SERVICE & INSTALLATION MANUAL

ELECTRIC VAPOR HEATER
CO2, Nitrogen, Argon

6/8KW	CO2	N-204234	(old 1-949-0004)
	N2, Ar	N-340794	
	CO2 Dual	N-350100	
12/16/24KW			
	CO2	N-204235	(old 1-949-0012)
	N2, Ar	N-344644	

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ELECTRIC VAPOR HEATERS
For CO2, N2, Argon service

INDEX

SERVICE & INSTALLATION MANUAL

ELECTRIC VAPOR HEATER

DESCRIPTION

Electric vapor heaters are used to warm cold gases being withdrawn from bulk storage tanks. The system has a maximum design working pressure of 450 psig. A vapor heater is required in commercial installations where cold gases/vapor is withdrawn from the storage tank or an external vaporizer. The function of the vapor or trim heater is to warm cool or cold gases to a suitable temperature for the operation of pressure reducing regulators, low temperature shut-off systems or gas mixers and other equipment that is sensitive to extremely cold temperatures.

This design uses an exposed heating element which can not be used for oxygen or nitrous oxide service.

The carbon dioxide models are manufactured using carbon steel heaters and shells and can operate at temperatures down to -20F. Carbon dioxide vapor at 300 psig 0^oF when expanded to atmospheric pressure will cool down as cold as -80^oF. This cold temperature can cause potential damage or freeze-up of pressure reducing regulators and control valves unless the vapor is properly warmed prior to reaching those devices. Typically, CO_2 vapor is heated to 70^o to 100^oF so that the gas temperature exiting pressure reducing regulators is around 50^oF.

Nitrogen and Argon vapor heaters are generally installed following the ambient vaporizer and ahead of low temperature protective systems that protect the downstream piping from extremely cold temperatures that could result from low ambient temperatures or an excessive consumption rate. The Nitrogen and Argon models are manufactured from stainless steel to protect against inadvertent contact with cold cryogenic liquid conditions.

This manual primarily describes the 6/8KW vapor heater since this is the most popular model.

The basic vapor heater consists of a vertically mounted zinc plated carbon or stainless steel pressure vessel rated for a maximum working pressure of 450 psi. A 2 inch male pipe thread immersion heater is used on the 6/8kW and a 3" 300# flange is used on the 12/16/24kW units. All except the 3&4kW units are designed to operate on 240 or 480V 3 phase electric power. The smaller 6/8kW units will produce 6kW on 240V and 8kW on 480V. They can be rewired to operate on lower voltages and single phase, but will require some modifications. The 12/16/24kW heaters can operate on 240/480V at all three output capacities. They too can be modified to operate on other voltages and on single phase power.

An integral control box is mounted on each heater that includes all the components necessary to safely operate the unit. The control system includes a control transformer with primary and secondary fuses. The installer is responsible for providing a fused disconnect device properly sized to handle the expected electrical load. There is a bi-metallic temperature controller that cycles the contactor on-off based upon the outlet gas temperature. There is a secondary overheat sensor that is factor set to 150F to protect against excessive temperatures. This is a manual reset

device that must cool down and be manually reset the continue operation.

The vapor heater is designed to run unattended and maintain a uniform gas discharge temperature. It will maintain a constant temperature as long as the gas flow rate is below rated capacity. Flow rates in excess of rated capacity will cause the gas discharge temperature to decrease in proportion to the flow.

The vapor heater is maintained in a constant warm condition and may be installed indoors ahead of the pressure reducing manifold or low temperature protection system. Units used in Nitrogen or Argon service may be set at temperatures as low as 0F to prevent wasting energy in cold climates. Most low temperature protection systems are set to close at -20F temperatures.

The pressure vessels are rated for a minimum of 450 psig and are protected with an integral pop type relief valve. The 6/8kW CO2 units are made with carbon steel that is externally zinc plated to protect it from corrosion if mounted outside. Table I shows the specifications of all styles of vapor heaters.

WARNING: These vapor heaters are NOT to be used in Oxygen, Hydrogen, or Nitrous Oxide service. They contain bare heating elements in direct contact with the gas and are NOT to be used on oxidizers or flammable materials.

INSTALLATION

Vapor heaters are typically installed adjacent to the bulk storage tank. The control enclosure on the 6/8KW N-204(S/N 1-949-0004) and 12/24KW (S/N 1-949-0012) are fully gasketed and suitable for outdoor installation.

The 6/8kW vapor heaters are typically installed in a vertical upright position with the electrical enclosure at the top. The 12/16/24kW units are typically horizontal.

Carbon dioxide units should be installed immediately ahead of the pressure reducing regulator. This insures that the cold vapor is warmed sufficiently that the cooling created by the expanding gas will not damage the regulator or cause excessive chilling of the downstream piping.

Nitrogen and Argon units should be installed immediately ahead of the low temperature manifold to warm the process vapor sufficiently to prevent tipping the low temperature protection system either due to low ambient temperature (winter) or surge demands that might cause cold gas to exit the ambient vaporizer. Installing the vapor heater too far away from the low temperature protection may cause the low temperature system to cool at low ambient conditions when there is little or no gas flow.

Mounting brackets are provided with the unit 6/8kW units to allow easy attachment to any vertical wall or solid surface... The 12/16/24 kW unit is designed to bolt to the foundation in a horizontal position. Both designs should be installed allowing sufficient room to remove and replace a damaged heater element.

The vaporizer should be installed in an easily accessible position so that there is proper access to the electrical enclosure. Allow a 3 ft clearance in front of the enclosure to meet NFPA 70 (NEC)

setback requirements. The installer must provide a fused servicing switch within line of sight.

WARNING

The external shell of the vapor heater may reach temperatures in excess of 150oF. Employees should be kept away from direct contact to prevent potential skin burns.

INSTALLATION PROCEDURE:

1. Attach the mounting brackets or legs to a suitable wall or solid surface with the electrical enclosure at a convenient height. The heater outlet should ideally be above the heater and should with the control box towards the top. A fused disconnect panel or circuit breaker should be provided in close proximity to the vapor heater, as required by all local and national electrical codes.

CAUTION

The electrical enclosure does not have an interlock mechanism and must not be opened while the electrical power is on.

2. Connect the inlet and discharge vapor supply connections to the unit using appropriate pressure and temperature rated piping. The inlet piping is closest to the heater element and the outlet is adjacent to the temperature controller. The 6/8kW unit is best installed vertically with the heater element facing downwards. Typical installations use type K silver soldered copper or sch80 steel/stainless steel threaded piping. See CGA G-6.3 for further information on piping for CO2 units. Pressure piping should meet or exceed ASME B31.3 power piping standards.
3. Insulating the discharge piping is optional depending upon ambient temperature conditions and the distance that the warm vapor must travel before entering a climate controlled building. Industrial gases dissipate heat readily and if the piping from the vapor heater is not insulated, the gas farther down the pipe may be close to ambient temperature. All pressure reducing regulators and control devices are typically installed following the vapor heater for CO2 installations. This protects the regulators and piping from extremely low temperatures caused by the expansion cooling. The N2 and Ar models are installed immediately ahead of the low temperature protection device(s).
4. Connect the electrical supply through the 3/4" or 1-1/4” knockouts in the rear of the electrical enclosure to the terminals to the contactor. The electrical supply must be properly labeled as to voltage and must match the characteristics of the vapor heater. Generally the units require 240/480 volt, 3-phase, 60 Hz power. See the appropriate wiring diagram for more specific information. The unit can be operated on single-phase power up to the amperage capacity of the contactor with special wiring for the individual heater elements. The customer must provide a grounded 3 phase power supply with a fuse or circuit breaker protected lockable disconnect means within visual sight of the installed heater to meet local and national electrical codes.

5. Check the control circuit transformer wiring for the proper voltage and wire as per the electrical diagram. Change the primary fuses as required to match the incoming voltage. (See the wiring diagram for details) Most models come wired for 480V service.

6. Set the temperature controller at a setting of approximately 100°F, or whatever temperature is desired. It is recommended that for use with pressure reducing regulators that the gas discharge temperature be a minimum of 70° to 100°F to prevent damage to diaphragms and regulator parts. The range on the temperature controller is 0-400°F and a good starting position on the controller is mid-range. The scale on the controller is not calibrated in an actual temperature range (F or C)

7. Check to make sure that the overheat sensor in the bottom of the electrical enclosure has the reset button properly depressed and set. The sensor will trip at 140°F in case of an overheat condition, and requires a manual reset after the sensor has tripped. A time delay relay in the lower left-hand corner of the enclosure needs to be set for approximately 2 to 4 seconds. The relay is used to delay actuation of the electrical contactor to prevent chattering. There is a narrow band in which the temperature controller may rapidly make and break contact which could cause the contactor to chatter. The time delay relay should be adjusted to prevent the chattering but not cause an excessive delay before energizing.

8. Wire the individual heater elements to the contactor as required by the proper wiring diagram. The 6/8kW units have three individual elements with three sets of colored wires. Each color of wires indicates one individual element. The 12/16/24kW heaters have six individual heater elements with six sets of colored wires.

THERMOSWITCH®

Temperature Controller Installation Instructions

FENWAL®

06-L00110-000
December 2016

ATTENTION: *To ensure safe and proper performance, read these instructions carefully before attempting to install or operate this Fenwal product. Please retain for future reference.*

The shell of each THERMOSWITCH® Controller contains the catalog number, the current rating, the temperature range, and the contact arrangement.

Controllers that are component recognized or listed by Underwriter's Laboratories (UL) or certified by the Canadian Standards Association (CSA) will also bear the symbol of the approving agency. In addition, UL component recognized units with temperature ranges up to 500°F will have a "4" as the first digit of the Catalog Number.

If the fourth digit of the catalog number is "2" or "7" (e.g., 17021, 17071), the controller is compression operated. Compression units that close on temperature rise are recommended if overranging is anticipated. Low temperature units [- 100 to +400°F (-73 to +204°C)] can be overranged to 500°F (260°C) and high temperature units [-100 to +600°F (-73 to +316°C)] overranged to 700°F for intervals not exceeding one hour.

The fifth digit of the catalog number describes whether contacts open or close on temperature rise. If contacts are open on temperature rise, the fifth digit of the number is an even number (17000, 17002, etc.). If contacts close on temperature rise, the fifth digit is an odd number (17021, 17023, etc.).

INSTALLATION

MOUNTING

THERMOSWITCH Controllers are supplied in six basic head configurations - Cartridge, Block Head, Hex Head, Coupling Head, Junction Box, and Circular Flange. See Figure 1.

To avoid restricting shell expansion when making installations in solid metal blocks, a 0.625 in. diameter reamed hole for 5/8 in. standard units or a 0.812 in. diameter reamed hole for 13/16 in. heavy duty units is recommended. See the following specific controller style listing for additional installation instructions.

Cartridge (Style 1) - Hole should have a short spline to receive the 0.125 in. diameter locating pin. This prevents the unit from rotating when the adjusting sleeve is turned. The cartridge style may be used for surface control if inserted into a Fenwal surface mounting well (Cat. No. 11100-2).

Block Head (Style 2) - Mounted in a similar manner to the cartridge type. If the unit is to be inserted into a reamed hole, mount two short pins on either side of the hole. The pins should rest against the sides of the block head to prevent rotation of the unit.

Hex and Coupling Head (Styles 3 and 4) - Installed like any pipe fitting. If installed in a pipe tee, the tee should be large enough to allow adequate circulation of the fluid around the temperature-sensitive section of the controller. See Table 1 for maximum torque values.

Junction Box (Style 6) - Junction box includes a 5/8 inch knock-out that is suitable for a variety of connection methods (conduit, flexible conduit, cable gland, etc.). The connection lead wire shall be 18AWG, 120/240 Vac, stranded, and include proper agency ratings. Installation must comply with all national and local wiring methods.

Circular Flange (Style 5) - Three holes in flange allow easy mounting on any flat surface.

CAUTION **Excessive torque applied to units may change temperature settings.**

Table 1:

THERMOSWITCH Controller	Maximum Torque
Standard (5/8 in. diameter)	35 ft·lb* (47.5 N·m)
Heavy Duty (13/16 in. diameter)	70 ft·lb** (94.9 N·m)
*4 ft·lb (5.4 N·m) when Teflon tape lubricant is used. **8 ft·lb (10.8 N·m) when Teflon tape lubricant is used.	

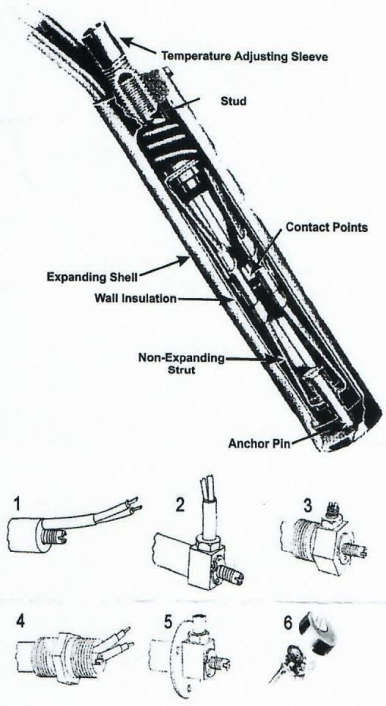

Figure 1. Head Configurations

WIRING

Connect controller leads in series with the load and power supply.

TESTING AND ADJUSTMENT

The arrow on the head of the controller indicates the direction to turn the adjusting screw to increase the temperature setting. Each full turn of the adjusting sleeve will change the temperature the approximate amount shown in Table 2.

After the controller has been installed, allow the controller to operate for several cycles to permit the controlled system to stabilize. Then adjust to the desired temperature. Check the setting by cooling the system to ambient temperature, reheating it, and rechecking the temperature. Where extremely accurate control is desired, several adjustments may be necessary. However, once adjusted, the accuracy of the setting will be maintained unless it is changed due to unforeseen reasons or deliberately.

TESTING TEMPERATURE SET POINT

The set point temperature is the temperature at which the contacts on a THERMOSWITCH Controller just "make" (close). All controllers are set at room temperature [75± 15°F (24 ±8°C)] unless ordered with a specific factory setting (MOD 3).

Testing the temperature set point in an application, under conditions where the heat source is remotely located from the controller, or when ambient temperature conditions are far below or above 75°F (24°C), may give misleading results. In some cases, this has led to rejection of controllers that were within proper setting tolerance. If you require temperature set point testing, Fenwal recommends that Model 80001-0 Test Kit. If you choose to build your own test equipment, we recommend that you contact your Fenwal representative for guidance in setting up a good thermal test system.

Table 2:

Tension Operated		Compression Operated	
Catalog Number	**Approx. °F per Full Turn of Adj Sleeve**	**Catalog Number**	**Approx. °F Per Full Turn of Adj Sleeve**
17000 to 17352	80-115	17021 to 17323	70-100
17800	125	17821	75
17802	160	17823	90
18000 to 18002	80-100	18021 to 18023	75-90

TENSION OR COMPRESSION OPERATED CONTROLLERS CAUTION STATEMENTS

CAUTION

- **Certain gases and liquids (including water at elevated temperature) could be corrosive and/or cause electrolytic action which could severely shorten life of controller. Rate of corrosion or electrolysis is influenced by many system parameters such as chemical makeup, temperature of solution, stray electrical currents, etc. Consult supplier of your chemicals or Fenwal for application suggestions. Also, note that Fenwal offers various platings and Type 321 Stainless steel, heliarc welded thermowells for added protection.**
- **Be sure that there is sufficient but not excessive room for the installed controller to expand in diameter and length.**
- **Insulate head of controller when large ambient temperature variations may occur. This precaution is not necessary on junction box type controllers (Series 17800).**
- **DO NOT immerse controller into liquids or gases unless it was specified for that job.**
- **DO NOT seal controller head with silicone materials.**
- **DO NOT thermally shield controller from medium being controlled.**
- **DO NOT remove adjusting sleeve or turn it in farther than necessary for desired operation. This action may permanently damage controller.**
- **DO NOT oil controller. Oil around adjusting sleeve will flow inside controller, contaminating contacts.**
- **DO NOT handle unit with pliers or force it into position either by hand or with tools.**
- **DO NOT subject shell of controller to deformation.**

TENSION OPERATED CONTROLLERS

Tension operated THERMOSWITCH controllers are identified by having a number other than 2 or 7 as the fourth digit of their Catalog Number.

Applying excess tension on the element of a tension operated controller may permanently warp the element, and in extreme cases, tear the anchor pin loose. To avoid over-tension, pay close attention to the following cautions:

CAUTION

- **Do not expose controller to temperatures above its upper range limit.**
- **Do not expose controller to more than 100°F (55°C) above its calibration point. Therefore, pretest controller to approximate required elevate temperature before inserting it into the process. Preset by turning adjusting sleeve in direction of arrow on head of controller. See Table 2.**
- **If necessary to decrease temperature of a tension operated controller in a heated system, it may be necessary to do this in several increments. Do not turn adjusting sleeve to achieve more than 100°F (55°C) temperature drop at a time. Wait until controller stabilizes (begins to cycle). Then repeat until desired setting is reached.**

COMPRESSION OPERATED CONTROLLERS

Compression operated THERMOSWITCH controllers are identified by having a 2 or 7 as the fourth digit of their Catalog Number. Applying excess compression on the element of a compression operated controller may result in warping or crushing it.

To avoid over-compression, pay close attention to the following cautions:

CAUTION

- **When rotating adjusting sleeve, do not exceed upper range limit of controller.**
- **When removing controller from a heated system, never plunge it into a colder medium or use an air blast for rapid cooling.**
- **DO NOT exceed the ratings indicated on the controller shell.**

CAUTION **DO NOT exceed the ratings indicated on the controller shell.**

Capacitors are not required under average conditions. However, for smoother control at small loads or to prevent contact bounce due to vibration, the capacitance listed in Table 3 is recommended.

Wire capacitors in parallel with controller lead connections. use capacitors rated for a minimum of 600 VDC with 120 VAC circuits and a minimum of 1000 VDC for 240 VDC circuits.

Table 3:

Voltage	Service	Capacitance (µF) (nonpolarized)
120 VAC	Resistance	None Required
240 VAC	Resistance	0.1
120 VAC	Relays	0.001 to 0.01
240 VAC	Relays	0.001 to 0.01
15-25 VAC	Relays	0.02
120 VAC	Motor	Use Relay
240 VAC	Motor	Use Relay

FENWAL CONTROLS

06-L00110-000 Rev AC ©2016 Kidde-Fenwal, Inc.

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MAINTENANCE

Very little routine maintenance is required on the vapor heaters. They are designed to operate independently with little maintenance required.

The units should be checked daily to make sure that it is functioning properly, and that warm gas is exiting. The pressure relief valve on the unit should be checked a minimum of once every two years to insure that it is properly functioning and not obstructed. The pop type relief valves may continue to weep if ever actuated. They typically must be replaced if they fail to reseat.

The contactor should be inspected every six months for evidence of pitting or contact damage.

Service technicians should be trained in the properties of carbon dioxide and not do electrical troubleshooting without being adequately trained.

OPERATING PROCEDURE

START-UP -- ALL VALVES CLOSED

1. Inspect all inlet and discharge piping to see that all piping is properly connected. Open the vapor supply valve and allow the vapor heater to pressurize. Check for leaks.

2. Check the control circuit transformer and heater elements for proper wiring as per the wiring diagram.

3. Check the electrical disconnect to make sure it is properly fused for the load required.

4. Set the temperature control switch in the middle of the range. Normal desired temperature range is 70^{o} to 100^{o}F for CO2 units and >0F for Nitrogen and Argon units.

5. Energize the vapor heater. Allow the vapor heater to cycle a few times to insure that the temperature controller, contactor, and time delaying relay are working correctly. Those units that contain the time delay relay should be set so that there is a minimum time delay before the contactor energizes but no so short as to cause the contactor to chatter. This is typically between 2 to 4 seconds delay. If the contactor chatters during operation, increase the time delay slightly.

6. Check for proper operation of the overheat sensor on those units that have them, by turning the temperature controller up to the maximum. The vapor heater shell should warm up to approximately 140^{o}F and trip the overheat sensor. Reset the temperature controller for the proper operating range and push the manual reset button. The vapor heater should then be left energized to automatically cycle as required to deliver warm vapor.

CAUTION	Never attempt to adjust or repair the electrical controls without disconnecting and locking out the power supply using an approved Lock-Out Tag-Out procedure. (LOTO)

SHUT-DOWN PROCEDURE

1. Turn off the electrical supply power by opening the electrical disconnect switch. Verify that there is no voltage potential on the controls prior to performing any electrical maintenance or repairs.

2. Close the valve between the storage tank and the vapor heater inlet. The vapor heater maybe left pressurized if desired.

3. Use Lock Out Tag Out (LOTO) procedures prior to opening or removing the vapor heater.

NOTE	The vapor heaters can be left on idle indefinitely with no gas usage. The heater elements will cycle off and on as required to maintain the set point temperature inside the heater.

VAPOR HEATER TROUBLE SHOOTING

SYMPTOM	PROBABLE CAUSE	REMEDY
Heater not energizing	Electrical power failure.	Turn disconnect switch on. Replace blown line fuses or circuit breaker. Replace blown transformer fuse(s).
	Overheat sensor actuated.	Reset sensor and check temperature switch operation.
	Contactor coil burned out.	Replace defective contactor.
	Temperature switch broken.	Replace switch and adjust to 70^{o} to 100^{o}F.
	Heater elements burned.	Replace defective heaters.
Cool gas exiting heater	Temperature switch adjusted too low.	Readjust to 70^{o} to 100^{o}F; middle of scale. Replace defective switch.
	Excessive vapor withdrawal.	Replace with a larger heater.
	One or more heater elements malfunctioning.	Check heater wiring. Replace defective heater elements.
	Low or improper voltage.	Check voltage and heater wiring.
Contactor chattering	Time delay relay set too short.	Adjust relay to 2 - 4 second delay or replace. NOTE: Pre 1993 units may need to install time delay relays for best operation.
Contactor arcing excessively	Contacts pitted.	Replace contactor.

SPARE PARTS LIST

6/8kW 340794 N_2, Ar			
6/8kW 204234 (1-949-0004) CO_2 350100 CO_2			
Description	Item No Fig1	Stock No.	Old Part No.
Heater Element, 6/8KW (steel-CO_2)	1A	204860	7-916-0017
Heater Element, 6/8KW (Stainless-N_2 Ar)	1B	340835	--
Temperature Controller	2	204176	1-050-0125
Relief Valve, 1/2", 450 psi	3	204213	1-016-0753
Control Box	4	205266	8-910-0024
Overheat Sensor, 140^{o}F Manual Reset	5	205171	7-950-0012
Wiring Diagram	6	205027	7-936-0093
Contactor, 30A	7	204497	5-017-0241
Transformer Control Circuit 240/480V-120 75VA	8	204505	5-020-0104
Timer OFF Delay (set 4 seconds)	9	204905	7-919-0023
Fuse, 8/10A (120) Buss FRN	10	350113	--
Fuse, 1/2A (480) Buss FRN-R (2x)	11	350116	--
Fuse 1.5A (240) Buss FRN-R (2x)	12	350114	--
	13		

12/16/24 kW 344644 N_2, Ar			
12/16/24kW 204235 S/N (1-949-0012) CO_2			
Description	Item No Fig1	Stock No.	Old Part No.
Heater Element, 12/16/24kW	1	27-131	--
Temperature Controller	2	27-084	1-050-0125
Relief Valve, 1/2", 450 psi	3	204213	1-016-0753
Control Box	4	27-045	
Overheat Sensor, 140^{o}F Manual Reset	5	N-205171	7-950-0012
Wiring Diagram	6	205028	7-936-0094
Contactor, 60A	7	570360A	5-017-0300
Transformer Control Circuit 240/480V-120 75VA	8	204505	5-020-0104
Timer OFF Delay (set 4 seconds)	9	204905	7-919-0023
Fuse, 8/10A (120) Buss FRN	10	350113	--
Fuse, 1/2A (480) Buss FRN-R (2x)	11	350116	--
Fuse, 1.5A (240) Buss FRN-R (2x)	12	350114	--

VAPOR HEATER SPECIFICATIONS

	6/8KW	12/16/24KW			
Part Number	N-204234	N-204235			
Stock No.	1-949-0004	1-949-0012			
Height	37"	28"			
Width	15"	48"			
Depth	15"	11-1/2"			
Gas Inlet	1"FPT front	1-1/2"Mueller Flange Rear			
Gas Outlet	1"FPT top	1-1/2"Mueller Flange Rear			
MAWP	450 psig	450 psig			
Overheat Sensor	140°F manual reset	140°F manual reset			
Temperature Range	-100° to 600°F	-100° to 600°F			
Electrical Requirements	240/480V 3-phase	240/480V 3-phase			
240V Electrical Amps	14.4A	12KW 16KW 24KW	28.8A 38.5A 47.7A		
480V Electrical Amps	9.6A	12KW 16KW 24KW	14.4A 19.2A 28.8A		
Delay Relay	1/2 - 10 sec	1/2 - 10 sec			
Electrical Enclosure	Nema-4 outdoor	Nema-4 outdoor			

CO_2 CAPACITY CALCULATIONS

The vapor heater capacity is determined by the heating element power output, gas flow rate, and the desired temperature differential. The following equations can be used to approximate the vapor heater capacity for carbon dioxide.

For example, 8KW @ 480V with a 100º differential (0º to 100ºF)

6/8kW CO2 Vapor Heater 204234

TEMPERATURE RANGE	6KW 240V	8KW 480V
0º to 40ºF	1,700 lbs/hr	2,280 lbs/hr
0º to 70ºF	1,025 lbs/hr	1,360 lbs/hr
0º to 120ºF	620 lbs/hr	830 lbs/hr

6/8kW N2, Ar Vapor Heater 340794

TEMPERATURE RANGE	6KW 240V	8KW 480V
0º to 40ºF	ft3/hr	ft3/hr
0º to 70ºF	15,900 ft3/hr	21,100 ft3/hr
0º to 120ºF	ft3/hr	ft3/hr

12/16/24kW CO2 Vapor Heater 204235

TEMPERATURE RANGE	12KW	16KW	24KW
0º to 40ºF	3,400 lbs/hr	4,500 lbs/hr	6,800 lbs/hr
0º to 70ºF	2,054 lbs/hr	2,700 lbs/hr	4,100 lbs/hr
0º to 120ºF	1,240 lbs/hr	1,650 lbs/hr	2,480 lbs/hr