

WARNING! Read all important information notices on pages 3-5

2-519.7 5H723536A

HEX6 Series

Installation, Parts, Service, and Maintenance Manual 60 Hz Models only





The Electric Forced Air Heaters are $_{C}UL_{US}$ listed certified for the following locations: Class I, Division 1 & 2, Groups C & D; Class II, Division 1, Groups E, F & G; Class II, Division 2, Groups F & G; Class I, Zones 1 & 2, Groups IIA & IIB; Zones 20, 21 & 22; Temperature Code T3B 329°F (165°C) (60 Hz Models)

For details of hazardous locations with potential for explosion, refer to the Canadian Electrical Code, Part 1, Section 18 or National Electrical Code articles 500–516.



WARNING. Improper installation adjustment, alteration, excessive vibration, service, or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing, operating or servicing this equipment.

Special Notes

The following special notices highlight important information in the installation, operation and maintenance sections.



This symbol indicates a potentially hazardous situation, which, if not avoided, can result in personal injury or damage to the equipment.



This symbol indicates a potentially hazardous situation, which, if not avoided, may be a shock hazard.



This symbol indicates an imminently hazardous situation, which, if not avoided, could result in death or serious injury.

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A. HEATER MAINTENANCE CHECKLIST

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Heater Model	Date of Maintenance
Serial Number	Maintenance Done By
Comments	



WARNING

Disconnect heater from power supply at integral disconnect or fuse box before opening enclosures or servicing heater.

IF INTEGRAL DISCONNECT IS BEING SERVICED, verify that power has been disconnected at fuse box or main panel.

Lock the switch in the **"OFF"** (open) position and/or tag the switch to prevent unexpected power application.

This heater should only be serviced by personnel with heating and hazardous location equipment experience.

A.1 Preventative Maintenance Grid

Cells of the grid with check boxes inside are the <u>minimum</u> maintenance measures required to be performed at the indicated time periods.

			Regular Service				Severe Service			
To-Do	Description	Annu Start	ual Up Mo	onthly	Every 3 Months	Every 6 Months	Annual Start Up	Monthly	Every 3 Months	Every 6 Months
Clean	Remove dust using compressed air. Do not with water or solvents. Do not immerse in with solvents. Clean the following: Immediate air. Do not immerse in with solvents in with solvents. 1. Motor 4. Fan 2. Louvers 5. Fan Guardinata 3. Finned Tubes Finned Tubes Finned Tubes	spray vater or								
Check	 Motor for smooth, quiet operation Louvers for proper angle and tightnes All explosion-proof covers for tightnes Pressure relief device for signs of leak Figure 1, page 5 and refer to A.3 Annua page 4 for further instructions. 	ss age. See al,								
	 Inspect all terminal connections and conductors:* Tighten loose connections. Replace conduct damaged insulation and frayed wiring.* 	stors with								
Electrical Inspection	 Inspect contactor contacts: If badly p burned or welded shut, replace with f supplied contactor.* 	itted, factory								
	 Check fuses: The correct fuse rating a are printed on the circuit board. Alway a backup fuse is available on the PCB. 	nd type /s ensure *								
	 Fluid leakage: Inspect the Pressure R Device(PRD) label indicator for signs rupture and degradation. If any fluid I occurs from the heater, disconnect it the power supply and replace the co immediately.* 	elief of eakage from re								
Inspection	 Enclosures: The interiors of each enclo must be clean, dry, and free of foreign materials.* 	osure								
	 Motor shaft bearing and play: If the m does not run quietly and smoothly an excessive play, replace the motor.* 	otor d has								

*For drilling rigs, this should be done every rig re-location.

A.2 Periodic (before and as required during heating season)



- □ Motor
- □ Louvers
- □ Finned Tubes
- 🗆 Fan
- □ Fan Guard

A.3 Annual (before heating season)

Mechanical Check

- Fluid leakage. The heater core is vacuum charged and contains proprietary heat transfer fluid. Inspect the Pressure Relief Device label indicator for signs of rupture and degradation. If the paper is torn, disintegrated or otherwise compromised this is an indication that fluid has leaked from the core. If any fluid leakage occurs from the heater, disconnect it from the power supply and have the core replaced. A factory supplied exchange core can be shipped from stock. Refer to Section Repair & Replacement, page 17 for details.
- <u>All enclosures.</u> Interior of enclosures must be clean, dry and free of foreign materials. Threaded covers must be installed and hand tight.
 - Note: Enclosure joints are metal to metal. Do not use gasket material or sealant in joints. A grease is applied to the joints at the factory and should be left intact.
- Motor shaft bearing play. Replace motor if play is excessive, or if motor does not run quietly and smoothly. Motor bearings are permanently lubricated.
- □ <u>Fan.</u> Replace immediately if cracked or damaged.
- □ <u>Louvers.</u> Screws should be tight. Louvers shall not be fully closed or override stops.
- □ <u>Tightness of all hardware.</u> All nuts and bolts, including mounting hardware, must be tight.
- Turn heater on for a minimum of five minutes. Check for warm air exiting heater through louvers. Crackling or pinging noises within heater during start-up are normal.

Check

- Motor for smooth, quiet operation
- Louvers for proper angle and tightness

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for reuse

- □ All explosion-proof covers for tightness
- Pressure relief device for signs of leakage.
 See Figure 1, page 5 and refer to A.3 Annual, page 4, for further instructions.

Electrical Check

- All terminal connections and conductors. Tighten loose connections. Conductors with damaged insulation must be replaced.
- Inspect contactor contacts. If badly pitted, burned or welded shut, replace with factory supplied contactor. For severe duty conditions such as arctic duty or drilling rigs, Modine recommends the contactor be replaced every two years.
- <u>Fuses.</u> Fuse rating and type are on printed circuit board. Correct fuse must be in the active fuse clip. It is recommended that a spare fuse be stored in the spare fuse clip.
- <u>All explosion-proof conduits</u>. Replace damaged conduits. All threaded conduit connections must have a minimum 5 turns engagement. Straight threaded conduit must protrude a minimum of 1/16" (1.6 mm) inside enclosures. Taper threaded connections must be at least hand tight.
- □ <u>Electrical resistance on all load side legs.</u> Reading should be balanced (± 5%).



WARNING. Read and adhere to the following. Failure to do so may result in severe or fatal injury. WARRANTY WILL BE VOID.



WARNING. Appropriate protection against ground faults, such as a ground-fault circuit interrupter or GFCI, is required to be used with this equipment. Failure to provide protection against electrical grounding or bonding during the use of this equipment can result in property damage, personal injury, or death. In addition, this equipment must be effectively grounded in compliance with all applicable electrical codes and standards.

- 1. Read and follow all instructions in this manual.
- 2. Heater is to be used only in atmospheres having an ignition temperature higher than the heater's maximum rated operating temperature as shown on the heater data plate. Refer to applicable electrical codes for additional information.
- Heater to be used only in the hazardous locations indicated on the heater's data plate.
- Heater is for dry indoor use only. Do not immerse in water. Do not store or use in areas exposed to rain or snow.
- 5. Heater is to be connected and serviced only by a qualified electrician experienced with hazardous location equipment.
- 6. Installation and wiring of the heater must adhere to all applicable codes.
- 7. Disconnect heater from power supply at integral disconnect or fuse box before opening enclosures or servicing heater. IF INTEGRAL DISCONNECT IS BEING SERVICED, verify that power has been disconnected at fuse box or main panel. Lock the switch in the "OFF" (open) position and/or tag the switch to prevent unexpected power application.
- 8. This heater is equipped with a bimetal overtemperature high-limit. It is of the automatic reset type and therefore the heater may restart without warning. The unit comes with secondary high-limit that will trip an internal breaker if it goes overtemperature. If secondary high limit activates, the heater requires inspection by authorized personnel. The heater is not to be operated with either overtemperature protection devices bypassed or circumvented.
- Venting pressure of the Pressure Relief Device (PRD) is factory set. Do not tamper with lock nut. (See Figure 1, page 5.)
- 10. Do not tamper or remove warning label indicator on the PRV.
- 11. The heater is equipped with a backup overpressure relief device. This is a single use device. If activated,

do not circumvent this device to operate the heater. Activation of this device necessitates removing the heater immediately from service for evaluation.

- 12. Operate the heater only while it is permanently mounted in an upright position. Refer to Section D. Installation, page 7 for details.
- 13. Heater must be kept clean. When operating in a dirty environment, regularly clean the finned tubes, fan, and fan guard. Follow the recommended maintenance procedures. Refer to Section A. Heater Maintenance Checklist, page 3 for details.
- 14. The heater core is vacuum charged and contains proprietary heat transfer fluid. If any fluid leakage occurs from the heater, disconnect it from the power supply and have the core replaced with a factory supplied core. Refer to Section I. Repair & Replacement, page 17 for details.
- 15. Do not operate the heater with any of the louvers fully closed or overriding their stops.
- 16. Do not operate the heater in atmospheres corrosive to steel or aluminum.
- Do not operate heater in ambient temperatures above 104°F (40°C).
- 18. Use factory approved replacement parts only.
- See applicable electrical codes for seal requirements in field installed conduits. Factory installed conduits require no further sealing.
- 20. Crackling or pinging noises within the heater core during start up may occur. This is normal.
- 21. Air discharge near the bottom of the heater may be warmer than the top. This is normal.
- 22. If there are any questions or concerns regarding the heater, contact the factory. Refer to the back cover of this manual for details.



Figure 1

1. Heater is not operating.

- 1.1 Check all fuses in heater control box.
- 1.2 Check remote disconnect switch and circuit breaker.
- 1.3 Check voltage supplied to the heater refer to the heater data plate for voltage requirements.
- 1.4 Check thermostat by turning it and check continuity with a multimeter.
- 1.5 Check the condition of the disconnect switch if the heater is so equipped. Measure continuity through the disconnect by engaging the switch.
- 1.6 Verify that there is a jumper wire present between terminals 5 and 6 on the terminal block located in the control box.
- 1.7 Check that internal breaker has not opened. If internal breaker has opened it is indication that an over-temperature event has occurred. Heater must be thoroughly evaluated by qualified personnel to ensure it is in proper working order before resetting this device.

7.

9.

- 2. Contactor is chattering.
 - 2.1 Check supply voltage.
 - 2.2 Check wiring connections. Tighten all loose electrical connections.
 - 2.3 Check thermostat for continuity (See 1.4, page 6). If thermostat does not break continuity replace thermostat.
- 3. Contactor is burned or welded.
 - 3.1 Check the contactor for burn marks and blackening. Replace the contactor.
 - 3.2 Check incoming power to the heater to ensure there are no voltage fluctuations.
- 4. Heat exchanger is dirty.
 - 4.1 Clean the heat exchanger using compressed air.
- 5. Pressure Relief Devices.
 - 5.1 If there are signs that the Pressure Relief Device has released fluid, Pressure Relief Device indicator is broken, blackening around the Pressure Relief Device exit hole, or there are fluid stains visible on the top louver, shut the unit down immediately. Activation requires the heater be removed from service for inspection by authorized personnel. Do not circumvent the overpressure devices to operate the heater. Lock out/ tag out heater according to site procedures.
 - 5.2 Check for restricted air flow, bad motor, broken thermostat or malfunctioned high limit.
 - 5.3 There is a secondary Pressure Relief Device to insure safety of the unit.
 - 5.4 If the secondary pressure relief device has opened, shut the unit down immediately. This is a single use device. Activation requires the

heater be removed from service for inspection by authorized personnel. Do not circumvent the overpressure device to operate the heater. Lock out/tag out heater according to site procedures.

- 6. Heater is cold on top and warm on bottom.
 - 6.1 The core may have lost its vacuum. Check the pressure relief devices for signs of loss of fluid and verify that the pressure relief devices label indicator is not broken. If pressure relief devices has released, send the unit in for repair or replace the core.
 - 6.2 If the Pressure Relief Device does not indicate loss of fluid, the heater should operate normally.
 - 6.3 The ambient temperature may be too low. If the ambient temperature is very cold the top of the core will be colder than the bottom – this is normal.
 - Unit cycles on high limit unit turns on and turns off within less than 5 minutes.
 - 7.1 Check and see if the pressure relief devices has released fluid. Core may have lost most or all of its fluid. If Pressure Relief Device has released, the unit requires inspection by authorized personnel.
 - 7.2 The core may be dirty, fan may not be working or may be turning the wrong direction (the fan must rotate clockwise as seen from the front of the unit) objects may be stuck in the heat exchanger for drying or warming up – remove any items from the exchanger.
- 8. The Ground Fault Interrupter (GFI) trips on the main panel, or heater blows fuses.
 - 8.1 Check that you have a fuse of the proper amperage rating.
 - 8.2 Check the pressure relief device for signs of loss of fluid and verify that the pressure relief device label is not broken.
 - 8.3 If condition is not observable, send heater in for repair.
 - 8.4 Heat exchanger needs to cool in order to engage switch to **"ON"** postion.
 - 8.5 Contact factory if further assistance is needed.
 - The fan is turning but very little air comes from the front of the heater.
 - 9.1 Check fan rotation and ensure that the fan turns clockwise as seen from the front of the heater. Refer to the Installation section below for more information.
 - 9.2 Check motor winding resistance and verify that they are within tolerance.
 - 9.3 Check fan blade set screws to ensure fan blade is not loose on the motor shaft.

All applicable codes must be adhered to. For optimum heating, the heater should be installed as follows:

D.1 Mechanical

- 1. Location
 - 1.1 There are no obstructions that may impede the heater's air inlet or discharge.
 - 1.2 The air discharge is directed into open areas and not at occupants.
 - 1.3 The air discharge is not directed at a thermostat.
 - 1.4 The air discharge is directed across areas of heat loss, such as doors and windows (see Figure 2, page 7).
 - The air discharge is directed along and at a slight angle toward exterior walls (see Figure 2, page 7).
 - 1.6 If equipment freeze protection is important, direct air discharge at equipment.
 - 1.7 Air discharge streams support each other and create a circular air flow. It is not required that the heater's air throw reaches the next heater (see Figure 2, page 7).





2. Mounting

- 2.1 The heater must be permanently mounted in a level, upright position for operation. See Figure 3, Figure 4, and Figure 5 on page 7 and 8 for maximum tilt angles, installation clearances, and physical dimensions. For ease of installation, a variety of mounting kits are available from the factory.
- 2.2 The mounting structure must be strong enough to:
 - Support the heater's weight (refer to Section F. Specifications, page 13).
 - Provide sufficient stiffness to prevent excessive vibration.
 - Withstand harsh situations such as transportable installations.



Figure 3



Figure 4







WARNING. Disconnect heater from power supply at integral disconnect or fuse box before opening enclosures or servicing heater.

IF INTEGRAL DISCONNECT IS BEING SERVICED, verify that power has been disconnected at fuse box or main panel. Lock the switch in the "OFF" (open) position and/or tag the switch to prevent unexpected power application. Installation and wiring of the heater must adhere to all application codes.

- 1. General
 - Use only copper conductors and approved explosion-proof wiring methods during installation. Refer to Section E. HEX6 Technical Data, page 12 to 13 and heater data plate for conductor rating.
 - 1.2 External overcurrent protection is required. Refer to Section E. HEX6 Technical Data, page 12 to 13 and heater data plate for voltage, frequency amperage, and phase. Supply voltage is to be within 10% of the data plate voltage.
 - 1.3 The heater must be installed by qualified personnel in strict compliance with electrical codes.
 - 1.4 All heaters come factory prewired and ready for direct connection to the power supply leads.
 - 1.5 The heater must be individually fused, preferably with Class J time-delay fuses for maximum safety. Unless stated otherwise in your local code, fuse size shall be 125% of line current or next size larger.
- 2. Field Wiring
 - 2.1 The supply conductors, ground conductor, and room thermostat conductors (see D.3 Wiring Schematics, page 11) all pass through the 1" NPT opening (see Figure 6, page 9) and are to be wired into the control enclosure (see Figure 7, page 9).



- 2.2 Heater may be supplied with a factory installed built-in room thermostat (see Figure 8, page 10). On heaters not supplied with this option, it is recommended that a remote room thermostat be used. Connect the remote room thermostat conductors to the printed circuit board terminal block marked "TSTAT". Any thermostat used with this heater must:
 - Be of an explosion-proof type
 - Be rated 125V minimum
 - Have a minimum 2 amp capacity
 - Open on temperature rise
- 2.3 Heater may be supplied with a factory installed built-in integral disconnect. (See Figure 8, page 10)

Field Wiring for Integral Disconnect:

- Power Supply conductors and Ground conductor pass through 1" NPT opening of Disconnect Enclosure (see Figure 8, page 10). Supply conductors to be wired to Disconnect Switch inside. Ground conductor to be wired to Ground Lug fastened to inside of Disconnect Enclosure.
- If applicable, Remote Room Thermostat conductors pass through 1" NPT opening (see Figure 8, page 10) and are to be wired to printed circuit board terminals marked "T'STAT".
- To reduce risk of ignition of hazardous atmospheres, conduit runs must have a sealing fitting connected within 18" (457 mm).
- 2.4 Factory installed conduits require no further sealing. Integral Disconnect is sealed at factory.
 - The internal grounding terminal in the control enclosure (or in the integral disconnect enclosure when this option is provided) shall be used as the equipment grounding means. An external bonding terminal is provided for a supplementary bonding connection where local authorities permit or require such a connection.



nstallation



Final Inspection

3.

- 3.1 Before application of electrical power:
 - Check that all connections are secured and comply with the applicable wiring diagram (see Wiring Schematics, page 11) and code requirements.
 - Confirm that the power supply is compatible with the data plate rating of the heater.
 - Remove any foreign objects from the heater.
 - Install all covers and verify that all enclosures are well secured.
 - Ensure that the fan rotates freely. See
 Figure 6, page 9 for proper direction of fan rotation.



WARNING. If heater has been stored at temperatures at or below freezing, the heat transfer fluid may become frozen. Under these circumstances it is necessary to cycle power to the heater, 30 seconds on, 30 seconds off for 3 minutes on initial startup.

Figure 8



Figure 9

HEX6 WIRING SCHEMATIC



E. HEX6 TECHNICAL DATA

E.1 60 Hz Electric Heaters

Model	Voltage	Nominal Wattage	Phase	Max. Motor Nameplate Current	Heater Wattage	Total Current	Minimum Circuit Ampacity	Supply Wire	Maximum Fuse Size	Tempe Ris	rature e	Core Kit art Number	Contactor Part Number	
	V	kW			W	А	А	AWG	А	°F	°C	Δ		
HEX6-208160-030		3.0		4.1	2700	18.5	23.2	10	25	19.0	10.5	12116		
HEX6-208160-050	208	5.0	1	4.1	4700	28.1	35.2	8	40	31.6	17.6	12117		
HEX6-208160-075		7.5	'	4.1	7200	40.2	50.2	6	60	27.9	15.5	12118		
HEX6-208160-100*		10.0		4.1	9690	52.2	65.2	6	70	37.2	20.7	12119		
HEX6-208360-030		3.0		2.3	2700	10.6	13.3	14	15	11.2	6.2	12116		
HEX6-208360-050		5.0		2.3	4700	16.2	20.2	10	25	18.6	10.3	12117		
HEX6-208360-075		7.5	3	2.3	7200	23.1	28.9	10	30	27.9	15.5	12118		
HEX6-208360-100		10.0		2.3	9700	30.1	37.6	8	40	37.2	20.7	12119		
HEX6-208360-150		15		2.3	14400	44.0	55.0	6	60	27.1	15.1	12120		
HEX6-240160-030		3.0		4.1	2700	16.6	20.8	10	25	19.0	10.5	12122		
HEX6-240160-050		5.0		4.1	4700	24.9	31.2	8	35	31.6	17.6	12123		
HEX6-240160-075		7.5	1	4.1	7200	35.4	44.2	8	45	27.9	15.5	12124		
HEX6-240160-100		10.0		4.1	9700	45.8	57.2	6	60	37.2	20.7	12125		
HEX6-240160-150*	240	15.0		4.1	14400	66.6	83.3	4	90	27.1	15.1	12126		
HEX6-240360-030			3.0		2.4	2700	9.6	12.0	14	15	19.0	10.5	12122	
HEX6-240360-050		5.0 7.5 3 10.0	_	2.4	4700	14.4	18.1	12	20	31.6	17.6	12123		
HEX6-240360-075			3	2.4	7200	20.5	25.6	10	30	27.9	15.5	12124		
HEX6-240360-100				2.4	9700	26.5	33.1	8	35	37.2	20.7	12125		
HEX6-240360-150		15.0		2.4	14400	38.5	48.2	8	50	27.1	15.1	12126		
HEX6-480160-030**		3.0		0.8	2700	7.1	8.8	14	10	19.0	10.5	12129		
HEX6-480160-050 **		5.0		0.8	4700	11.2	14.0	14	15	31.6	17.6	12130		
HEX6-480160-075**		7.5	1	0.8	7200	16.4	20.5	10	25	27.9	15.5	12131	13847	
HEX6-480160-100 **		10.0		0.8	9700	21.6	27.0	10	30	57.2	20.7	12132		
HEX6-480160-150 **		15.0		0.8	14400	32.1	40.1	8	45	27.1	15.1	12133		
HEX6-480160-200 **		20.0		0.8	19400	42.5	53.1	6	60	36.1	20.1	12134		
HEX6-480360-030	(00	3.0		1.2	2700	4.8	6.0	14	10	19.0	10.5	12129		
HEX6-480360-050	480	5.0		1.2	4700	1.2	9.0	14	10	31.6	17.6	12130		
HEX6-480360-075		7.5		1.2	7200	10.2	12.8	14	15	27.9	15.5	12131		
HEX6-480360-100		10.0		1.2	9/00	15.2	16.6	12	20	57.Z	20.7	12132		
HEX6-480360-150		15.0		1.2	14400	19.5	24.1 71.C	10	25	Z7.1	15.1	12133		
HEX6-480360-200		20.0		1.2	19400	25.5	31.6	8	35	36.1	20.1	12134		
HEX6-480360-250		25.0		1.2	24200	51.5	39.1	8	40	22.0	12.2	12135		
HEX6-480360-300		30.0 75.0	_	1.2	29200	57.5	46.7	6	50	20.4	14.0	12130		
HEX6-400360-330		35.0	3	1.2	34200	43.3	54.Z	14	10	10.0	17.1 10 E	12137		
HEX6-600360-030		5.0		0.7	4700	5.0	4.5	14	10	716	10.5	12130		
HEX6-600360-030		75		0.7	7200	3.5 70	9.9	14	15	279	17.0	12139		
HEX6-600360-075		10.0		0.7	9700	10.7	12.9	14	15	101	207	12140		
	600	10.0		0.7	9700	10.5	12.9	14	15	10.1	20.7	12141		
HEX6-600360-150	600	15.0		0.7	14400	15.2	18.9	12	20	27.1	15.1	12142		
HEX6-600360-200		20.0		0.7	19400	20.0	25.0	10	30	36.1	20.1	12143		
HEX6-600360-250		25.0		0.7	24200	24.8	31.0	8	35	45.2	25.1	12144		
HEX6-600360-300		30.0		0.7	29200	29.6	57.0	8	40	26.4	14.6	12145		
HEX6-600360-350		35.0		0.7	34200	34.4	43.0	8	45	30.7	17.1	12146		

Notes

⁶ Exceeds the 48 amp circuit limit of NEC 424-22. DS not available for these units.

**480V: 1-phase units are certified for Class I, Div. 1, Group D and Class II, Div. 1 Groups F & G. Heater rated for -20°C to +40°C. Special Order.

- Minimum conductor size for 86°F (30°C) ambient. Derate conductor for ambient temperature. Use minimum 194°F (90°C) insulation.
- 2. Heater is functioning normally if at rated voltage the amp draw is within 10% of the value in this table.
- 3. Operation at lower voltages will result in reduced heat output and amp draw.
- 4. Add "T" to model number when adding a built-in thermostat.

- 5. Add "D" to model number when adding a built-in disconnect switch.
- 6. Add "U" to model number for units with continuous fan option.
- 7. Add "A" to model number for units with stainless steel cabinet.
- 8. Add "L" to model number for large box option.
- 9. Add "P" to model number when adding a built-in pilot light.

F. SPECIFICATIONS

F.1 60 Hz Models

			Nominal kW									
			3	5	7.5	10	15	20	25	30	35	
Maximum	ft		12,000	8,000	10,000	7,000	10,000	7,000	10,000	7,000	6,000	
Altitude	m		3,658	2,438	3,048	2,134	3,048	2,134	3,048	2,134	1,829	
	@ 70°F (CFM)		500		850		1750		3600			
AIr Flow	@ 21°C (m ³ /hr)		850		1444		2973		6116			
Horizontal Air	ft		15		3	30		40		70		
Throw	m		4	.6	9.1		12.2		21.3			
Maximum	ft		7 10			0		20				
Height (to underside)	m		2	2.1 3			.0		6.1			
Minimum	HP		1/2									
Motor Power	kW		0.373									
Fan Diamotor	in		12				1	6		20		
Fail Diameter	mm		305			40	06	508				
	without Ibs		148				17	7	212			
Net Weight	DS	kg	67.1			80.2		96.2				
Net Weight	with DS	lbs		160			189		224			
	WITT D5	kg		ε	32.5		95.6		101.6			
	without	lbs		2	202		22	27	263			
Shipping	DS	kg		9	91.6		103	3.9	119.3			
Weight	with DS	lbs			214		23	39		275		
	with DS	kg			97		108	3.3		124.7		

Specifications 60 Hz Models

1.	Hazardous Location Rating	Class I, Groups C and D; Class II, Groups E, F and G; Temperature Code T3B [329°F (165°C)]*
2.	Enclosures	NEMA Type 7 & 9. For dry, indoor use only. Do not immerse in water. Do not store or use in areas exposed to rain or snow
3.	Motor Type	Explosion-proof. Thermally protected. Permanently lubricated ball bearings.
4.	Fan	Aluminum blade. Steel spider and hub with 5/8" (15.875 mm) bore
5.	Fan Guard	Split design with close wire spacing. 1/4" (6.3 mm) diameter probe will not enter
6.	Mounting Holes	Two 9/16". (14.3 mm) diameter holes at top
7.	Heating Elements	Three long-life, low watt-density, high grade metal-sheathed elements
8.	Temperature High-Limit	Automatic reset type, snap-action bimetal, open on temperature rise. Rated 100,000 cycles at 10 amps, handles 0.128 amps
9.	Backup Temperature High- Limit	Automatic reset type, snap-action bimetal, close on temperature rise. Rated 100,000 cycles at 10 amps, handles 0.128 amps.
10.	Control Circuit	120V, 0.128 amps, 15 VA. (Grounded)
11.	Slim Junction Box	10.25" (230 mm) x 8.00" (180 mm) x 6.75" (172 mm)
12.	Optional Built-in Thermostat	36°F to 82°F (2°C to 28°C)
13.	Optional Built-in Disconnect Switch	DS for use only on heaters with total current not exceeding 48 amps. Lockout handle accepts 1/4" diameter padlock shackle
14.	Control Transformer	Multi-tap primary, 120V secondary, 50 VA
15.	Optional Pilot Light	Indicates call for heat
16.	Contactor	75 amps. Rated for 1,000,000 mechanical operations. 120V, 15 VA coil (separately fuse-protected)
17.	Heat Transfer Fluid	Long life formulated proprietary heat transfer fluid
18.	Cabinet Material	12 ga. (0.104") (2.60 mm) steel. Epoxy coated with five-stage pretreatment, including iron phosphate. Optional stainless steel.
19.	Core	Steel with integral aluminum fins, vacuum charged and hermetically sealed
20.	Conduit Material	Heavy walled, 0.122" (3.1 mm) steel
21.	Overpressure Protection	Pressure relief device, steel body, no field serviceable parts
22.	Protection	Single use device, non serviceable.
23.	Operational Temperature Limitations	-58°F to 104°F (-50°C to 40°C)
24.	Storage Limitations	-58°F to 176°F (-50°C to 80°C). Do not immerse in water. Do not
		expose to rain or snow.

Note:

*Some units may be Class I, Div. I, Group D and Class II, Div. 1, Group F & G.

G. PARTS ASSEMBLY DIAGRAM



ltem	Description	25 - 46 kW	6.3 - 10 kW	125 - 20 kW	20 9 - 35 kW			
1	Coro	2.5 - 4.0 KVV	0.0-10 KW	**	20.3 - 33 KVV			
1	Core	Dainted 1	2694-02	Painted 12699-02	Painted: 12704-02			
2	Panel, Bottom	S.S.: 126	94-03	S.S.: 12699-03	S.S.: 12704-03			
3	Panel, Left Side	Painted: 1 S.S.: 126	2691-02 91-03	Painted: 12696-02 S.S.: 12696-03	Painted: 12701-02 S.S.: 12701-03			
4	Louver Kit, c/w screws	407	75	4076	4077			
5	Panel, Top	Painted: 12 S.S.: 126	2693-02 93-03	Painted: 12698-02 S.S.: 12698-03	Painted: 12703-02 S.S.: 12703-03			
6	Panel, Right	Painted: 1: S.S.: 126	2692-02 92-03	Painted: 12697-02 S.S.: 12697-03	Painted: 12702-02 S.S.: 12702-03			
7	Panel, Fan Shroud	Painted S.S.: 9	: 3782 9212	Painted: 3783 S.S.: 9213	Painted: 3784 S.S.: 9214			
8	Fan Blade	4022	4023	4024	4025			
9	Fan Guard Kit	Painted S.S.: 9	: 4078 504	Painted: 4079 S.S.: 9505	Painted: 4080 S.S.: 9506			
	208/240V 1PH 60 Hz 480V 1PH 60 Hz		12215 (US Motors)	10388 (Marathon)				
10	208/240/480V 3PH 60 Hz		10562 (US Motors)	10387 (Marathon)				
	600V 3PH 60 Hz		12216 (US Motors)	10672 (Marathon)				
11	Bracket, Motor Mount Right	Painted S.S.: 9	: 3789 9112	Painted: 3789 S.S.: 9112	Painted: 3789 S.S.: 9112			
12	Channel, Motor Mount	Painted S.S.: 9	: 3785 206	Painted: 3786 S.S.: 9207	Painted: 3787 S.S.: 9208			
13	Bracket, Motor Mount Left	Painted S.S.: 9	: 3788 9111	Painted: 3788 S.S.: 9111	Painted: 3788 S.S.: 9111			
14	Coupling, Motor	37	37 (US Motors) 4590 (Baldor & Marathon Motor	-s)			
15	Conduit, Motor	9500 3813 10389						
16	Cover, Thermostat Enclosure	5371						
17	Conduit, Control Enclosure	3813						
18	Conduit, Element Enclosure		Contac	t Factory				
19	Enclosure, Element		9	679				
20	Cover, Element Enclosure	Daintad: 1	3 2605 02	Dointed: 12700.02	Daintad: 1270E 02			
21	Panel, Element Enclosure Guard	S.S.: 126	95-03	S.S.: 12700-03	S.S.: 12705-03			
22	Enclosure, Thermostat		4	983				
23	Thermostat, Built-in kit			-				
24	Contactor		17	-				
25	Transformer		12290 (60 Hz)	11295 (50 Hz)				
27	Bracket, Printed Circuit Board		38	809				
28	Terminal, 6-14 Ga. Screw Lug		18	376				
29	Secondary Thermal Protection Circuit Power Resistor			-				
30	Fuse, Buss MDQ - 1/2 Amp		9	357				
31	Assembly, Printed Circuit Board		3	514				
32	Secondary Thermal Protection Reset		Contac	t Factory				
33	Cover, Control Enclosure		ון	960				
34	Bracket, Above Transformer	-						
35	Thermowell, Ambient High-Limit		9	267				
36 37	High Limit, Ambient Temperature Plug, 1" NPT Explosion Proof		12	- 2169				
38	Temperature High-Limit Kit (N.O.)			-				
39	Temperature High-Limit Kit (N.C.)			-				
40	Bus-Bar, Straight							
41 42	Bus-Bar, Small Curved Bus-Bar, Large Curved		Provided wi	th Core Kits**				
17	Kit DS Accombly			_				
44	Pilot Light Complete		IN-M-PILC	DT-XLSGS-G				
	C 1 ² 1 ³ 1							

Please have model and serial number available before calling

** See technical data table for part numbers. Note: For Items not shown, contact factory.



WARNING

Disconnect heater from power supply at integral disconnect or fuse box before opening enclosures or servicing heater.

IF INTEGRAL DISCONNECT IS BEING SERVICED, verify that power has been disconnected at fuse box or main panel.

1. After repairing any component:

- 1.1 Check that electrical connections are correct and secure (see Figure 9, page 10).
- 1.2 Remove any foreign material from enclosures
- 1.3 Install and secure all covers
- 1.4 Ensure that all fasteners are tight
- 1.5 Remove all foreign objects from heater
- 1.6 Ensure air exits through louvers and fan rotates counterclockwise when viewed from rear of heater (see Figure 14, page 18).

The heater core is vacuum charged and not field repairable.

2. Core

For core removal:

- 2.1 Remove cabinet bottom and element enclosure cover.
- 2.2 Disconnect all wires entering element enclosure (see Figure 10, page 17).
- Slightly loosen all cabinet bolts shown in Figure 10, page 17, to prevent the core from binding.
- 2.4 With an assistant supporting the weight of the core, remove the 3 core mounting bolts.Carefully lower the core out of the cabinet (see Figure 11, page 17).
- 2.5 To return core to factory, use crate supplied with exchange core to protect the element terminals and plate threads.
- 2.6 To reinstall, lift the core up into cabinet while an assistant guides the element wires into the element enclosure conduit.
- 2.7 Position the core and tighten the 3 core mounting bolts. Tighten the remaining cabinet bolts.

Lock the switch in the **"OFF"** (open) position and/or tag the switch to prevent unexpected power application.

This heater should only be serviced by personnel with heating and hazardous location equipment experience.



Figure 10



Figure 11



Figure 12



Figure 13



Figure 14

Motor, Fan, & Fan Guard

3.

- 3.1 Remove bolts holding the motor to the motor mount. On units with a built-in thermostat, remove the bolts on the back of the thermostat enclosure.
- 3.2 Remove conduit #1 located between motor junction box and control enclosure by turning it in the direction illustrated (see Figure 12, page 18). Note that conduits #1 and #2 are not interchangeable and have left hand threads on one end, this end is indicated by a machined groove.
- 3.3 Remove the two-piece fan guard assembly (see Figure 13, page 18).
- 3.4 Lift the motor assembly off the motor mount.
- 3.5 Before removing the fan, measure and record the location of the fan hub on the motor shaft (see Figure 14, page 18). If difficult to remove, use a gear puller on the fan hub.
- 3.6 To reassemble, place motor assembly onto motor mount and fasten the fan guard to cabinet.
- 3.7 Simultaneously engage and tighten both ends of conduit #1 into enclosures. Leave a 1/16" to 3/16" (1.6 to 4.8 mm) gap between the motor and fan guard (see Figure 15, page 19). Adjust conduit #2 to center the fan in the shroud.
- 3.8 To ensure a minimum 5 thread engagement, threaded ends of conduits must protrude a minimum of 1/16" (1.6 mm) into enclosures. The groove on conduit #2 must not be more than 7/8" (22 mm) from motor coupling (see Figure 14, page 18).
- 3.9 Bolt motor to motor mount. Manually spin the fan blade to ensure fan rotates freely.
- 3.10 Air must exit through louvers and fan must rotate counterclockwise when viewed from rear of heater (see Figure 12, page 18).
- Heating Elements
 - 4.1 Heating elements are an integral part of the vacuum charged core. A factory exchange core can be shipped immediately from stock. Refer to 2. Core, page 17 for details.
- 5. Contactor

4

6.

- 5.1 Loosen, but do not remove contactor mounting screws. Slide contactor off mounting screws.
- 5.2 Replace with a factory supplied contactor of the same rating.
- Transformer
 - 6.1 Replace with a factory supplied transformer of the same rating.
 - 6.2 On the new transformer, select primary wires to match heater voltage.
 - 6.3 Ensure that the correct transformer secondary lead is grounded (see Figure 9, page 10). Individually terminate all unused wires using closed end connectors.



Figure 15



Figure 16

- Printed Circuit Board
 - 7.1 After removing the printed circuit board (P.C. Board) bracket assembly from the control enclosure, separate the P.C. Board from the bracket by cutting off the plastic spacers (see Figure 9, page 10).
 - 7.2 Reinstall a new factory supplied P.C. Board onto the mounting bracket, using new nonconducting spacers of the same length. Spacers are supplied with a new P.C. Board. Reinstall the control circuit ground wire to the printed circuit board bracket (see Figure 16, page 19).
- Fuse

9.

- 8.1 Replace fuse with one of the same type and rating as indicated on P.C. Board or refer to parts list. An extra fuse should be stored in the clips marked "SPARE".
- Cabinet panels
 - 9.1 Bolt-on cabinet panels are individually replaceable.

NOTES



NOTES



NOTES



COMMERCIAL WARRANTY

This Warranty (the "Warranty") shall apply to Products (as defined below) sold by Modine Manufacturing Company, a Wisconsin corporation ("Seller") to you ("Buyer").

Seller hereby warrants that during the Applicable Warranty Period (as defined below) its Products shall be free from defects in material and factory workmanship under normal use and service, subject to the EXCLUSIONS described below and according to the terms outlined in this Warranty.

If Seller receives written notice of a breach of this Warranty prior to the end of the Applicable Warranty Period (which such notice shall include the model and serial numbers of the Product, as well as the date and a reasonably detailed description of the Product's alleged failure), Buyer shall with Seller's prior written approval, return the applicable Product or component thereof to Seller with shipping charges prepaid; if upon examination by Seller such Product or component thereof is disclosed to have been defective, then Seller will, without charge to Buyer, at Seller's option, either repair the Product, replace defective parts in the Product, or offer an entire replacement unit of the Product; provided that the warranty period for a Product that has been repaired or provided with replacement parts shall not extend beyond the original Applicable Warranty Period, nor shall any replacement parts provided for a Product be under any warranty beyond the original Applicable Warranty Period for the Product; similarly, if Seller provides an entire replacement unit of the Product, the warranty period for the replacement unit is limited to the remainder of the original Applicable Warranty Period. Seller shall have no responsibility for installation, service, field labor, shipping, handling, or other costs or charges, except as expressly provided in this Warranty. Buyer shall have no remedy hereunder for any defective part returned without proper written authorization from Seller, as described above.

For purposes of this Warranty and subject to the exclusions described below, the term "Products" shall mean parts or equipment manufactured by Seller, sold to Buyer pursuant to a purchase contract between Buyer and Seller (most often initiated by a purchase order issued by Buyer and accepted by Seller), and expressly described in such contract. The term "Products" shall not include third-party parts or equipment furnished by Seller, except that, to the extent assignable. Seller will assign to Buver the benefits (together with all limitations and exclusions) of the thirdparty manufacturer's warranty for such parts or equipment. This Warranty extends only to the original purchase contract between Buyer and Seller and is nontransferable, except that this Warranty may be assigned to an Authorized End User (as defined below). All replaced parts or equipment shall become Seller's property. For purposes of this Warranty, the term "Applicable Warranty Period" shall mean the warranty period set forth in the table below for each type or class of Product described on the table; provided that, when the Product is to be used as a component part of equipment manufactured by Buyer, the Applicable Warranty Period shall be limited to one (1) year after the date of shipment from Seller, notwithstanding anything in the table below to the contrary. For purposes of this Warranty, the term "Authorized End User" shall mean any third-party that purchases the Product directly or indirectly from Buyer for the Authorized End User's own use upon the first installation of the Product and not for resale.

BUYER HEREBY ACKNOWLEDGES THAT ITS REMEDIES FOR BREACH OF THIS WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, ARE LIMITED AS DESCRIBED ABOVE.

EXCLUSIONS AND LIMITATIONS: This Warranty is subject to the following exclusions and limitations:

The term "Products" shall not include and this Warranty shall not apply to any of the following items: refrigerant gas, belts, filters, fuses and other items consumed or worn out by normal wear and tear.

In addition, this Warranty shall not apply to:

(1) Products or components thereof that are damaged or adversely affected by conditions beyond Seller's control, including but not limited to polluted or contaminated or foreign matter contained in the air or water utilized for heat exchanger (condenser) cooling or if the failure of the part is caused by improper air or water supply, or improper or incorrect sizing of power supply;

(2) Any Products or components thereof which have been repaired or altered outside the factory of Seller in any way, or otherwise subject to unauthorized repairs or alterations, so as, in the judgment of Seller, to affect the Product's durability or performance;

(3) Materials or labor of any kind not furnished by Seller, or any charges for any such labor or materials, whether such labor, materials or charges thereon are due to replacement of parts, adjustments, repairs, or any other work done by any party other than Seller;

(4) Labor or other costs incurred for diagnosing, repairing, removing, installing, shipping, servicing, or handling of either defective or replacement parts;

(5) Any Products removed from their original location for reinstallation in another location;

(6) Any Products or components thereof which have been operated, maintained, or serviced contrary to Seller's written installation, operation, and/or servicing instructions or owner's manual;

(7) Damages resulting from operation with an inadequate or interrupted supply of air or water;

(8) Any Products or components thereof which have been subjected to misuse, negligence, faulty installation, improper servicing, accident, excessive thermal shock, excessive humidity, physical damage, impact, abrasion, improper operation, or other operating conditions in excess of or contrary to those for which such equipment was designed;

(9) With respect to gas-fired or oil-fired units, any Products or components thereof if the input to the Product exceeds the rated input (as indicated on the Product's serial plate) by more than five percent (5%);

(10) Any Products or components thereof which, in the judgment of Seller, have been installed in a corrosive atmosphere, marine, or coastal application, subjected to corrosive fluids or gases, or damaged or adversely affected by the effects of the physical or chemical properties of water or steam or other liquids or gases used in the Products or any component thereof;

(11) Damage or failure to start resulting from improper voltage conditions, blown fuses, open circuit breakers, or other

inadequacy or interruption of electrical service or fuel supply; or

(12) Any Products or components thereof from which the serial number has been altered, defaced or removed.

BUYER AGREES THAT THE WARRANTIES AND REMEDIES DESCRIBED HEREIN ARE THE ONLY WARRANTIES AND REMEDIES PROVIDED BY SELLER WITH RESPECT TO THE PRODUCTS AND TO THE MAXIMUM EXTENT PERMITTED UNDER APPLICABLE LAW SHALL BE IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES AND REMEDIES WHATSOEVER, EITHER EXPRESS OR IMPLIED, WHETHER ARISING FROM LAW, COURSE OF DEALING, USAGE OF TRADE, OR OTHERWISE, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT. EACH OF WHICH SELLER HEREBY EXPRESSLY **DISCLAIMS. SELLER NEITHER ASSUMES (NOR HAS** AUTHORIZED ANY PERSON TO ASSUME) ANY OTHER WARRANTY OR LIABILITY IN CONNECTION WITH ANY PRODUCTS. REPRESENATATIONS AND CONDITIONS, EXPRESS OR IMPLIED BY STATUTE, TRADE USAGE, OR OTHERWISE, ARE EXCLUDED AND WILL NOT APPLY TO THE PRODUCTS UNDER THIS WARRANTY, EXCEPT FOR WARRANTIES WHICH BY LAW CANNOT BE EXCLUDED

OR LIMITED. Without limiting the foregoing,

Seller makes no and specifically disclaims all representations and/or warranties that the Products will detect the presence of, or eliminate, prevent, treat, or mitigate the spread, transmission, or outbreak of any pathogen, disease, virus, or other contagion, including but not limited to COVID 19.

BUYER AGREES THAT IN NO EVENT WILL SELLER BE LIABLE FOR COSTS OF PROCESSING, LOST REVENUES OR PROFITS, INJURY TO GOODWILL, OR ANY OTHER SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES OF ANY KIND RESULTING FROM THE PURCHASE OF THE PRODUCTS, OR FROM BUYER'S USE OF ANY PRODUCT, WHETHER ARISING FROM BREACH OF WARRANTY, NONCONFORMITY TO ORDERED SPECIFICATIONS, DELAY IN DELIVERY, OR ANY OTHER LOSS SUSTAINED BY THE BUYER.

OPTIONAL SUPPLEMENTAL WARRANTY

Buyer may purchase from Seller a supplemental warranty with respect to Products which shall extend the Applicable Warranty Period as set forth in the express terms and conditions described in the supplemental warranty agreement. Such supplemental warranty terms may include an additional four (4) years on certain compressors, an additional five (5) years "all parts" warranty, an additional four (4) or nine (9) years on certain heat exchangers, and/or such additional supplemental warranty terms as Seller chooses to make available to its customers from time to time.

			APPLICABLE WARRANTY PERIOD (WHICHEVER OCCURS FIRST)			
COMPONENT	APPLICABLE MODE	LS	Time from Date of First Beneficial Use by Buyer or Authorized End User	Time from Date of Shipment from Seller		
	Gas Fired Unit Heaters with Tubular Style Heat Exchangers (e.g. HD, HDS, PTX, BTX, etc)	Aluminized or Stainless Steel	10 YEARS	126 MONTHS		
	Gas Fired Unit Heaters with Clam-	Aluminized Steel (not in high- h u m i d i t y applications)	10 YEARS (must be Stainless Steel in high-humidity applications)	126 MONTHS		
Heat Exchangers and/or Coils	Shell Style Heat Exchangers (e.g. PDP, BDP, etc.)	Aluminized Steel (in high-humidity applications)	1 YEAR	18 MONTHS		
		Stainless Steel	10 YEARS	126 MONTHS		
	Low Intensity Infrared	Units	5 YEARS	66 MONTHS		
	Indoor and Outdoor Duct Furnaces Steam/Hot Water Units, Oil-Fired U Cassettes, Vertical Unit Ventilators,	and System Units, Inits, Electric Units, Geothermal Units	1 YEAR	18 MONTHS		
Burners and Elements	Low Intensity Infrared	Units	2 YEARS	30 MONTHS		
Burners and Elements	High Intensity Infrared and Electr	ic Infrared Units	1 YEAR	18 MONTHS		
Comprossors	Condensing Units for Ca	ssettes	5 YEARS	66 MONTHS		
Compressors	Vertical Unit Ventilators, Geot	hermal Units	1 YEAR	18 MONTHS		
Sheet Metal Parts	All Products		1 YEAR	18 MONTHS		
Components, excluding Heat Exchangers, Coils, Condensers, Burners, Sheet Metal	All Products		2 YEARS	30 MONTHS		

As Modine Manufacturing Company has a continuous product improvement program, it reserves the right to change design and specifications without notice.



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