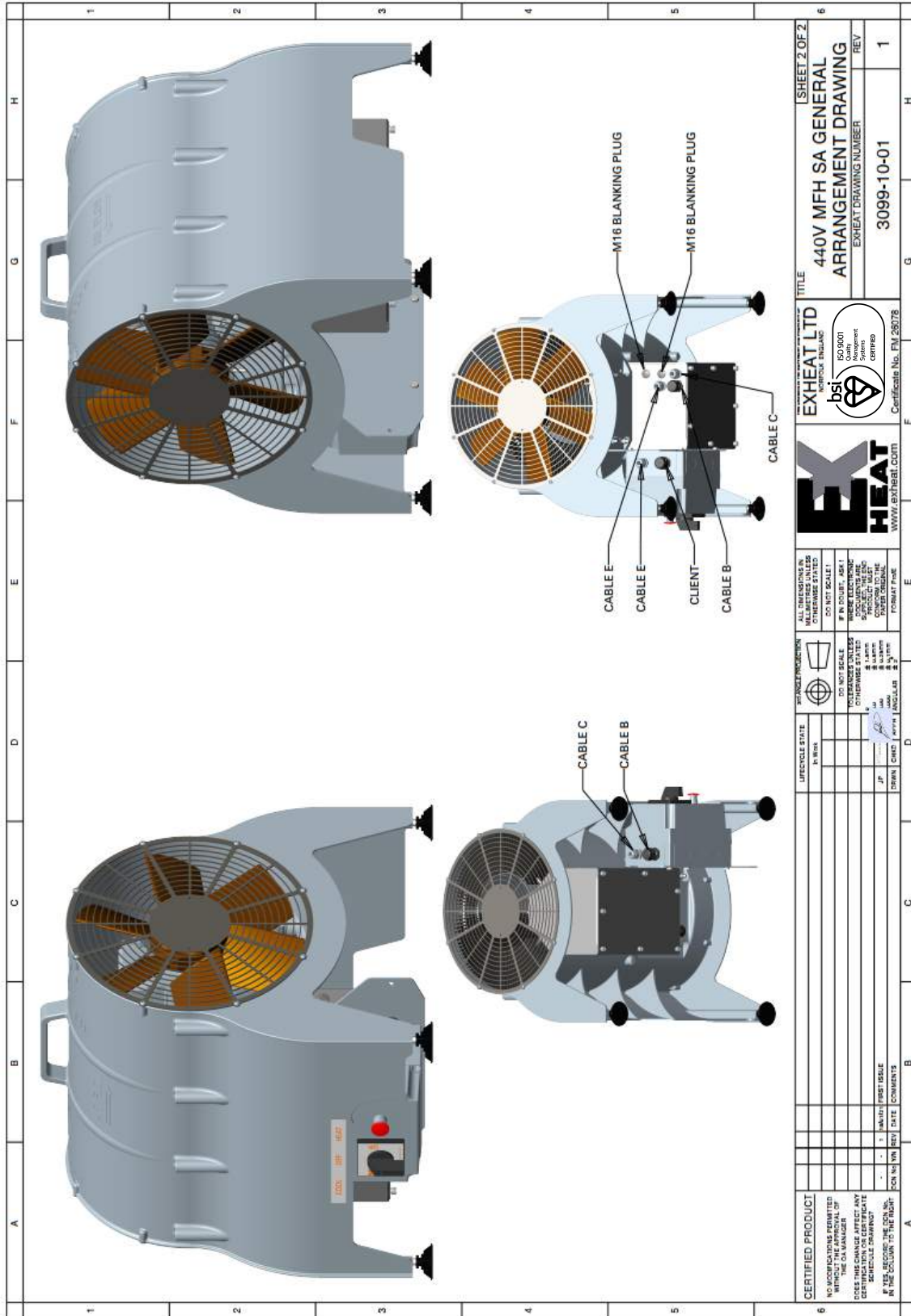
9.0 COSHH Statement

- 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).

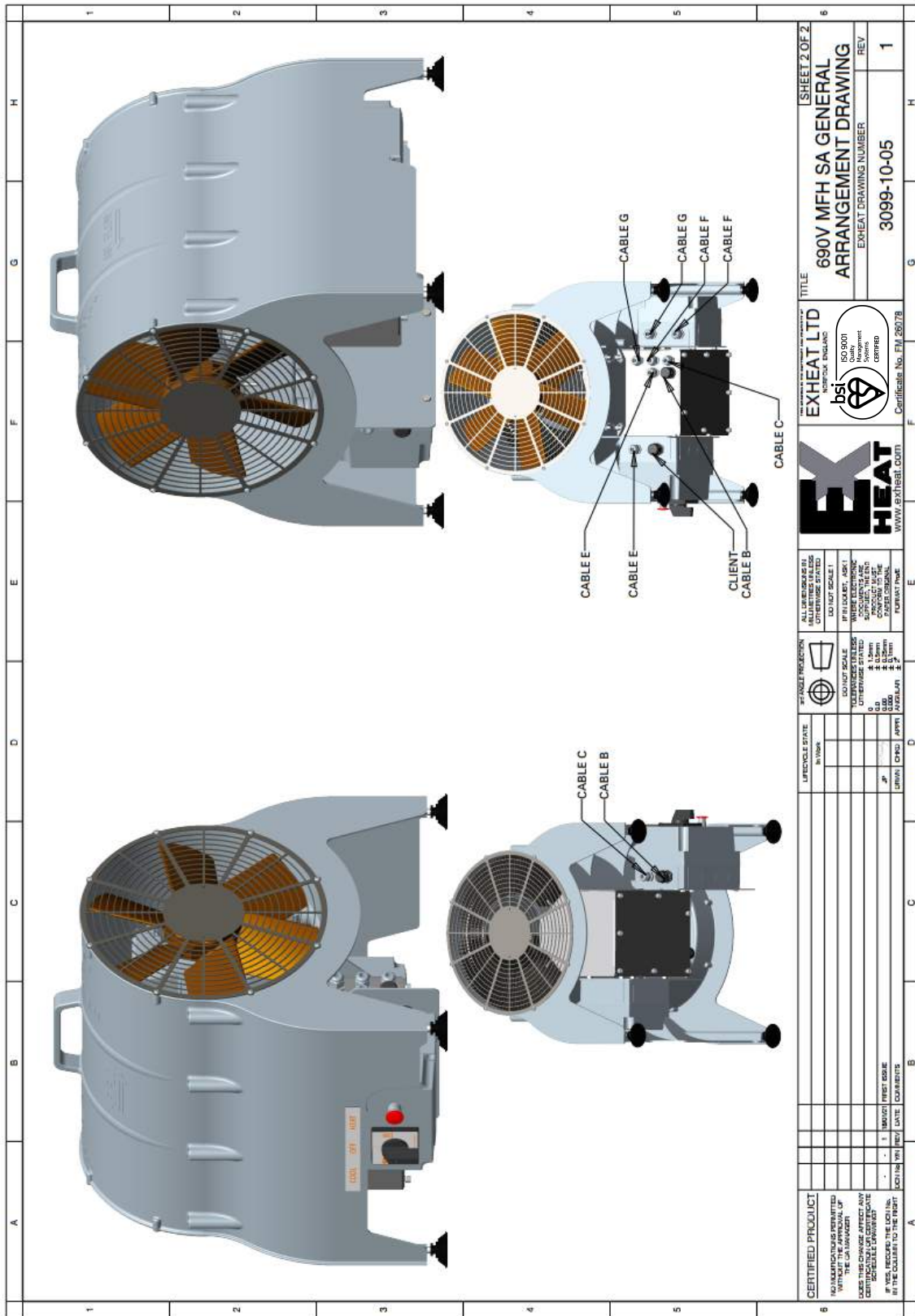
10.0 General Assembly Drawing – 440V

1	2	3	4	5	6																				
A	B	C	D	E	F																				
1	2	3	4	5	6																				
<p>NOTES:</p> <p>1. SPECIFICATION: (i) UP TO 15KW, 440V, FORCED AIR HEATER (SEE TABLE). (ii) THIS HEATER IS FOR AMBIENT CONDITIONS ONLY. NOT SUITABLE FOR PRESSURISED SYSTEMS.</p> <p>2. CERTIFICATION: (i) IP65.</p> <p>3. REFERENCE DOCUMENTS: (i) WIRING DIAGRAM: 3099-10-03 (MFH-SA WIRING DIAGRAM 440). (ii) ELECTRICAL TEST PROCEDURE: WI-09-114. (iii) MANUFACTURING PROCEDURE: 3099-10-08-29. (iv) THERMAL TESTING PROCEDURE: 3099-10-TEST. (v) MANUFACTURING COMPONENTS DRAWINGS: 3099 SERIES. (vi) KANBAN MAP: 3099-10-02.</p> <p>4. CABLE ENTRIES: (i) SUPPLIED IP65 NYLON GLAND TO SUIT INCOMING CABLE OUTER DIAMETERS BETWEEN 10 AND 140MM. (ii) STRESS RELIEF FOR THIS CABLE / GLAND IS PROVIDED BY A CABLE TIE BASE TO SUIT UPTO 10MM WIDE CABLE TIES.</p>		<p>5. MOUNTING: THE MFH IS FOR FLOOR MOUNTING ONLY UNLESS FITTED WITH THE EXHEAT INDUSTRIAL SUPPLIED WALL MOUNTING BRACKET.</p> <p>6. WEIGHT: WEIGHT: 20KG +/- 2KG DEPENDING ON SPECIFICATION.</p> <p>7. OBSTRUCTION: DO NOT OBSTRUCT EITHER THE INLET OR OUTLET. ENSURE AT LEAST 500MM CLEARANCE AT ALL TIMES WHILE IN OPERATION.</p> <p>8. MAIN MATERIALS OF CONSTRUCTION: (i) CASING: NYLON (IP65) (GREY). (ii) ELEMENTS: INLETS, STAINLESS STEEL. (iii) ELEMENT ENCLOSURE: STAINLESS STEEL. (iv) BRACKETRY: STAINLESS STEEL.</p> <p>9. EARTHING: (i) ALL EARTHING MUST BE COMPLETED IN ACCORDANCE WITH THE INSTALLATION OPERATION AND MAINTENANCE MANUAL. (ii) EARTH LEAKAGE PROTECTION POWER SUPPLY IS MANDATORY.</p>		<p>MODEL</p> <p>MFH-SA PORTABLE SAFE AREA FAN ASSISTED HEATER rated 11.2/12.5/13.5/15 kW @ 380/400/415/440 VAC.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>VOLTAGE</th> <th>KW RATING</th> <th>CURRENT(A)</th> <th>STOCK CODE</th> </tr> </thead> <tbody> <tr> <td>380/400</td> <td>-11.2</td> <td>-19</td> <td>S99700440</td> </tr> <tr> <td>/415/440</td> <td>-12.5</td> <td>-20</td> <td></td> </tr> <tr> <td></td> <td>-13.5</td> <td>-21</td> <td></td> </tr> <tr> <td></td> <td>-15</td> <td>-22</td> <td></td> </tr> </tbody> </table>		VOLTAGE	KW RATING	CURRENT(A)	STOCK CODE	380/400	-11.2	-19	S99700440	/415/440	-12.5	-20			-13.5	-21			-15	-22	
VOLTAGE	KW RATING	CURRENT(A)	STOCK CODE																						
380/400	-11.2	-19	S99700440																						
/415/440	-12.5	-20																							
	-13.5	-21																							
	-15	-22																							
<p>EXHEAT LTD ISO 9001 ISO 14001 Registered COMPANY</p> <p>www.exheat.com</p> <p>Certificate No. FM 28078</p>																									
<p>TITLE</p> <p>440V MFH SA GENERAL ARRANGEMENT DRAWING</p> <p>EXHEAT DRAWING NUMBER: 3099-10-01</p> <p>REV 1</p>																									
<p>SHEET 1 OF 2</p>																									



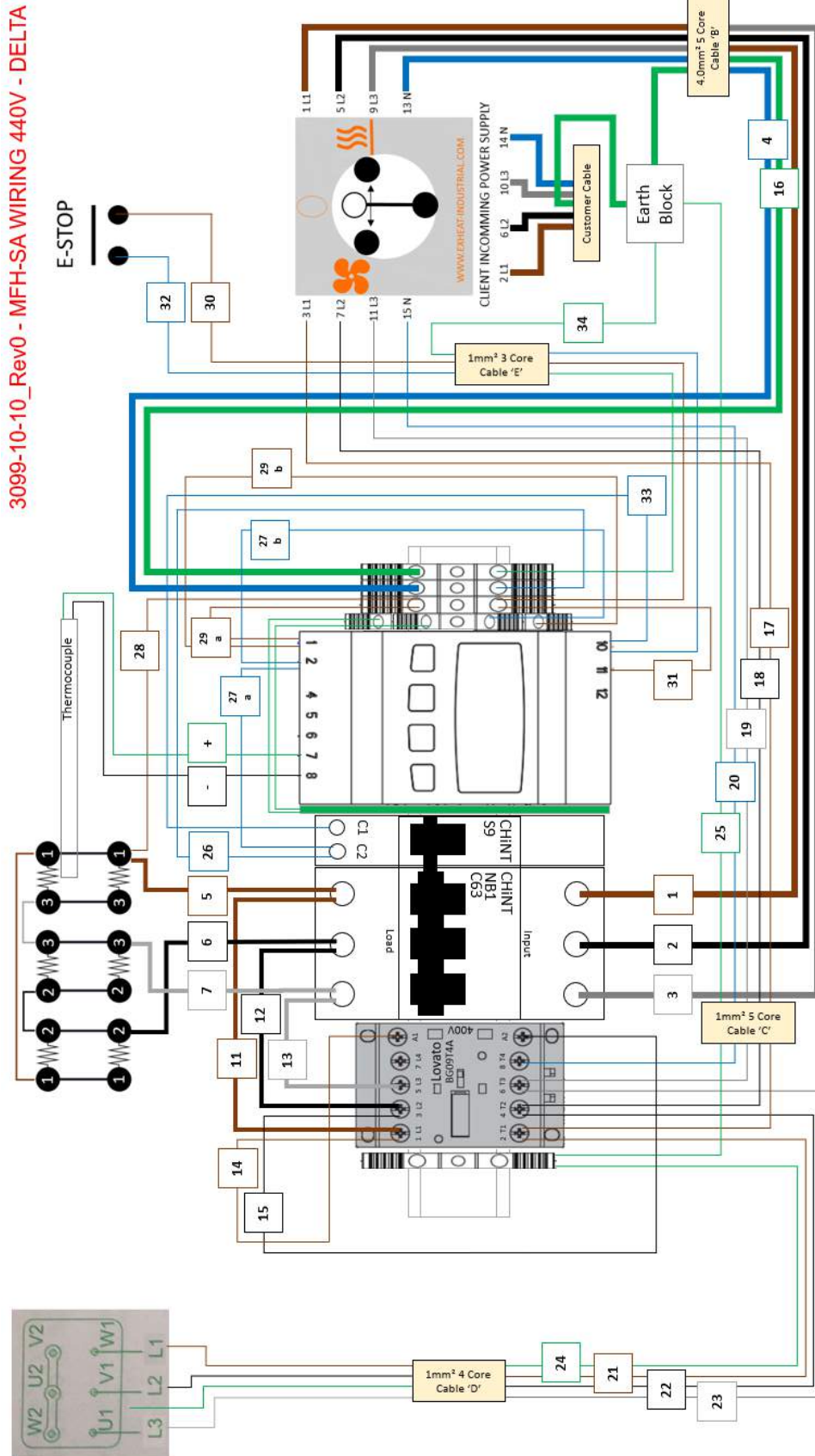
11.0 General Assembly Drawing – 690V

<p>NOTES:</p> <p>1. SPECIFICATION: (i) UP TO 12.5KW, 690V, FORCED AIR HEATER (SEE TABLE). (ii) THIS HEATER IS FOR AMBIENT CONDITIONS ONLY NOT SUITABLE FOR PRESSURISED SYSTEMS.</p> <p>2. CERTIFICATION: (i) IP85.</p> <p>3. REFERENCE DOCUMENTS: (i) WIRING DIAGRAM: 3099-10-10 (MFH-SA WIRING DIAGRAM 690). (ii) ELECTRICAL TEST PROCEDURE: WI-09-114. (iii) MANUFACTURING INSTRUCTIONS: IND-WI-08-29 (iv) THERMAL TESTING PROCEDURE: 3099-10-TEST. (v) MANUFACTURING COMPONENTS DRAWINGS: 3099 SERIES. (vi) KANBAN WIP: 3099-10-02.</p> <p>4. CABLE ENTRIES: (i) SUPPLIED IP65 NYLON GLAND TO SUIT INCOMING CABLE OUTER DIAMETERS BETWEEN 10 AND 140MM.</p>												<p>5. MOUNTING: THE MFH IS FOR FLOOR MOUNTING ONLY UNLESS FITTED WITH THE EXHEAT INDUSTRIAL SUPPLIED WALL MOUNTING BRACKET.</p> <p>6. WEIGHT: 22kg +/- 2kg DEPENDING ON SPECIFICATION.</p> <p>7. OBSTRUCTION: DO NOT OBSTRUCT EITHER THE INLET OR OUTLET. ENSURE AT LEAST 500MM CLEARANCE AT ALL TIMES WHILE IN OPERATION.</p> <p>8. MAIN MATERIALS OF CONSTRUCTION: (i) CASING: NYLON PPA-GF30 (GREY). (ii) ELEMENTS: STAINLESS STEEL. (iii) ELEMENT ENCLOSURE: STAINLESS STEEL. (iv) BRACKETRY: STAINLESS STEEL. (v) FIXINGS : STAINLESS STEEL & BRASS.</p> <p>9. EARTHING: (i) ALL EARTHING MUST BE COMPLETED IN ACCORDANCE WITH THE INSTALLATION OPERATION AND MAINTENANCE MANUAL. (ii) EARTH LEAKAGE PROTECTION POWER SUPPLY IS MANDATORY.</p>																							
<p>MODEL</p> <p>MFH-SA-15-690 MFH-SA PORTABLE SAFE AREA FAN ASSISTED HEATER rated 15kW, 690 VAC (10/-10%), 3ph, 50/60Hz (4-W STAR)</p>												<p>VOLTAGE</p> <p>690</p>						<p>RW RATING</p> <p>15</p>						<p>CURRENT (A)</p> <p>13.5</p>						<p>EXHEAT STOCK CODE</p> <p>043489N.01.02</p>					
<p>LIFE CYCLE STATE</p> <p>IN WORK</p>												<p>ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.</p> <p>DO NOT SCALE!</p> <p>IF ANY DIMENSIONS DIFFER BETWEEN DRAWINGS, THE DRAWING DIMENSIONS TAKE PRECEDENCE.</p> <p>UNLESS OTHERWISE STATED, DIMENSIONS ARE TO THE UNFINISHED SURFACE OF THE PARTS UNLESS OTHERWISE SPECIFIED.</p> <p>ALL DIMENSIONS ARE TO UNLESS OTHERWISE SPECIFIED.</p> <p>100 250 500 1000</p>						<p>EXHEAT LTD</p> <p>EXHEAT LTD 150000 NEWBOLD, INDIANLAND</p> <p>BSI ISO 9001 Management SYSTEMS CERTIFIED</p> <p>Certificate No. FM 35728</p>						<p>TITLE</p> <p>690V MFH SA GENERAL ARRANGEMENT DRAWING</p> <p>REV</p> <p>1</p>						<p>DATE</p> <p>3099-10-05</p>					
<p>CERTIFIED PRODUCT</p> <p>THIS PRODUCT IS THE PROPERTY OF EXHEAT LTD AND IS TO BE USED ONLY FOR THE PURPOSES INTENDED BY THE USER. UNLESS OTHERWISE STATED, THIS DRAWING IS THE PROPERTY OF EXHEAT LTD AND IS TO BE KEPT IN CONFIDENTIALITY.</p> <p>IF YOU REQUIRE THE DATA IN THIS DRAWING TO BE CHANGED, PLEASE CONTACT THE DESIGNER AT THE COMPANY TO THE RIGHT.</p> <p>ISSUE NO. 1</p> <p>ISSUE DATE 3099-10-05</p> <p>ISSUE COMMENTS</p>												<p>DATE</p> <p>3099-10-05</p>						<p>REV</p> <p>1</p>																	

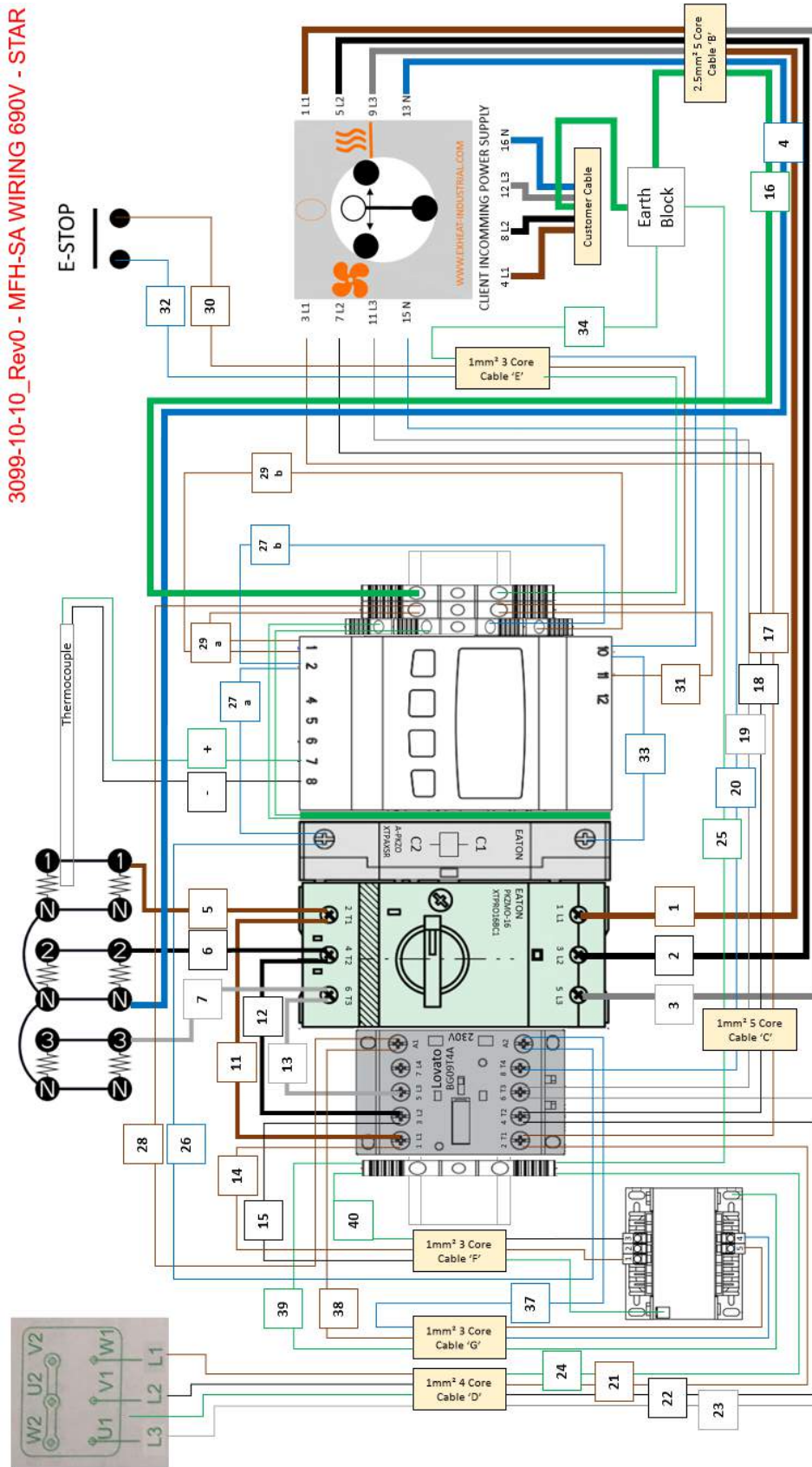


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TITLE 690V MFH SA GENERAL ARRANGEMENT DRAWING		REVISIONS REV 1 3099-10-05		EXHEAT DRAWING NUMBER 3099-10-05		REV 1	

12.0 Schematic - 440V



13.0 Schematic - 690V



14.0 Point to Point – 440V

3099-10-10_Rev0 - MFH-SA WIRING 690V - STAR

Bunch	Wire No.	Colour	mm ²	Description	Description
Single	35	Blue	2.5	ELEMENTS - L2	ELEMENTS - L2
Single	36	Blue	2.5	ELEMENTS - L3	ELEMENTS - L3
A - 5C	-	Brown	2.5	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	Power Supply / Customer Input - L1
A - 5C	-	Black	2.5	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	Power Supply / Customer Input - L2
A - 5C	-	Grey	2.5	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	Power Supply / Customer Input - L3
A - 5C	-	Blue	2.5	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	Power Supply / Customer Input - N - OPTIONAL
A - 5C	-	Y/G	2.5	Switch Box EARTH Terminal	Power Supply / Customer Input - E
B - 5C	1	Brown	2.5	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	MCB 690V 3P 10-16A EATON PART REF PKZM0-16 (RS 212-7955)
B - 5C	2	Black	2.5	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	MCB 690V 3P 10-16A EATON PART REF PKZM0-16 (RS 212-7955)
B - 5C	3	Grey	2.5	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	MCB 690V 3P 10-16A EATON PART REF PKZM0-16 (RS 212-7955)
B - 5C	4	Blue	2.5	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	ELEMENTS - N
B - 5C	16	GY	2.5	Switch Box EARTH Block	WPE 4 - Element Enclosure EARTH Terminal (Right)
E - 3C	34	GY	1	Switch Box EARTH Block	WPE 4 - Element Enclosure EARTH Terminal (Right)
Single	5	Brown	2.5	ELEMENTS - L1	MCB 690V 3P 10-16A EATON PART REF PKZM0-16 (RS 212-7955)
Single	11	Brown	2.5	CONTACTOR LOVATO 11-BG09-T4-A230 20 Amps 4 Pole	
F - 3C	14	Brown	1		
Single	6	Black	2.5	ELEMENTS - L2	MCB 690V 3P 10-16A EATON PART REF PKZM0-16 (RS 212-7955)
Single	12	Black	2.5	CONTACTOR LOVATO 11-BG09-T4-A230 20 Amps 4 Pole	
F - 3C	15	Black	1		
Single	7	Grey	2.5	ELEMENTS - L3	MCB 690V 3P 10-16A EATON PART REF PKZM0-16 (RS 212-7955)
Single	13	Grey	2.5	CONTACTOR LOVATO 11-BG09-T4-A230 20 Amps 4 Pole	MCB 690V 3P 10-16A EATON PART REF PKZM0-16 (RS 212-7955)
G - 3C	37	Blue	1	TRANSFORMER 100VA 690V PRIMARY 230V SEC	CONTACTOR LOVATO 11-BG09-T4-A230 20 Amps 4 Pole
Single	26	Blue	1	SHUNT 690V EATON PART REF A-PKZ0(230V 50HZ) (RS 492-1709)	
Single	27a	Blue	1	WDK 2.5 ACH Link Double Terminal - Top	TRIP AMP UNIT TS23-233-M-232
Single	27b	Blue	1		TRIP AMP UNIT TS23-233-M-232
Single	ACH N	Green	1	Anti Condensation Heater	WDK 2.5 ACH Link Double Terminal - Top
G - 3C	38	Brown	1	TRANSFORMER 100VA 690V PRIMARY 230V SEC	CONTACTOR LOVATO 11-BG09-T4-A230 20 Amps 4 Pole
Single	28	Brown	1	WDU 2.5 - Element Enclosure LIVE-230V Terminal (Right)	
Single	29a	Brown	1	WDK 2.5 ACH Link Double Terminal - Bottom	TRIP AMP UNIT TS23-233-M-232
Single	29b	Brown	1		WDK 2.5 ACH Link Double Terminal - Bottom
Single	ACH L	Green	1	Anti Condensation Heater	WDK 2.5 ACH Link Double Terminal - Bottom
F - 3C	40	GY	1	EARTH TERMINAL ON TRANSFORMER	WPE 4 - Element Enclosure EARTH Terminal (Left)
G - 3C	39	GY	1	EARTH MOUNTING BOLT ON TRANSFORMER CASE	
C - 5C	17	Brown	1	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	CONTACTOR LOVATO 11-BG09-T4-A230 20 Amps 4 Pole
D - 4C	21	Brown	1	690v 3Ph 0.55 kW Motor - L1	
C - 5C	18	Black	1	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	CONTACTOR LOVATO 11-BG09-T4-A230 20 Amps 4 Pole
D - 4C	22	Black	1	690v 3Ph 0.55 kW Motor - L2	
C - 5C	19	Grey	1	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	CONTACTOR LOVATO 11-BG09-T4-A230 20 Amps 4 Pole
D - 4C	23	Grey	1	690v 3Ph 0.55 kW Motor - L3	
C - 5C	20	Blue	1	3 Position Changeover Switch - Isolator 20A 4 Pole with cent	CONTACTOR LOVATO 11-BG09-T4-A230 20 Amps 4 Pole
D - 4C	24	Y/G	1	690v 3Ph 0.55 kW Motor - N	
C - 5C	25	Y/G	1	Switch Box EARTH Block	WPE 4 - Element Enclosure EARTH Terminal (Left)
E - 3C	30	Brown	1	APEME-STOP SWITCH ASSEMBLY	WDU 2.5 - Element Enclosure LIVE-230V Terminal (Right)
Single	31	Brown	1	TRIP AMP UNIT TS23-233-M-230	
E - 3C	32	Blue	1	APEME-STOP SWITCH ASSEMBLY	TRIP AMP UNIT TS23-233-M-230
Single	33	Blue	1	SHUNT 690V EATON PART REF A-PKZ0(230V 50HZ) (RS 492-1709)	TRIP AMP UNIT TS23-233-M-230
Single	8	White	1	TRIP AMP UNIT TS23-233-M-230	Thermocouple
Single	9	Green	1	TRIP AMP UNIT TS23-233-M-230	Thermocouple

15.0 Point to Point – 690V

3099-10-10_Rev0 - MFH-SA WIRING 440V - DELTA

Bunch	Wire No.	Colour	mm ²	Description	Description
Single	35	Black	2.5	ELEMENTS - L2	ELEMENTS - L2
Single	36	Grey	2.5	ELEMENTS - L3	ELEMENTS - L3
Single	37	Brown	2.5	ELEMENTS - L1	ELEMENTS - L1
A - 5C	-	Brown	4	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	Power Supply / Customer Input - L1
A - 5C	-	Black	4	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	Power Supply / Customer Input - L2
A - 5C	-	Grey	4	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	Power Supply / Customer Input - L3
A - 5C	-	Blue	4	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	Power Supply / Customer Input - N - MANDATORY
A - 5C	-	YIG	4	Switch Box EARTH Terminal	Power Supply / Customer Input - E
B - 5C	1	Brown	4	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	MCB 25A 3 POLE CHINT NB1-63C3P25
B - 5C	2	Black	4	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	MCB 25A 3 POLE CHINT NB1-63C3P25
B - 5C	3	Grey	4	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	MCB 25A 3 POLE CHINT NB1-63C3P25
B - 5C	4	Blue	4	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	WDU 2.5 - Element Enclosure NEUTRAL Terminal (Right)
B - 5C	16	GY	4	Switch Box EARTH Block	WPE 4 - Element Enclosure EARTH Terminal (Right)
E - 3C	34	GY	1	Switch Box EARTH Block	WPE 4 - Element Enclosure EARTH Terminal (Right)
Single	5	Brown	2.5	ELEMENTS - L1	MCB 25A 3 POLE CHINT NB1-63C3P25
Single	11	Brown	2.5	CONTACTOR LOVATO 11-BG09-T4-A400 20 Amps 4 Pole	
Single	14	Brown	1		
Single	6	Black	2.5	ELEMENTS - L2	MCB 25A 3 POLE CHINT NB1-63C3P25
Single	12	Black	2.5	CONTACTOR LOVATO 11-BG09-T4-A400 20 Amps 4 Pole	
Single	15	Black	1		
Single	7	Grey	2.5	ELEMENTS - L3	MCB 25A 3 POLE CHINT NB1-63C3P25
Single	13	Grey	2.5	CONTACTOR LOVATO 11-BG09-T4-A400 20 Amps 4 Pole	
Single	26	Blue	1	SHUNT TRIP 240V CHINT PART REF S9	WDU 2.5 - Element Enclosure NEUTRAL Terminal (Right)
Single	27a	Blue	1		TRIP AMP UNIT TS23-233-M-232
Single	27b	Blue	1		WDK 2.5 ACH Link Double Terminal - Top
Single	ACH N	Green	1	Anti Condensation Heater	WDK 2.5 ACH Link Double Terminal - Top
Single	28	Brown	1	WDU 2.5 - Element Enclosure LIVE-ONE Terminal (Right)	ELEMENTS - L1
Single	29a	Brown	1		TRIP AMP UNIT TS23-233-M-232
Single	29b	Brown	1		WDK 2.5 ACH Link Double Terminal - Bottom
Single	ACH L	Green	1	Anti Condensation Heater	WDK 2.5 ACH Link Double Terminal - Bottom
C - 5C	17	Brown	1	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	CONTACTOR LOVATO 11-BG09-T4-A400 20 Amps 4 Pole
D - 4C	21	Brown	1	440v 3Ph 0.55 kW Motor - L1	
C - 5C	18	Black	1	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	CONTACTOR LOVATO 11-BG09-T4-A400 20 Amps 4 Pole
D - 4C	22	Black	1	440v 3Ph 0.55 kW Motor - L2	
C - 5C	19	Grey	1	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	CONTACTOR LOVATO 11-BG09-T4-A400 20 Amps 4 Pole
D - 4C	23	Grey	1	440v 3Ph 0.55 kW Motor - L3	
C - 5C	20	Blue	1	3 Position Changeover Switch - Isolator 32A 4 Pole with cent	CONTACTOR LOVATO 11-BG09-T4-A400 20 Amps 4 Pole
D - 4C	24	YIG	1	440v 3Ph 0.55 kW Motor - E	
C - 5C	25	YIG	1	Switch Box EARTH Block	WPE 4 - IP66 Element Enclosure EARTH Terminal (Left)
E - 3C	30	Brown	1	APEM E-STOP SWITCH ASSEMBLY	WDU 2.5 - Element Enclosure LIVE-ONE Terminal (Right)
Single	31	Brown	1	TRIP AMP UNIT TS23-233-M-230	
E - 3C	32	Blue	1	APEM E-STOP SWITCH ASSEMBLY	TRIP AMP UNIT TS23-233-M-230
Single	33	Blue	1	SHUNT TRIP 240V CHINT PART REF S9	TRIP AMP UNIT TS23-233-M-230
Single	8	White	1	TRIP AMP UNIT TS23-233-M-230	Thermocouple
Single	9	Green	1	TRIP AMP UNIT TS23-233-M-230	Thermocouple

16.0 Certification Documentation



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