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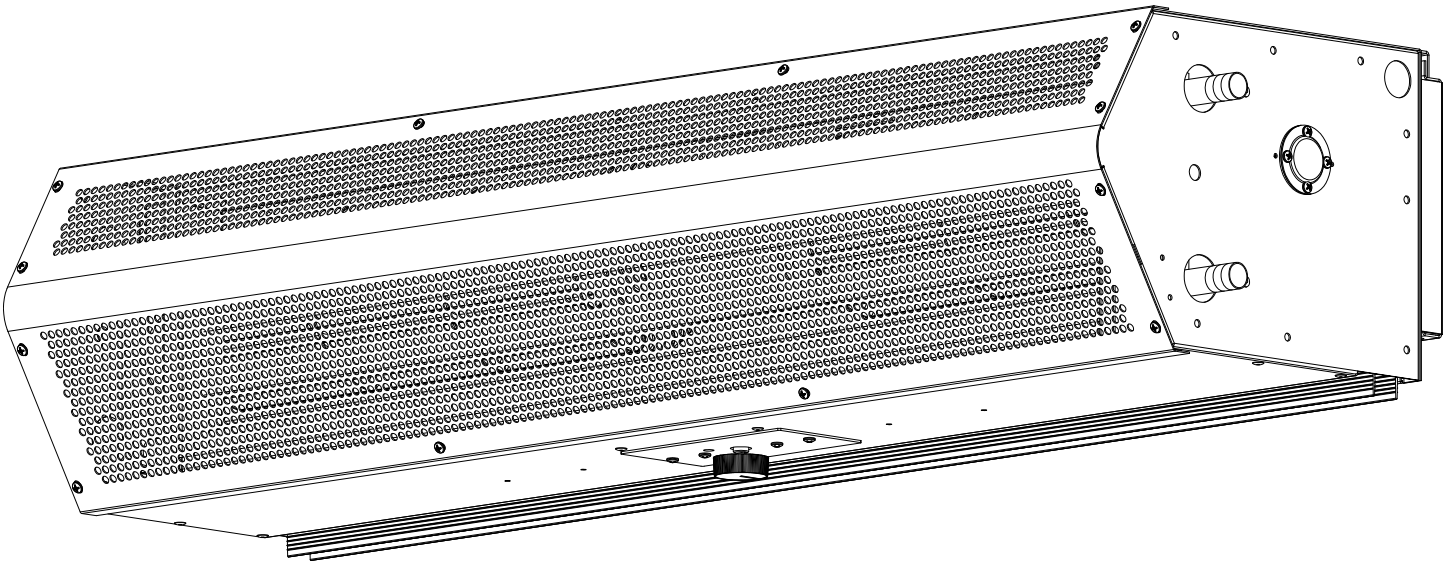
LPV2 Hot Water/Steam Heated Series 2

LoPro Series 2
Air Curtain
Submittal Package



Submitted by:

Mars Air Systems, LLC
14716 S. Broadway
Gardena, CA 90248

Project Name	
P.O.#	
S.Q.	
Company	
Print Name	
Signature	
Date	

(Electronic Signature Preferred)

Company Seal or Stamp

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Model Lengths: 25”–144”
Environmental Separation (up to 8’)
Insect Control (up to 7’)

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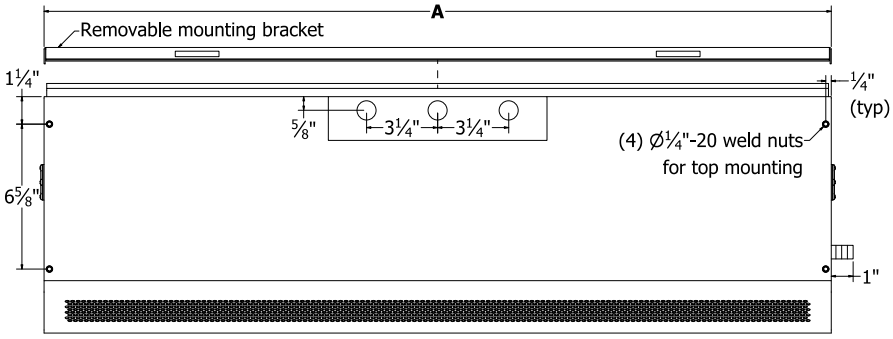
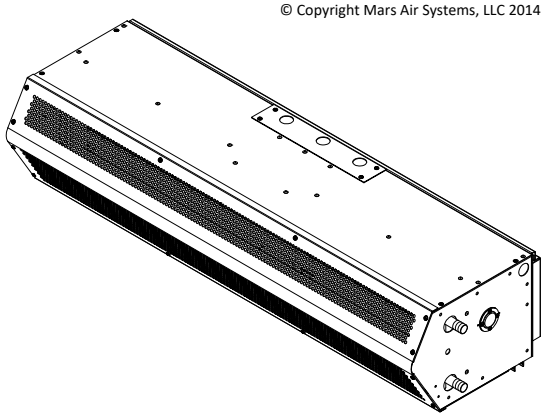
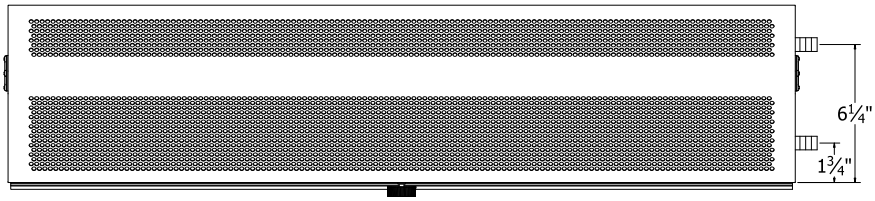
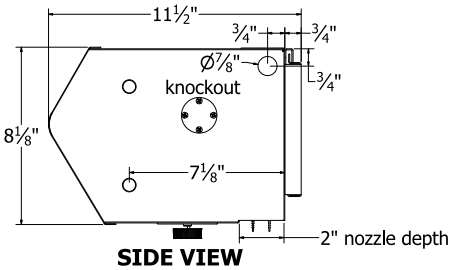


TOP VIEW

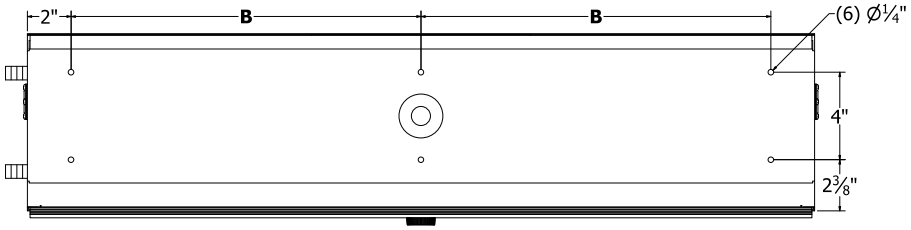




FRONT VIEW



SIDE VIEW



REAR VIEW

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Notes:

1. Recommended service clearances are 12” to the left and right sides, 24” on top, and 24” in front of the unit.
2. Circuit protection (per NEC) to be installed by others.
3. To prevent accidental damage during operation, unit must be installed so that the bottom of the air curtain does not extend below the door header.
4. Units up to 72” in width can be fastened to wall on both ends without intermediate support. Longer units are double units joined by a 2” mounting bracket and must be supported in the center.

Model Number	Mechanical Data					Lab Data	
	Overall Length A (in)	Nozzle Length (in)	Rear Mounting Distance B (in)	Motor (hp)	Weight (lb)	Max Velocity (fpm)	Max Volume (cfm)
☐ LPV225-1V*-OB	36	36	16	1/6	40	1800	900
☐ LPV236-1V*-OB	42	42	19	1/6	45	1800	1050
☐ LPV242-1V*-OB	48	48	22	1/6	52	1800	1200
☐ LPV248-1V*-OB	60	60	28	1/6	60	1800	1500
☐ LPV260-1V*-OB	72	72	34	1/6	75	1800	1800
☐ LPV272-1V*-OB	86	86	19	(2) 1/6	90	1800	2100
☐ LPV284-2V*-OB	98	98	22	(2) 1/6	104	1800	2400
☐ LPV296-2V*-OB	110	110	25	(2) 1/6	112	1800	2700
☐ LPV2108-2V*-OB	122	122	28	(2) 1/6	120	1800	3000
☐ LPV2120-2V*-OB	146	146	34	(2) 1/6	150	1800	3600

*** – Use corresponding letters in “Electrical Data” column headers (see page 2) to complete the model numbers.**

Note: above data is for 60 Hz at 1550 RPM. For 50 Hz, RPM is 1300 with a 17% reduction in performance.

LPV2 (Low Profile Variable Speed 2) Series

Hot Water/Steam Heated
Model Lengths: 25”–144”
Environmental Separation (up to 8’)
Insect Control (up to 7’)

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Standard Features:

Air Curtain

- ETL-certified to conform to UL 1995 (US) and CSA 22.2 (Canada) standards for indoor use
- Sleek self-contained one-piece heavy-gauge corrosion-proof paint lock metal design
- Fire retardant and rust preventative electrostatic polyurethane powder coating
  - Standard color is Obsidian Black (OB)
- 1/6 HP continuous duty motors (NEMA 1)
- Adjustable air directional vane with 40° sweep front to back
- Removable wall mounting bracket for easy installation
- 18-months parts warranty
- Freight included (FOB continental USA)
- Proudly made in the USA

Coil Data	Hot Water				Steam		
	Coil Code (V)	GPM	MBH	Temp Rise (°F)	Coil Code (V)	MBH	Temp Rise (°F)
☐ LPV236-1V*-OB	1 Row	6	25	26	1 Row	26	37
☐ LPV242-1V*-OB	1 Row	6	30	26	1 Row	43	38
☐ LPV248-1V*-OB	1 Row	6	34	26	1 Row	49	38
☐ LPV260-1V*-OB	1 Row	7	44	27	1 Row	62	38
☐ LPV272-2V*-OB	1 Row	8	54	28	1 Row	76	39
☐ LPV284-2V*-OB	1 Row	12	60	26	1 Row	85	38
☐ LPV296-2V*-OB	1 Row	12	68	26	1 Row	99	38
☐ LPV2108-2V*-OB	1 Row	13	78	26	1 Row	112	38
☐ LPV2120-2V*-OB	1 Row	14	88	27	1 Row	125	39
☐ LPV2144-2V*-OB	1 Row	16	108	27	1 Row	151	39

* - Use corresponding letters in “Voltage Code” column headers to complete the model numbers.
EAT: 70 F, EWT: 200 F, Steam pressure: 5 PSI

Hot Water and Steam Coils

- Coil casings shall not be less than 16-gauge galvanized steel with tube holes formed with extruded collars
- Fins are die formed 0.006” aluminum (1 row – 10 FPI)
- Coil tubes constructed of heavy wall, 5/8” OD seamless copper
- Coil tubes are mechanically expanded into fins to ensure a uniform pressure bond
- Manifolds shall be of heavy seamless copper construction
- All joints shall be brazed with high temperature silver brazing alloy (7%), max steam operating pressure: 30 PSI
- Fittings shall be of wrought copper or similar construction such that the entire fluid circuit shall be of compatible nonferrous materials
- Manifold shall be fitted with 1/4” vent or drain fittings
- Supply and Return fitting is to be on the righthand side (specify alternate location)

Electrical Data Full Load Amp (FLA)	Unit Voltage (Voltage Code)	
	115V/1Ø ☐ (A)	208-230V/1Ø ☐ (D)
☐ LPV236-1V*-OB	2.4	1.2
☐ LPV242-1V*-OB	2.4	1.2
☐ LPV248-1V*-OB	2.4	1.2
☐ LPV260-1V*-OB	2.6	1.4
☐ LPV272-1V*-OB	2.6	1.4
☐ LPV284-2V*-OB	4.8	2.4
☐ LPV296-2V*-OB	4.8	2.4
☐ LPV2108-2V*-OB	5.0	2.6
☐ LPV2120-2V*-OB	5.2	2.8
☐ LPV2144-2V*-OB	5.2	2.8

* – Use corresponding letters in “Voltage Code” column headers to complete the model numbers.

Ampacity (MCA) = total FLA X 1.25

Alternate voltage codes with FLA data:
·220V/1Ø/50Hz (U) – 0.9A per motor

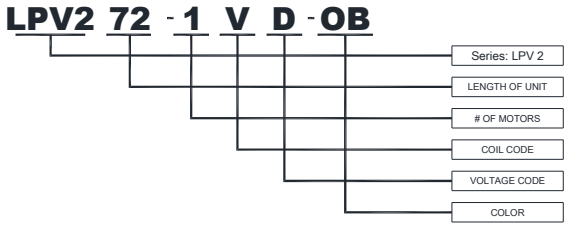
Mars Recommended Accessories (see catalog for complete listing):

- Door Limit Switches (§)
  - ☐ 99-014, Combination mechanical switch, 250V, 1HP Max
- Solid State Controllers (§)
  - ☐ J0021, Commercial low voltage controller, 115V, 1Ø, adjustable time delay, with commercial plastic surface mounted door limit switch (field installed)
  - ☐ J0022, Commercial low voltage controller, 208-277V, 1Ø, adjustable time delay, with commercial plastic surface mounted door limit switch (field installed)
- Thermostats (§)
  - ☐ 99-063, Thermostat, line voltage up to 250V max, single stage, single pole
- Brackets (§)
  - ☐ B0042, Transom mounting bracket set for LPV2

(§) = Shipped loose

Sound Levels (measured at 10’ in a free field):
25-36” Units = 49 dBA, 42” Unit = 50 dBA, 60-96” Units = 53 dBA, 108-144” Unit = 54 dBA

EXAMPLE



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NOTE: Mars Air Systems, LLC reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions, or replacements for previously purchased equipment.

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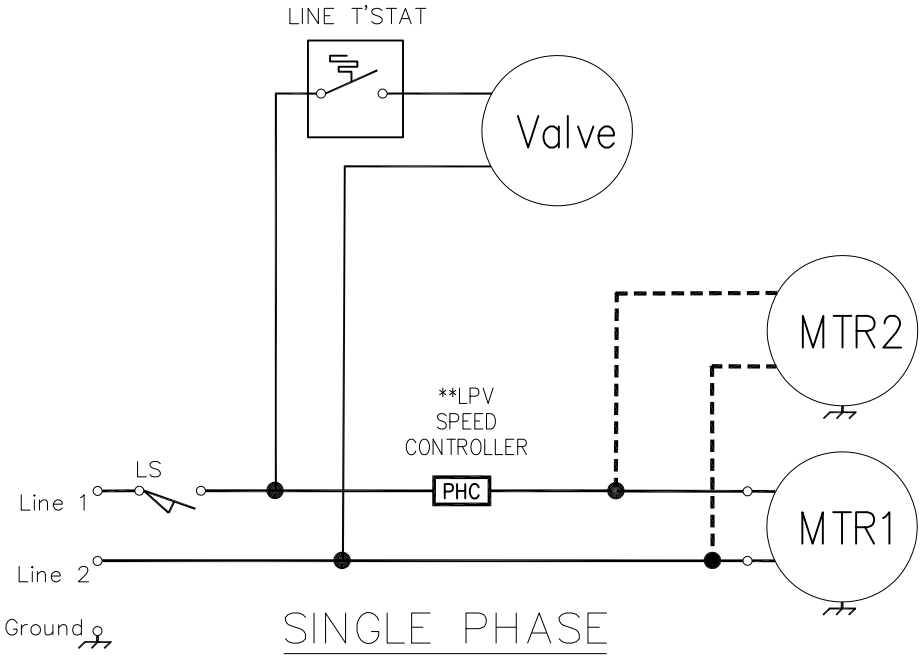
PROJECT				OPTIONS/ITEMS
TITLE				
COMMENTS			DATE 12/1/16	PAGE
			REV. NO 1	
MODEL NO. Series 2	DRAWING NO. TYPICAL–HW–S Heated	DRAWN BY NT	CHECKED BY	FILE NAME

TYPICAL Hot Water/Steam HEATED DIAGRAMS



SINGLE PHASE

**Speed Controller applicable only for LP series

120/208–240/277v Single Phase Motor

1/6 H.P. Use 15A Micro Switch
1/2 H.P. Use 15A Micro Switch
1 H.P. Use 20A Micro Switch

120/208–240/277v Single Phase Motor

Larger than 1 H.P. Use Contactor and
15A Micro Switch

Typical Single Phase Motor Terminal Connections:
For 1/2 HP: <1> is Common for 115V
<1> is Hot for 208/230V
<2> is Low Speed
<3> is High Speed
<4> is Ground
<5> is Medium Speed
For 1 HP: <1> is Common for 115V, 208/230V
<2> is High Speed
<3> is Low Speed
<4> is Ground

Notes: This wiring diagram is applicable for Single Phase motors as follows:
LPV2: Up to 3 motors
STD2: Up to 2 motors
HV2: 1 motor

*See Door Limit Switch submittal for additional switch info

S Y M B O L S

LS – Micro Switch
M – Contactor or Motor Starter
MC – Contactor Coil
T – Control Transformer
PHC – Speed Controller (LPV series only)

Thermostats

Line voltage to low voltage Models

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Thermostats

Thermostat Part #	Description	Applicable Air Curtain Series
99-063	Thermostat, 801, Line Voltage, Up to 250V, Analog, Single Stage, Single Pole	All Hot Water / Steam
99-064	Thermostat, 802, Line Voltage, Up to 250V, Analog, Two Stage, Double Pole	WM/BD Electric
99-264	Thermostat, 9200H, 24 Volt, Digital, Single Pole, R.G.W.Y.B.O.	Elec LPV2, STD2, HV2, EP2, PH & All Gas Fired
99-263	Thermostat, RS4110, 24 Volt, Digital, Single Pole, R.G.W.Y.B.O., Battery Power	Elec LPV2, STD2, HV2, EP2, PH & All Gas Fired

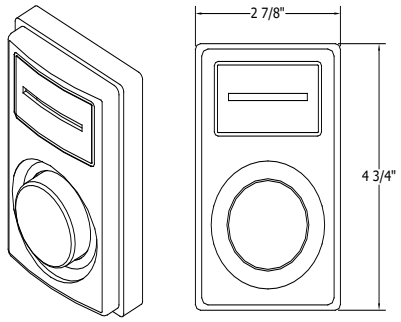
Features:
- Allows automatic control of heated air
- Remote mounted (field installed by others)
- Temperature range from 50F to 90F
- Regulates the heat near the air curtain
- Analog Bimetal Temperature Sensing
- Thermostats are UR (UL Recognized)
- 1 year warranty

Line Voltage (99-063, 99-064)
- Applicable for all Hot Water/Steam Heated and WM/BD Electric models
- Single Stage, Single Pole (99-063) or Double Stage, Double pole (99-064), up to 250V
- Remote Wall Mounted by others
- Requires Junction Box (J-Box field supplied and installed)

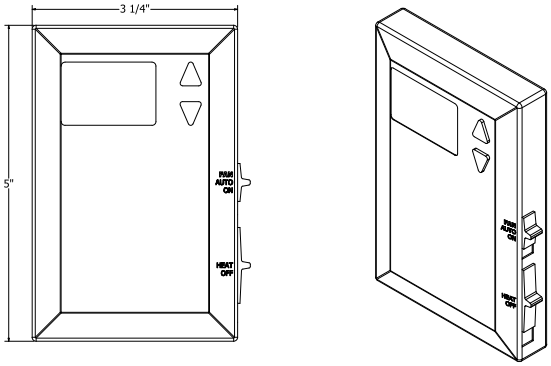
Low voltage (99-264, 99-263)
- Applicable for STD2, HV2, EP2, PH Electric models and for all Gas Heated models
  - Included with STD2, HV2, EP2, PH Electric models
- Low voltage (24V) control
- Fan and Heat Control Switch
- Remote Wall Mounted by others

*Do not mount low voltage thermostat greater than 30ft from the air curtain. Mounting the low voltage thermostat too far from the air curtain may cause a voltage drop and cause chattering.

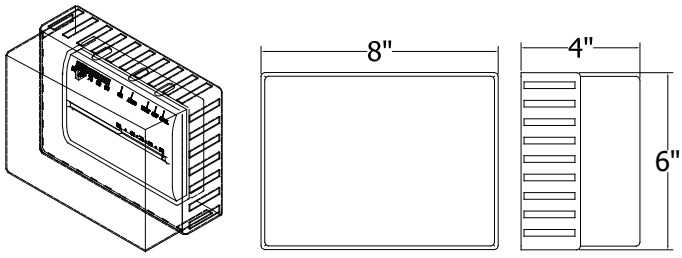
Options and Accessories:
- 2 Stage Line Voltage Thermostat
- Digital Programmable Low Voltage Thermostat
- Digital Low Voltage Thermostat with Battery Backup
- Factory Wired and Installed Thermostat
- Lockable clear cover



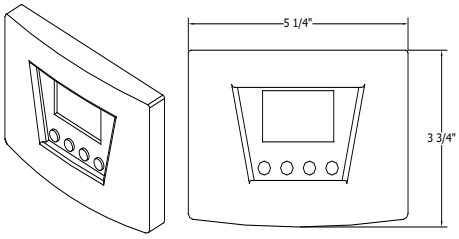
99-063 – Thermostat, 801, Line Voltage, Single Stage, Single Pole



99-264 – Thermostat, 24 Volt, Digital, Single Stage, R.G.W.Y.B.O.



99-182 - Cover, Lockable, Clear



99-263 – Thermostat, 24 Volt, Digital, Single Stage., R.G.W.Y.B.O., Battery Power

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Document No: ACC-IOM
Date: 04/13/2013

ACCESSORY INSTALLATION SUPPLEMENT

Door Limit and Magnetic Reed Switches

1. Mars door limit and magnetic reed switches are available with NEMA 1, 4X and 7 ratings. Contact the factory for additional ratings and details. (See FIG. 1 for typical single swing, hinged door type, door limit switch installation)

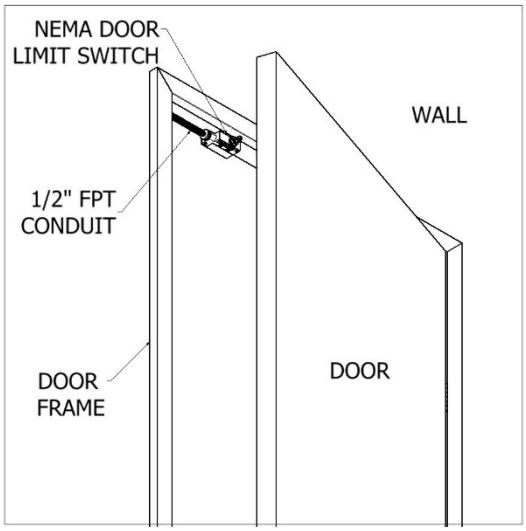

FIG. 1

2. Use light gauge materials when field fabricating brackets to activate and deactivate the door limit switch(s). (FIG. 2) Figure 2 also shows the typical installation of the combination plunger/roller type NEMA 1 door limit switch, for all non-hinged style doors.

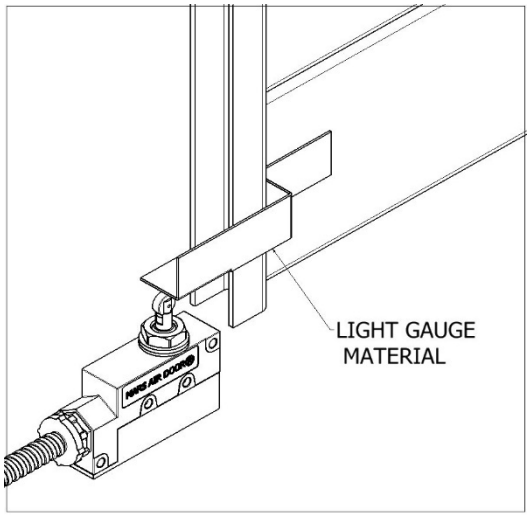

FIG. 2

3. All wiring must be per local and NEC (National Electric Code) codes.

4. Panels or controllers may be required. Refer to wiring diagram inside the control panel box.

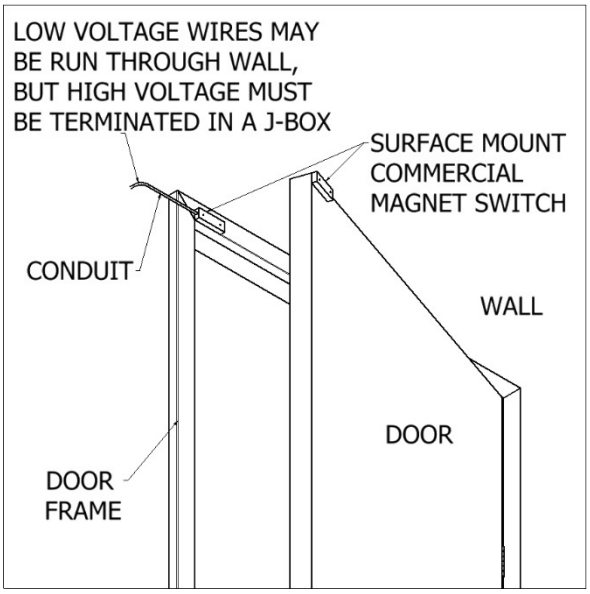

FIG. 3

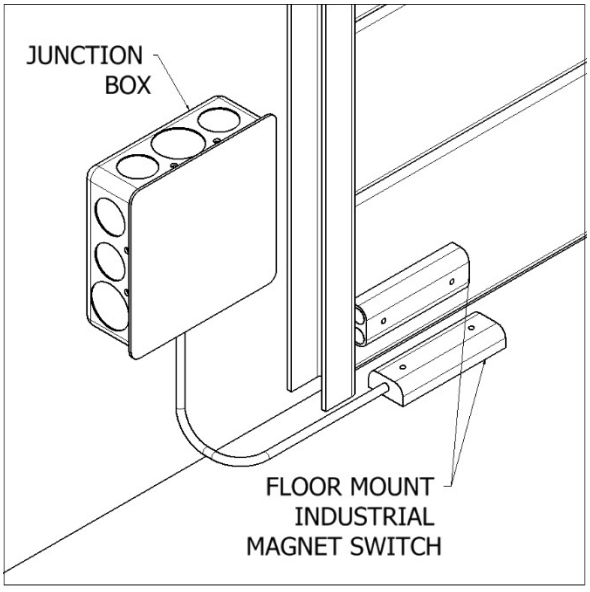

FIG. 4

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Bracket Installation

1. Side Extension Plates: For doorways wider than the air curtain, use combination of Side Extension Plates and Adjustable Mounting Brackets. (FIG. 5)

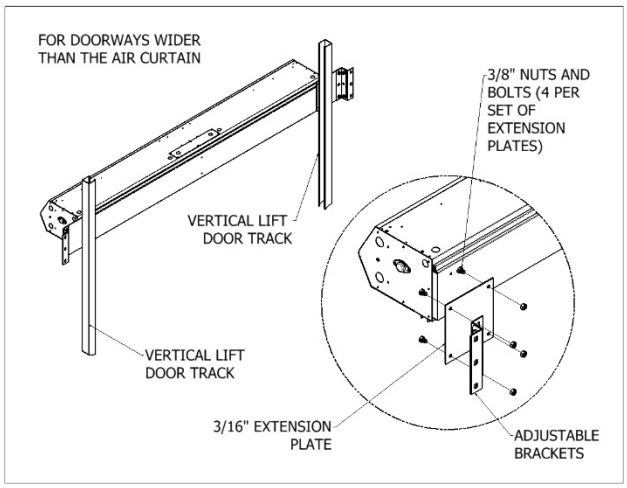

FIG. 5 (LPV SHOWN)

2. Adjustable Mounting Brackets: For installation of air curtain over drum-style roll-up door, use Extended Wall Mounting Brackets. (FIG. 6)

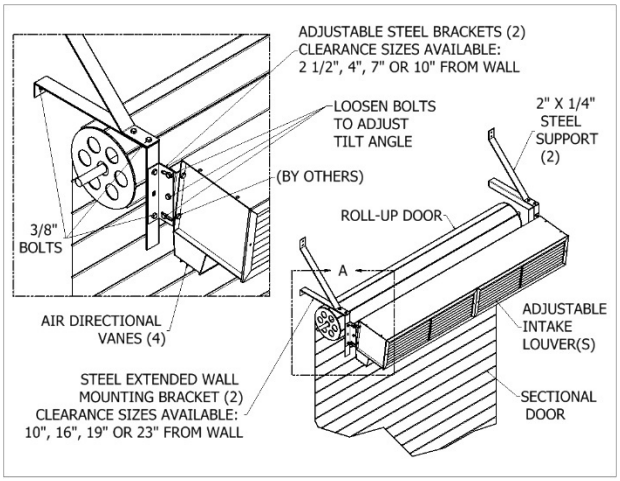

FIG. 6 (STD SHOWN)

3. Extended Wall Mounting: For Tandem Mounting of air curtain over sectional style door, use either wall mounting angle brackets or threaded rods.

4. Top Mounting Brackets: For overhead installation of units, use in conjunction with the threaded holes provided on top of unit.

Note: Angle brackets, threaded rods and I Beams are provided by others. (FIGS. 7 & 8) All optional brackets are not available for WMI/WMH and BD Series.

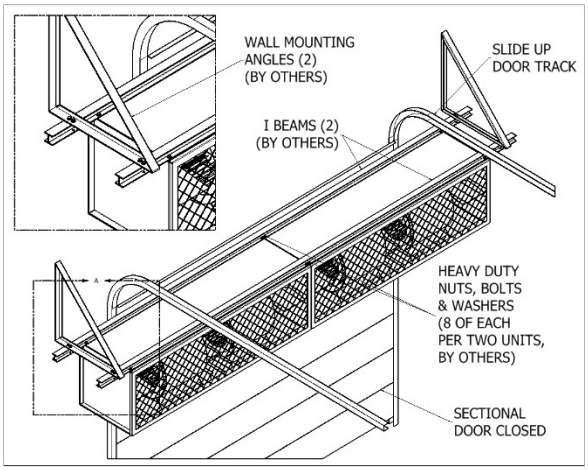

FIG. 7 (WMI/WMH Shown)

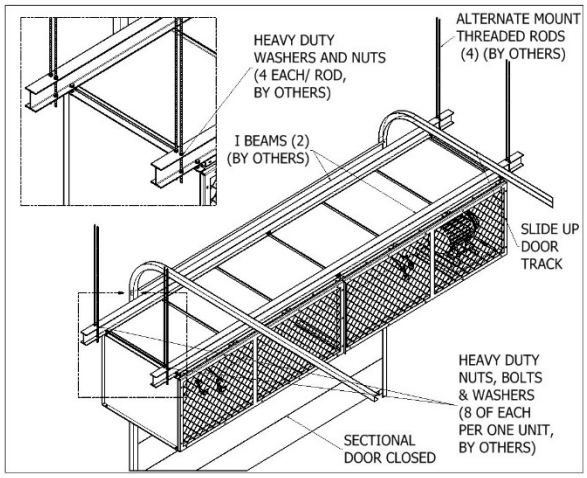

FIG. 8 (BD Shown)

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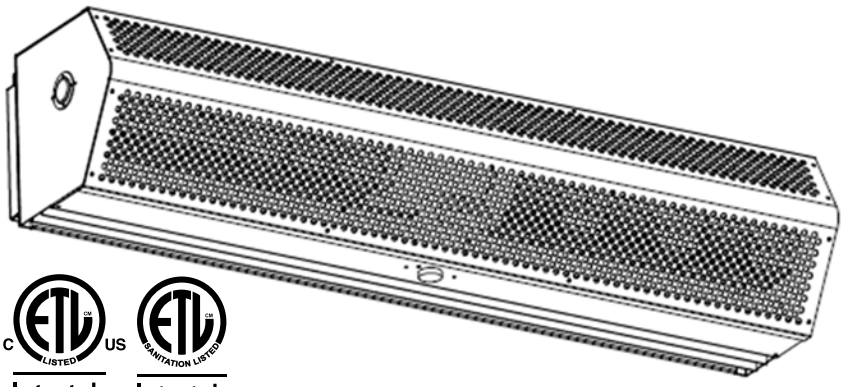
Document No: LP2-IOM
Date: 08/21/20

LOW PROFILE (LPV2) VARIABLE SPEED AND LOW PROFILE (LPN2) ETL SANITATION CERTIFIED COMMERCIAL SERIES

Installation, Operation and Maintenance Manual

Please read and save these instructions. Read carefully before attempting to assemble, install, operate, or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with these instructions could result in personal injury and/or property damage. Retain these instructions for future reference.

OVERVIEW



Mars Air Curtains are designed to cover door openings, providing both temperature control/environmental separation and flying insect control, when the building's doors are opened. Typical installation heights are: LoPro Series; LPV2 (Variable Speed) models (Environmental up to 8'), LPN2 (ETL Sanitation for Customer Entrances) models (Flying Insect Control up to 7') and LPN2-F (ETL Sanitation for Counter Top/Pass Through Windows) models (Flying Insect Control up to 4' from Counter Top) All ETL Sanitation Certified Models should be mounted at the Flying Insect Control heights referenced above. The units are typically wall mounted horizontally above the door opening. They can also be suspended from the ceiling. The units are ETL Listed, Canada and US, for either an inside or outside mount and ETL Sanitation Certified. Heated units must be mounted on the inside or the protected side of the opening. The motors used in all LoPro Series are 1/6HP.

WARNING

When servicing the product, motor may be hot enough to cause pain or injury. Allow motor to cool before servicing.

The LoPro Series come standard with a stamped air intake screen(s). The LPV2 models can be configured with an aluminum mesh filter(s) as an option. The LPN2 models 25" and all LPN-F models come standard with an aluminum mesh air intake filter(s) in conjunction with the punched air intake screen(s).

GENERAL SAFETY INFORMATION

Use this product only in the manner intended by the manufacturer. If you have any questions, contact the manufacturer. Only qualified personnel should install this product. Installing personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards.

WARNING

To reduce the risk of fire, electric shock, or injury to persons, observe the following.

A. Always disconnect, lock and tag power source before installing or servicing product.
B. Installation work or electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.
C. The combustion airflow needed for safe operation of fuel burning equipment in the area may be affected by the product's operation. Follow the heating equipment manufacturer's guideline and safety standards, such as those published by the National Fire Protection Agency (NFPA), the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) and local code authorities.
D. When cutting or drilling into a wall or ceiling, be careful not to damage electrical wiring and other hidden utilities.

WARNING

Precaution should be taken in explosive atmospheres.

RECEIVING AND INSPECTION

Upon receiving the product, check to make sure all items including switches are accounted for by referencing the Bill of Lading to ensure all items were received. Inspect each carton for shipping damage before accepting delivery. Notify the freight carrier if any damage is noticed. The carrier will make notification on the delivery receipt acknowledging any damage to the product. All damage should be noted on all copies of the Bill of Lading which is countersigned by the delivering carrier. A Carrier Inspection Report should be filled out by the carrier upon arrival and a report given to the Traffic Department. If damaged upon arrival, file a claim immediately with the carrier. Any physical damage to the unit after acceptance is not the responsibility of Mars Air Systems.

UNPACKING

Verify that all parts, components and accessories, and the correct quantities of each have been received. If any items are missing, report shortages to Mars Air Systems directly to arrange for obtaining the missing items. Again, verify quantities received against those on the Bill of Lading only, as multiple shipments may be involved.

INSTALLATION

Typical Mounting – Wall or Ceiling Mounted Horizontally Above the Door Opening

1. Remove the air intake grille(s) and/or air intake filter(s) from the product and set aside. Gently remove all packaging materials, hardware, and all other accessories from interior of unit prior to operating. Severe unit damage will occur if these items are not removed prior to operation.
2. Lay unit on its top with directional vanes pointing up and remove the Tek Screws from the wall mounting plate, just behind the discharge nozzle, and remove the mounting plate from the unit. (FIG. 1) Measure the mounting plate and center it over the opening. The air curtain shall be equal to or greater than the width of the opening.
3. Install the mounting plate(s) above the opening. Multiple pre-punched 7/16” mounting holes are provided for your convenience. These holes must be utilized to secure the product to the wall. All hardware is field provided by others.
4. Align the tabs on the rear of the unit with the slots provided on the wall mounting plate (FIG. 2). The bottom flange on the unit must also drop in the bottom channel of the wall mounting plate. Replace the Tek Screws to secure the unit in place.

Note: If the holes provided on the bottom of the unit and the bottom of the wall mounting plate do not align, remove the unit and re-install. The holes on the bottom channel of the wall mounted plate must be on the bottom.

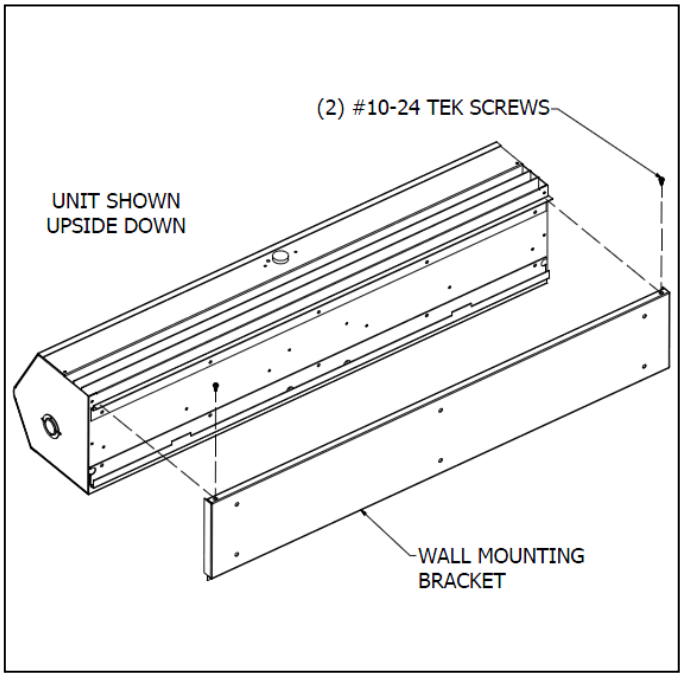


FIG. 1

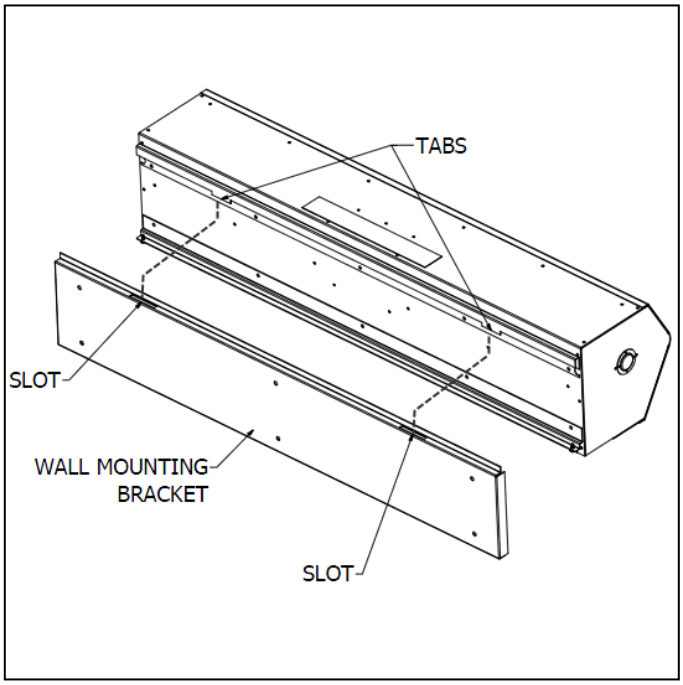


FIG. 2

5. Mount the product such that the discharge is 1” above the opening and all obstacles. (FIG. 3)

   Note: If the product is installed higher than the recommended 1” above the opening, then it must be moved 3/8” away from the wall for every 1” that it is moved up. Any void between the wall and the product must be sealed, by others, to optimize performance.

6. Use four (4) threaded rods for overhead installation or four (4) threaded bolts for wall installation. All hardware is field provided by others. (FIG. 3)

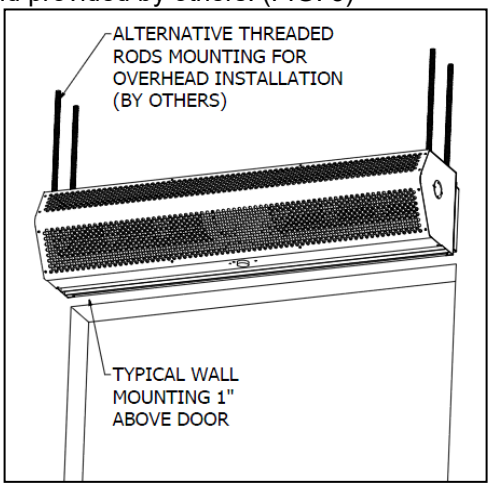


FIG. 3

7. If applicable, optional Adjustable Mounting Brackets, Side Extension Plates and Extended Wall Mounted Brackets are also available for installations over a Vertical Lift or Drum Roll-up type door. (Reference **Accessory Installation Supplement**)
8. If applicable, for tandem installation or products mounted side by side, allow no more than 6" between the two products. For overhead installation using threaded rods, the products may require a beam, by others, to span the full distance of the mounting length. (Reference **Accessory Installation Supplement**)
9. All wires must be connected internal of the unit and some knockouts are provided. However, it may be necessary to create your own knockout, as required.
10. The unit must be wired per NEC and local codes.

Electrical Field Wiring

The unit and any optional accessories must be wired with the proper voltage to the junction box per the wiring diagram. (FIG. 4, unheated products only)

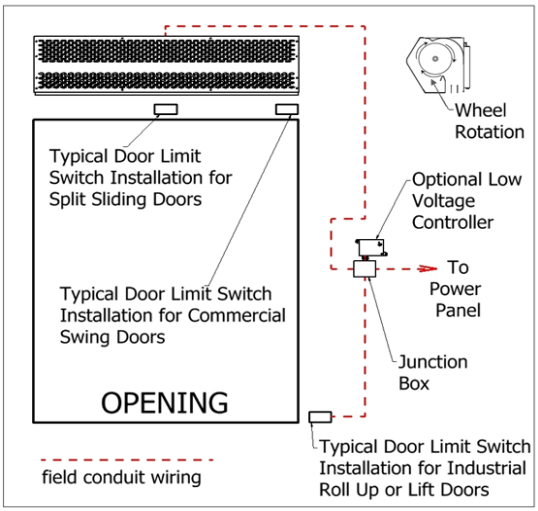


FIG. 4

NOTE

For accessory installation, reference Accessory Installation Supplement.

For heated products, reference Heated Products Supplement.

START-UP

This product has been assembled and tested at the factory prior to shipping. The following procedures should be performed to assure its performance. Before continuing with the start-up, it is important to recognize the safety controls furnished with the unit.

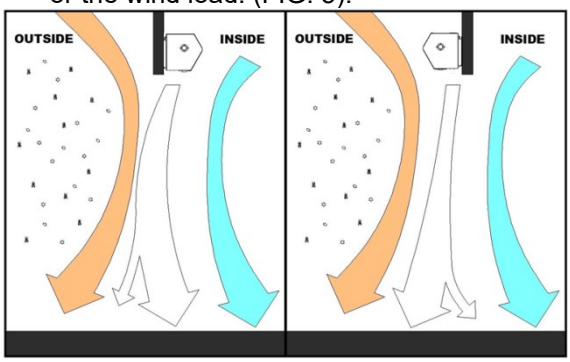
WARNING

Prevent hazard of electrical shock. More than one disconnect switch may be required to de-energize this product.

WARNING

The following items must all be completed by a qualified installer and checked off when completed

A. Re-check that the product has been installed properly and is level and secure.
B. Check all terminal screws are tight and field wiring is connected in accordance to National Electrical Code and wired per the enclosed wiring diagram. For electric heated models, ensure that the coils are secured and not touching each other on any metal surface.
C. Verify proper voltage prior to powering the product. (See product label for reference).
D. Check all field wired components "if supplied" are wired correctly.
E. Check that the inlet air supply and the discharge air supply are free of obstructions.
F. Check that all air filter(s) and/or air intake grille(s) are in place and installed properly, as originally shipped.
G. Verify voltage to the product once more and turn power on.
H. Regardless of whether the product is mounted on the inside or outside of the door opening, set the air directional vanes in the discharge nozzle slightly outward to approximately 10-15° towards the outside, or the wind load. (FIG. 5).



I. For products with control panels, turn the HOA (Hand-On-Auto) selector switch to “On” position and open the door to energize the product. For products without a control panel or an On/Off switch, open the door to energize the product.
J. If heated products are installed, reference **Heated Products Supplement**.
K. For three phase units, verify direction of rotation of blower wheels (note direction arrows on the blower wheel housing). Correct if needed by changing polarity of three phase power.
L. **VERY IMPORTANT** Using a clamp meter, measure the amperage to each motor and ensure that they do not exceed the amperage listed on the product label.
M. If applicable, adjust the air intake grille(s) such that the output air stream reaches the floor. For temperature control and environmental separation applications, the air stream should reach the floor with sufficient strength to create an air seal around the door opening without creating turbulent mixing of the inside and outside air. For flying insect control applications, the air stream should reach the floor with maximum strength. If after proper installation and adjustment, the product appears to be producing too little or too much air for the application, contact the manufacturer.

MAINTENANCE

WARNING

To reduce the risk of fire, electrical shock, or injury to persons, observe the following:

A. Maintenance is to be performed only by qualified personnel who are familiar with local codes and regulations and are experienced with this type of product.
B. Before servicing or cleaning the product switch power off at service panel and lock service panel to prevent power from being switched “ON” accidentally.

Routine maintenance is required to keep this product operating at its peak performance and efficiency. Over time, the housing, air intake grille, air intake filter, blower wheels and motor(s) will accumulate a build up of dust, debris and other residue. It is imperative to keep these components clean. Failure to do so will not only lower operational efficiency and performance, but also reduce the useful life of the product. The time between cleanings depends on the application, location, and daily hours of use. On average, under normal use conditions, the product should require a thorough cleaning once every six (6) months.

To clean the product, perform the following:

1. Verify the product has been disconnected from the power source.
2. Use a damp cloth and either a warm mild soapy water solution or bio-degradable degreaser, to wipe down the exterior components of the housing.
3. To access the interior of the product, remove the air intake grille(s) and/or air intake filter(s). This is accomplished by removing the screws on the face of the air intake grille(s)/filter(s).
4. Thoroughly clean the air intake grille(s)/filter(s).
5. Thoroughly wipe down the motor, blower wheels and blower wheel housings. Be careful not to spray the motor with a water hose.
6. The motor(s) require no additional lubrication. They are permanently lubricated and feature double sealed ball bearings.
7. To re-install the product, reverse the procedures above.
8. Reconnect the power source to the product.
9. If you have any questions regarding the maintenance of the product, contact the manufacturer.

SPECIAL APPLICATIONS

Outdoor Installation

For outdoor unit special consideration may be required for enclosure and other components to minimize damage caused by exposure to the outdoor elements. Contact factory for special construction and costing.

Freezer and Cooler Installation

Air curtain must be mounted on the warm side for optimal performance. LPV2 series with variable speed switch is strongly recommended to control the air curtain air flow velocity at the floor level.

High humid areas may require de-humidifier or additional defrost cycle to minimize condensation and freezing for freezer applications. We recommend the air curtain unit to not replace doors but work in conjunction with door opening sequence cycle. Contact factory for details.

CAUTION

The appliance is not to be used by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction. Children are not to play with the appliance.

DISCLAIMER

Mars reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions, or replacements for previously purchased equipment.

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Date: 10/20/2023

HEATED PRODUCTS SUPPLEMENT

NOTE

Before proceeding, refer to the unit's specific IOM Manual for safety, installation, and startup information. Verify proper voltage to the product per local and NEC codes. Ensure proper rotation for units with three phase motors.

Electric Heated Products

Electric heated products are certified only for indoor use. Electric heated products come standard with a thermostat (shipped loose, unless ordered as factory pre-mounted) which is to be field installed at eye level within 3 feet of the unit.

Note:

1. Electric heated Low Profile 2, Standard 2, High Velocity 2, Extra Power 2, and Phantom series units come standard with internally mounted controls with 24V control circuit (FIG. 1).
2. Wiring connection for the electric heated Low Profile 2 units is at the top of the housing which can be accessed by removing the top cover plate, while internal terminal blocks are provided for electric heated Standard 2, High Velocity 2, Extra Power 2, and Phantom series units.
3. Electric heated Wind Stopping and WindGuard units include an electric heater control panel mounted on the right-hand side, as standard. Optional motor/unit control panel available, which includes a remote 24-volt thermostat with On/Off switch with terminals provided.

The thermostat should be mounted close to the product to best sense the air temperature in the vicinity of the door opening. Connect proper voltage to the product per local and NEC codes.

Thermal overload protection is built into all heater coil assemblies. In the event of an overload condition, the overload will trip and disconnect electrical power from the heater coil. Upon diagnosing and fixing the problem, power can be reconnected to the heater coil by manually resetting the thermal overload by way of the buttons(s) or lever(s) located in the unit or panel.

To operate multiple units in conjunction using a single door switch and single thermostat, a primary/secondary configuration is required (FIG. 2).

For high ampacity units, additional holes can be drilled to bring in additional electrical wires. Use appropriate bushings for new holes to protect wire casing. High temperature silicon wires are recommended for main supply power.

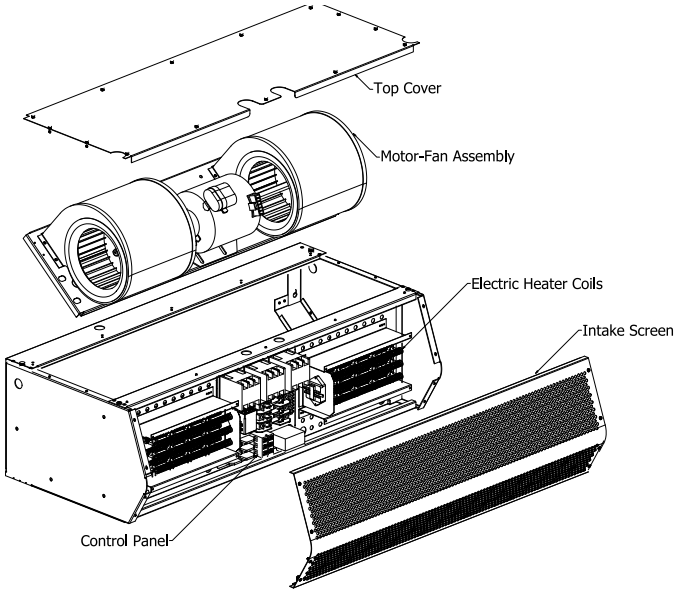

FIG. 1 (Electric Heated STD2 unit)

An unobstructed clearance space of 18-24" is required at the top of all heated air curtains to allow for service and optimal performance.

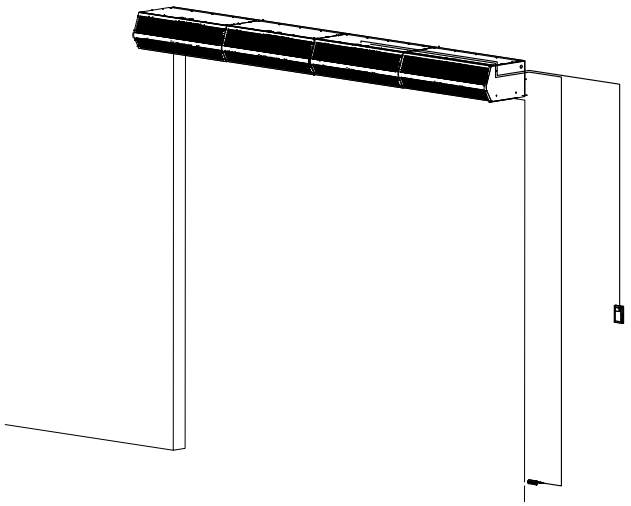

FIG. 2 (Tandem Mounted Primary/Secondary Units)

Hot Water and Steam Heated Products

Hot water and steam heated products are certified only for indoor use. Low Profile 2, Standard 2, High Velocity 2, Extra Power 2, and Phantom series units are shipped with coils mounted in the interior of the unit. Wind Stopping and WindGuard units are shipped with coils factory mounted to the exterior of the unit.

Once the coil has been secured to the cabinet, access to the motor and fan is through the removable access panels located on the top of the cabinet for Standard 2, High Velocity 2, Extra Power 2, Phantom series, and WindGuard units.

Note: Low Profile 2 and Wind Stopping units require the removal of the coil to access the motor(s) and/or fans.

All piping should be done by a licensed pipe fitter and in accordance with local codes and regulations. Connect the supply and return fittings as required. All traps and valves are to be sized and field installed by others. For Standard 2, High Velocity 2, and Extra Power 2 units, front intake screen must be removed to access vent plugs. Standard coil configuration is right hand supply and left-hand return (FIGS. 3 & 4) except for Low Profile 2 series, which has supply and return connection on the same end. Optional temperature controls, if ordered, are to be field installed by others.

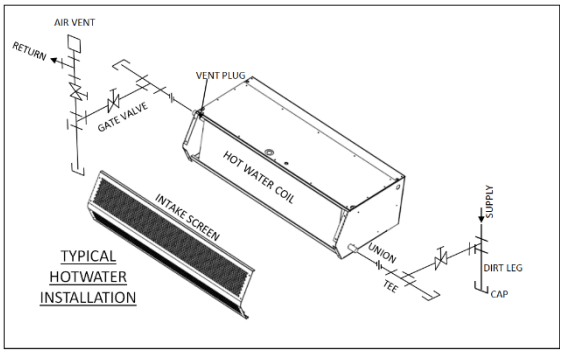

FIG. 3 (Hot Water Heated STD2 Unit)

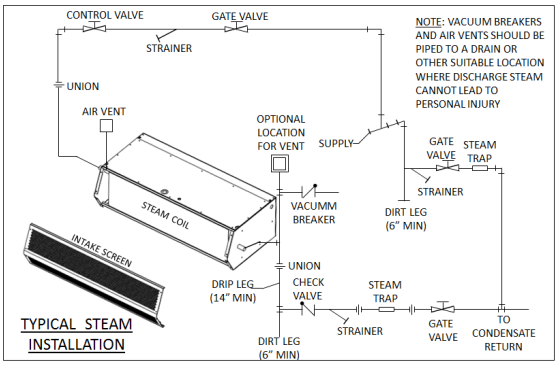

FIG. 4 (Steam Heated STD2 Unit)

TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
NO AIR BLOWING OUT OF DISCHARGE NOZZLE	- No power being supplied to the unit from the electrical power source	- Confirm power source / check if in on position
	- Circuit breaker is tripped	- Reset circuit breaker
	- Blown fuses on power supply	- Replace fuses
	- Motor overload is open or tripped	- Allow the motor to cool down; motor has auto reset internal overload; if unit is panel equipped, press reset button on overload inside panel, or replace motor overload if overload remains tripped
	- Motor contactor / relay defective (if applicable)	- Check voltage to coil; check contacts to see if they are pulling in
	- Failed switch	- Replace or repair limit switch
MOTOR IS RUNNING BUT FANS ARE NOT SPINNING	- Loose or broken coupling (belt drive)	- Replace or tighten coupling
	- Loose set screws on wheel hubs	- Tighten set screws on motor shaft flats
	- Fan spinning inside fan housing	- Tighten fan on shaft or replace fan
	- Broken fan hub	- Replace fan wheels
ELECTRICAL CONTROLS NOT WORKING WHEN DOOR IS OPEN	- Switch is in off position	- Turn unit's switch to the on position
	- Door limit switch is not operating	- Repair or replace door limit switch
UNIT WILL NOT TURN OFF	- Door limit switch is permanently closed or energized	- Position the door switch in a manner that turns off the unit when the door closes and turns on the unit when the door opens. Only light pressure required.
LOW AIR FLOW	- Discharge air vanes out of adjustment	- Adjust vanes to proper position (Refer to Start-Up Section in this manual)
	- Obstruction on intake or discharge	- Remove obstruction or move air curtain
	- Power leads out of polarity	- Switch power leads to correct polarity (3 phase models only)
	- Blower motor rotating below normal speed	- Apply proper voltage per unit requirement (see unit label) / Adjust adjustable motor speed knob (if applicable)
	- Fan rubbing against housing	- Free fan from housing
	- Blower wheels clogged with dirt	- Clean and remove dirt from blower wheels
EXCESSIVE AIR VELOCITY AT DOOR OPENING	- Nozzle out of adjustment and not angled far out enough (BD only)	- Adjust nozzle angle to outside
	- Air temperature too cold	- Add auxiliary heat to overcome wind chill
	- Air stream pushing air outside of the building	- Adjust discharge angle back into building
AIR NOT HITTING THE FLOOR	- Low air velocity	- Adjust vanes to proper position or check installation height (Refer to Start-Up Section in this manual)
	- Obstruction in the direction of air flow	- Remove obstruction or move air curtain (Move out 3/8" for every 1" up from the door)
	- Negative building pressure	- Provide a make-up air system to relieve negative building pressure
UNEVEN AIR	- Shaft rotating inside fan	- Replace fan or tighten fan on shaft
	- One motor not functioning	- Replace or repair motor
EXCESSIVE NOISE AND OR VIBRATION	- Loose or broken coupling (belt drive)	- Replace or tighten coupling
	- Loose set screws on wheel hubs	- Tighten set screws on motor shaft flats
	- Fan spinning inside fan housing	- Tighten fan on shaft or replace fan
	- Broken fan hub	- Replace fan wheels
	- Bearing end caps worn	- Replace Bearing end caps
	- Damaged blower wheel	- Replace Blower Wheel
	- Bearing end caps worn	- Replace Bearing end caps
	- Pillow block bearings make noise	- Grease Bearing
	- Balancing clips missing	- Replace Blower Wheel

TROUBLESHOOTING MOTOR

To determine if the motor is in good operating condition, compare measured motor resistance at the motor terminals to the values shown below.

MARS MOTOR RESISTANCE READINGS

Single Phase Motors

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Applicable Air Curtain Series	Mars Part #	Manufacturer Part #	Brand	Motor Rating	HP	Voltage	Phase	Capacitor Rating	Motor Frame	MOTOR WIRES OR TERMINAL (T) OHM READINGS HIGH SPEED (1750) Black Motor Wire & White Motor Wire	MEDIUM SPEED (1650) -	LOW SPEED (1450) -
LPV2, LPN2	03-001	7190-1682	Fasco	Nema 1	1/6	115	1	5 µF 370Vac	-	11.5	-	-
	03-002	7190-1903	Fasco	Nema 1	1/6	115	1	5 µF 370Vac	-	8.4	-	-
	03-003	7190-1825	Fasco	Nema 1	1/6	230	1	4 µF 440Vac	-	64	-	-
	03-004	7190-1904	Fasco	Nema 1	1/6	230	1	6 µF 370Vac	-	44.6	-	-
	03-124	7190-3307	Fasco	Nema 1	1/6	115/230	1	10 µF 370Vac	-	8.2/36	-	-
	03-124	K33NVDHJ-1446	US	Nema 1	1/6	115/230	1	10 µF 370Vac	-	8.1/32	-	-
Applicable Air Curtain Series	**Mars Part #**	**Manufacturer Part #**	**Brand**	**Motor Rating**	**HP**	**Voltage**	**Phase**	**Capacitor Rating**	**Motor Frame**	**White Motor Wire (T1) & Black Motor Wire (T3)**	**White Motor Wire (T1) & Black Motor Wire (T5)**	**White Motor Wire (T1) & Black Motor Wire (T2)**
STD2, N2, PH10, QP10	03-010	34G928X169	Baldor	Washdown (IP54)	1/2	115	1	-	56Z	1.2	-	-
	03-010	34G928X169	Baldor	Washdown (IP54)	1/2	208/230	1	-	56Z	4.6	-	-
	03-005	7124-1175	Genteq	Nema 1	1/2	115	1	7.5 µF 370Vac	48	2.6	3.8	5.2
	03-006	7124-1560	Genteq	Nema 1	1/2	208/230	1	10 µF 370Vac	48	9.9	15.9	22.5
	03-007	48S17T439	Marathon	Nema 1	1/2	277	1	-	48Z	7.7	-	-
	03-005	K055PWM1736C13H	Nidec	Nema 1	1/2	115	1	10 µF 370Vac	48Y	2.1	3.7	5.2
	03-005	K055PWM1736C13H	US	Nema 1	1/2	115	1	10 µF 370Vac	48Y	5.3	3.7	5.4
	03-006	K55HXPNA-2845	US	Nema 1	1/2	208/230	1	10 µF 370Vac	48Y	8.7	18.2	24.2
Applicable Air Curtain Series	**Mars Part #**	**Manufacturer Part #**	**Brand**	**Motor Rating**	**HP**	**Voltage**	**Phase**	**Capacitor Rating**	**Motor Frame**	**White Motor Wire (T1) & Black Motor Wire (T2)**	**White Motor Wire (T1) & Black Motor Wire (T3)**	**-**
HV2, NH2, PH12	03-021	35T276R025G1	Baldor	Washdown (IP54)	1	115	1	-	56Z	0.7	-	-
	03-015-Baldor	35M316S174	Baldor	Nema 1	1	115	1	-	56Z	0.6	-	-
	03-015-Baldor	35M316S174	Baldor	Nema 1	1	208/230	1	-	56Z	2.2	-	-
	03-021	35T276R025G1	Baldor	Washdown (IP54)	1	208/230	1	-	56Z	2.8	-	-
	03-014	7124-0985	Genteq	Nema 1	1	115	1	50 µF 370Vac	56	1.6	2.4	-
	03-015	7124-1096	Genteq	Nema 1	1	208/230	1	30 µF 370Vac	56	6.5	9.2	-
	03-015	-	Nidec	Nema 1	1	208/230	1	20 µF 370Vac	48Y	4.3	6.5	-
	03-014	K55BWJZB-2362	US	Nema 1	1	115	1	20 µF 370Vac	48Y	1	2.1	-
	03-015	-	US	Nema 1	1	208/230	1	20 µF 370Vac	48Y	3.2	6.3	-

Three Phase Motors

Applicable Air Curtain Series	Mars Part #	Manufacturer Part #	Brand	Motor Rating	HP	Voltage	Phase	Motor Frame	LEAD WIRE OHM READINGS Black Motor Wire (L1) & Red Motor Wire (L2)	Black Motor Wire (L1) & White Motor Wire (L3)	Red Motor Wire (L2) & White Motor Wire (L3)
STD2, N2, PH10, QP10	03-008	P55YYDHB-1527	US	Nema 1	1/2	208-230	3	48	16.1	16.1	16.1
	03-008	P55YYDHB-1527	US	Nema 1	1/2	460	3	48	63.6	63.6	63.6
	03-009	48T17T135	Marathon	Nema 1	1/2	575	3	48	136	136	136
HV2, NH2, PH12	03-017	56T17T5541	Marathon	Nema 1	1	208-230	3	56Z	4.3	4.3	4.3
	03-017	56T17T5541	Marathon	Nema 1	1	460	3	56Z	16.5	16.5	16.5
	03-018	56T17T5544	Marathon	Nema 1	1	575	3	56Z	26.6	26.6	26.6
	03-022	35N127S902	Baldor	Washdown (IP54)	1	208-230	3	56Z	5.1	5.1	5.1
	03-022	35N127S902	Baldor	Washdown (IP54)	1	460	3	56Z	19.8	19.8	19.8
EP2	03-026	165716	Century	Nema 1	3	208-230	3	U56Y	1.5	1.5	1.5
	03-026	165716	Century	Nema 1	3	460	3	U56Y	5.7	5.7	5.7
	03-026	P63TYFMJ-1687	US	Nema 1	3	208-230	3	56HZ	1.2	1.2	1.2
	03-026	P63TYFMJ-1687	US	Nema 1	3	460	3	56HZ	4.4	4.4	4.4
	03-028	35E92Y26	Baldor	Nema 1	3	575	3	56Z	9.2	9.2	9.2
WMI	03-110	36H110-2211G1	Baldor	Nema 1	1,2,3	208-230	3	184Z	3.5	3.5	3.5
	03-110	36H110-2211G1	Baldor	Nema 1	1,2,3	460	3	184Z	13.5	13.5	13.5
WMH	03-055	37F932W828G1	Baldor	Nema 1	5	230	3	215YZ	0.7	0.7	0.7
	03-055	37F932W828G1	Baldor	Nema 1	5	460	3	215YZ	2.4	2.4	2.4
	03-046	37F909X889G1	Baldor	Nema 1	7	230	3	215YZ	0.6	0.6	0.6
	03-046	37F909X889G1	Baldor	Nema 1	7	460	3	215YZ	1.6	1.6	1.6
BD	03-033	U639A - 215TTFC6027	Marathon	Nema 1	10	208-230	3	215T	0.4	0.4	0.4
	03-033	U639A - 215TTFC6027	Marathon	Nema 1	10	460	3	215T	1.2	1.2	1.2
	03-074	GT1128A 170118.60	Marathon	Nema 1	25	575	3	284TS	0.5	0.5	0.5

WARRANTY

Mars' warranty coverage, period, extent, and limitations apply to the product only. It does not apply to labor. Mars warrants that the Mars product 1) is free from defects in materials and workmanship, and 2) conforms to Mars' published specifications. The warranty period for Mars products (except for heated models, custom models, or WMI, WMH and BD models) is a five (5) year period commencing on the date of shipment. The warranty for heated models is an eighteen (18) month period, the warranty for custom models and for accessories is a twelve (12) month period, and the warranty for WMI, WMH, and BD models is a twelve (12) month period. The date on the customer's invoice is the date of shipment unless Mars or your reseller informs you and Mars otherwise. Mars will provide free replacement of any part that fails as a result of a defect in material or manufacturer's workmanship. Changes in operational specification parameters that differ from those provided on the original purchase order are not covered. Mars products are inspected and tested before packaging and are shipped in working condition. The warranty for Mars products only covers free-of-charge replacement of failed parts. The warranty does not cover labor and transportation expenses that may be required to deliver and to install replacement parts. Because in many instances it is impossible to determine the cause of failure, the customer may be responsible for transportation charges associated with replacement of failed part. Mars does not warrant uninterrupted or error-free operation of Mars product. Under no circumstance is Mars liable for any of the following: 1) third-party claims against you for damages, 2) special, incidental, or indirect damages, or 3) any economic consequential damages (including lost profits and savings), regardless of whether Mars, its suppliers, or its resellers were informed of the possibility of damages. The warranty does not cover repair or exchange of Mars products resulting from misuse, accidental damage, modification, unsuitable physical or operating environment, improper maintenance or installation by customer, or failure caused by a product for which Mars is not responsible. The warranty does not cover damages caused by mishandling during transportation. The warranty is voided by removal or alteration of Mars product or parts identification labels, and by improper installation of product and resulting non-compliance with federal, state, and local codes and regulations. Additionally, Mars reserves the right to void the warranty for non-payment of invoice.

CONTACT FACTORY FOR COMPLETE PARTS LIST FOR ALL MODELS.

KEEP THIS MANUAL FOR YOUR RECORDS.

Model Number:_____

Serial Number: _____

Date Purchased: _____

Dealer Purchased From: _____

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SECTION 23 34 33

AIR CURTAINS

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air curtains for pedestrian entrances.

B. Air curtains for countertop and drive through windows.

1.2 RELATED SECTIONS

A. Section 05 50 00 – Metal Fabrications: Concealed steel support members.

B. Section 06 10 00 – Rough Carpentry.

C. Section 05 41 00 – Structural Metal Studs.

D. Section 07 62 00 – Sheet metal flashing.

E. Section 07 92 00 – Joint Sealants.

F. Section 08 10 00 – Metal Doors and Frames.

G. Section 08 33 00 – Overhead Coiling Doors.

H. Section 08 42 00 – Entrance Doors.

I. Section 22 10 00 – Plumbing Piping:

J. Section 23 21 00 – Hydronic Piping: Hot water heating piping to units.

K. Section 23 22 13- Steam and Condensate Piping: Steam heating piping to units.

L. Section 26 05 00 – Equipment Wiring: Connections to building power distribution.

1.3 REFERENCES

A. ASTM A240 / A240M -10 – Standard Specification for Chromium and Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

B. ASTM A591 / A591M -98 – Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Weight (Mass) Application (Withdrawn in 2005, replaced by A879/A879M).

C. ASTM A879 / A879M -06 – Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Application Requiring Designation of the Coating Mass on Each Surface.

D. ASTM A653 / A653M -09a – Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

E. AHRI 410-2001 – Standard for Forced-Circulation Air-cooling and Air-Heating Coils.

F. NSF/ANSI 37 – Air Curtains for entranceways in food and food service establishments – ETL Sanitation.

G. CRN – Canadian Registration Number Coil.

H. ANSI Z223-NFPA 54 – National Fuel Gas Code/

I. UL 507 – UL Standard for Safety Electric Fans – Intertek Testing Services Listed for US and Canada

J. UL 2021 – UL Standard for Fixed and Location-Dedicated Electric Room Heaters – Listed for US and Canada.

K. NEC – National Electric Code.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Include plans, elevations, sections, and details, indicating dimensions, tolerances, materials, fasteners, hardware, finish, piping, electrical wiring diagrams, options, and accessories.

D. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
   1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
   2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.

E. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, two samples, minimum size 6.25 inches (160 mm) square, representing actual product, color, and patterns.

G. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

H. Operation and Maintenance Manual: Submit manufacturer's operation and maintenance manual, including operation, maintenance, adjustment, and cleaning instructions, troubleshooting guide, parts list, and electrical wiring diagrams.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum ten years documented experience producing the products specified in this Section

B. Installer Qualifications: Minimum five years documented experience installing products specified in this Section

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store in a dry, heated storage area until installation of products.

C. Protect materials and finish from damage during handling and installation.

1.7 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Coordinate the installation of wiring and control switches for air curtains with the openings and the hardware provided for such openings.

C. Install after doors, walls, ceilings, and other adjacent surfaces are finished and painted.

1.8 WARRANTY

A. Standard five-year limited parts warranty for unheated units against defects in workmanship and material.

B. Standard 18-month limited parts warranty for heated units against defects in workmanship and materials.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturer: Mars Air Systems, LLC; 14716 South Broadway St., Gardena, CA 90248. Tel: (310) 532-1555 or (800) 421-1266. Fax: (310) 324-3030. Email: info@marsair.com. Web: www.marsair.com.

B. Delete one of the following two paragraphs: coordinate with requirements of Division 1 section on product options and substitutions.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 33 00.

2.2 AIR CURTAIN ASSEMBLIES

A. Motor Fan Assembly: Design for easy removal, assembly, repair, and maintenance.
   1. Motor: Totally enclosed air over (TEAO) cooled motor with sealed lifetime pre-lubricated ball bearings, motor starter and thermal overload protection.
      a. LPN2 Units: Wired for single speed operation.
      b. LPV2 Units: Wired for variable speed operation.
      c. Electrical Characteristics: 115V AC, single phase; 2.4 Amp (units up to 48 inches wide) or 2.6 Amp (units 60 to 72 inches wide) full load per motor/fan.
      d. Electrical Characteristics: 208/230V AC, single phase; 1.2 Amp (units up to 48 inches wide) 1.4 Amp (units 60 to 70 inches wide) full load per motor/fan.
      e. Meets NEC. ETL Listed to conform to UL 507 (US) and CSA22.2 (Canada) Standards.
   2. Fans: Tangential type, double width, directly driven by an electric motor.
      a. Provide resilient isolation dampening mountings between motor frame and housing.
      b. Factory balanced blower wheel assembly statically and dynamically.

B. Housing: Self-contained one-piece type for units up to 72 inches in length with sufficient strength for mounting from pre-punched mounting holes at both ends to ceiling without intermediate support. Units longer than 72” are two units tandem mounted next to each other.
   1. Size:

a. Unheated: 8-7/8 inches deep by 8 inches high (including discharge nozzle) by width of unit.
b. Electric Heated: 11-3/4 inches deep by 8 inches high (including discharge nozzle) by width of unit.
c. Hot Water/Steam Heated: Depth 11-3/4 inches by 8 inches high including discharge nozzle by width of unit plus 10 inches for manifolds

2. Mounting:
   a. Unheated Inside Mount.
   b. Heated Inside Mount.
   c. Unheated Outside Mount.
   d. Mount Location Indicated.
3. Material:
   a. Provide 18- and 20-gauge electro or hot dipped galvanized steel sheet housing conforming to ASTM A 591 and/or ASTM A 653.
   b. Provide type 304 stainless steel housing with brushed finish. ASTM A 240/A 240M.
4. Air Inlet Grille and Filters:
   a. Location: Front.
   b. Type: Fixed air intake grille.
      1) Filter: Aluminum mesh, 1/4 inch (6.4 mm), washable.
   c. Type: UV Only as follows
      1) UV: UVC & UVV germicidal and odor elimination, 4” UV section with disposable UV bulbs
5. Discharge: Provide integral discharge nozzle specified.
6. Finish and Color: Provide with, no VOC, corrosion resistant polyurethane powder coated finish for sheet metal housings.
   a. Obsidian Black.
   b. Pearl White.
   c. Titanium Silver.
   d. Stainless Steel.

C. Environmental Air Curtains: Models for Heights up to 8 feet (2438 mm) for Environmental Separation and Temperature Control and up to 7 feet (2133 mm) for Flying Insect Control.
   1. Discharge Nozzle: Adjustable air foil vanes with a plus/minus 40-degree sweep front to back.
   2. Air Velocity at Nozzle:
      a. LPV225-1: 25 Inch (635 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
      b. LPV236-1: 36 Inch (915 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
      c. LPV242-1: 42 Inch (1067 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
      d. LPV248-1: 48 Inch (1220 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
      e. LPV260-1: 60 Inch (1524 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.

f. LPV272-1: 72 Inch (1830 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
g. LPV284-2: 86 Inch (2184 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.
h. LPV296-2: 98 Inch (2489 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.
i. LPV2108-2: 110 Inch (2794 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.
j. LPV2120-2: 122 Inch (3099 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.
k. LPV2144-2: 146 Inch (3708 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.

3. Air Speed at Floor: Minimum of 400 fpm (2 m/s) at 1 foot (304 mm) from the floor.
4. Air Inlet Grille and Filters:
   a. Location: Front.
   b. Type: Fixed air intake grille.
      1) Filter: Aluminum mesh, 1/4 inch (6.4 mm), washable.
   c. Speed: 625 cu ft/min (295 L/s), minimum, per motor/fan assembly.
5. Sound Pressure Level At 10 feet (3 m) From Nozzle:
   a. Single Motor/Fan Units (LPV2 25-LPV2 36): 49 dBA.
   b. Single Motor/Fan Units (LPV2 42): 50 dBA.
   c. Single Motor/Fan Units (LPV2 48): 52 dBA.
   d. Single Motor/Fan Units (LPV2 60-LPV2 72): 53 dBA.
   e. Two Motor/Fan Units (LPV2 84-LPV2 96): 53 dBA.
   f. Two Motor/Fan Units (LPV2 108-LPV2 144): 54 dBA.

D. Insect Control Air Curtains: Models for Concession Stand Heights to 4 feet (1219 mm) or Customer Entry Heights to 7 feet (2134 mm) certified to NSF/ANSI Standard 37.
1. Discharge Nozzle: Wedge-shaped discharge outlet nozzle with adjustable air foil vanes with a plus/minus 40-degree sweep front to back.
2. Air Velocity at Nozzle:
   a. LPN225-1: 25 Inch (635 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
   b. LPN236-1: 36 Inch (915 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
   c. LPN242-1: 42 Inch (1065 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
   d. LPN248-1: 48 Inch (1220 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
   e. LPN260-1: 60 Inch (1524 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
   f. LPN272-1: 72 Inch (1830 mm) Wide Units: 1800 feet/min (9.1 m/s) single 1/6HP motor/fan assembly.
   g. LPN284-2: 86 Inch (2184 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.
   h. LPN296-2: 98 Inch (2489 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.

i. LPN2108-2: 110 Inch (2794 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.
j. LPN2120-2: 122 Inch (3099 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.
k. LPN2144-2: 146 Inch (3708 mm) Wide Units: 1800 feet/min (9.1 m/s) two 1/6HP motor/fan assembly.

3. Air Speed at Floor:
   a. Concession stand windows require a minimum of 600 fpm (3.05 m/s) at 16 inches (406.4 mm) from countertop with Aluminum mesh, 1/4 inch (6.4 mm), washable.
   b. Customer entry doors require a minimum of 600 fpm (3.05 m/s) at 3 feet (914 mm) from floor.
4. Air Inlet Grille and Filters:
   a. Location: Front.
   b. Speed: 625 cu ft/min (295 L/s), minimum, per motor/fan assembly.
   c. Type: Fixed air intake grille.
   d. Type: Aluminum mesh, 1/4 inch (6.4 mm), washable filter.
5. Sound Pressure Level At 10 feet (3 m) From Nozzle:
   a. Single Motor/Fan Units (LPV2 25 to LPV2 36): 49 dBA.
   b. Single Motor/Fan Units (LPV2 42): 50 dBA.
   c. Single Motor/Fan Units (LPV2 48): 52 dBA.
   d. Single Motor/Fan Units (LPV2 60 and LPV2 72): 53 dBA.
   e. Two Motor/Fan Units (LPV2 84 and LPV2 96): 53 dBA.
   f. Two Motor/Fan Units (LPV2 108 to LPV2 144): 54 dBA.

2.3 COMPONENTS

A. Electric Heaters: Provide complete with motor control panel factory mounted to air curtain housing, and thermostat to be field installed.
   1. Temperature limit controller.
   2. Thermostat: Wall-mounted, 115-Volt operation, with heater on/off selection.
   3. Thermostat: Wall-mounted, 208-Volt operation, with heater on/off selection.
   4. Thermostat: Wall-mounted, 230-Volt operation, with heater on/off selection
   5. Thermostat: Wall-mounted, 24-Volt operation, with heater on/off selection.
   6. Heating Coils: ETL approved as part of unit. CEC tested by ETL. Factory mounted on the discharge end of the motor fan assembly and located within the nozzle outlet.

B. Steam Heaters: Provide finned tube steam coils for field mounting on air intake side of the air curtain cabinet with opposite end connections.
   1. Meets NEC and CEC tested by ETL Certified to conform to UL1995(US) and CSA22.2 (Canada) Standards.
   2. Output: Air curtain manufacturer's standard, one-row coils.
   3. Coils: Certified in accordance with AHRI 410.
   4. Connections: Same end, right hand, horizontal.
   5. Connections: Same end, left hand, horizontal.
   6. Casing: One-piece unpainted galvanized steel, bolted to air curtain housing
   7. Supply and return fittings on ends of casing.
   8. Thermostat: Wall-mounted 115-Volt operation, with heater on/off selection.

9. Thermostat: Wall-mounted 208-Volt operation, with heater on/off selection.
10. Thermostat: Wall-mounted 230-Volt operation, with heater on/off selection.
11. Thermostat: Wall-mounted optional 24-Volt operation, with heater on/off selection.

C. Hot Water Heaters: Provide finned tube water coils for field mounting on air intake side of the air curtain cabinet with opposite end connections.
1. Meets NEC and CEC tested by ETL Certified to conform to UL1995(US) and CSA22.2 (Canada) Standards.
2. Output: Air curtain manufacturer's standard, one-row coils.
3. Coils: Certified in accordance with AHRI 410.
4. Connections: Same end, right hand, horizontal.
5. Connections: Same end, left hand, horizontal.
6. Casing: One-piece unpainted galvanized steel, bolted to air curtain housing.
7. Supply and return fittings on ends of casing.
8. Thermostat: Wall-mounted 115-Volt operation, with heater on/off selection.
9. Thermostat: Wall-mounted 208-Volt operation, with heater on/off selection.
10. Thermostat: Wall-mounted 230-Volt operation, with heater on/off selection.
11. Thermostat: Wall-mounted optional 24-Volt operation, with heater on/off selection.

D. Door-Activated Limit switch(s): Provide, field installed 250-Volts, 20 amps limit switch to control air curtain(s) as follows; Automatic on/off control, activates air curtain when door is opened and turns off when door is closed. Provide limit switch for direct control one 1 HP or up to two 1/2 HP single phase motors without a separate control panel. Provide a separate control panel for three-phase motors and/or units exceeding 1 HP, 250-Volts or 20 amps controlled by a limit switch.
1. Type: Combination plunger/roller switch for swing and sliding doors.
    a. Provide limit switches with NEMA 1 (20 amps) ratings in locations indicated.
    b. Provide limit switches with NEMA 4X (10 amps) ratings in locations indicated.
    c. Provide limit switches with NEMA 7 (10 amps) ratings in locations indicated.
2. Type: Magnetic reed switch and actuator for swing and sliding doors. Industrial floor mounted or surface mounted switches for roll up doors
3. Operation for Unheated Units: Automatic on/off control, on when door is opened, off when door is closed.
4. Operation for Heated Units: Automatic on when door is opened, off after time delay period after door is closed, maintaining heat in the event door is opened within time delay period. Field adjustable from 1 to 17 minutes.

E. Optional Digital Programmable Controller:
1. WiFi enabled controller for wireless interface with field supplied smartphone, tablet or computer
2. No download or app required for wireless interface
3. Wireless control range up to minimum of 50 feet from controller
4. Fully factory assembled and wired inside the air curtain for easy field installation

5. Optional remote mounted high resolution 7” Color LCD Display with resistive touchscreen technology
6. Fully programmable controller
7. Connect and control via any web browser
8. Factory built wireless router with over 50 feet range
9. Pre-set and fully customizable programs
10. Time delay (Passive & Adaptive)
11. Factory Integrated temperature control sensors. No external thermostat required.
12. Heat on Demand Mode to regulate the space temperature
13. Summer-Winter modes
14. 24/7/365 timer
15. Maintenance schedule alerts
16. Password protected
17. High temperature lock from fan failure
18. Low voltage control signal for door activation
19. Multispeed fan control
20. Optional Integrated BMS controls
21. Optional BACnet MS/TP
22. Optional BACnet IP
23. Optional adaptive fan speed control and heat control based on existing field conditions. Field mounted outdoor temperature sensors required.

F. Provide mounting hardware as required for the opening.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that required utilities are in correct location and are of correct capacities for specified products.

B. Verify openings to receive air curtains are plumb, level, square, accurately aligned, correctly located, and in tolerance.

C. Examine surfaces to receive air curtains. If surface preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

A. Install air curtains in accordance with approved shop drawings and manufacturer's printed installation instructions.

B. Install air curtains plumb, level, square, true to line, and weathertight, without warp or rack.

C. Anchor air curtains securely in place to supports.

D. Coordinate with sheet metal flashing as specified in Section 07 62 00.

E. Install joint sealants as specified in Section 07 92 00.

F. Coordinate with electrical power as specified in Section 26 05 00.

G. Install door limit switches and adjust for correct operation.

H. Provide connection to piped services and utilities as specified in Section 22 10 00 and 23 21 00.

3.3 FIELD QUALITY CONTROL

A. Adjust air curtains to function properly.

B. Adjust air foil vanes located within the discharge nozzle as required for prevailing conditions at each opening.

C. Check heated air curtain performance on a calm day by measuring air temperature 6 inches off the floor. Optimal reading is halfway between the temperature inside and outside the building.

3.4 CLEANING

A. Clean air curtains promptly after installation in accordance with manufacturer's instructions.

B. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

C. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.5 PROTECTION

A. Protect materials and finish from damage until substantial completion.

3.6 SCHEDULES

A. Refer to Air Curtain Schedule appended to this section.

END OF SECTION

atmosphere is everything
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Reference Links

Link	Description
https://marsair.com/	Main website
https://marsair.com/document-library	Submittals for all Mars Air Curtains, Accessories, Installation, and Brochures
https://www.marsair.com/Content/Downloads/CSISpecs/LPV2-LPN2-CSI-Specification.doc	LPV2 Series CSI spec (Word doc)