



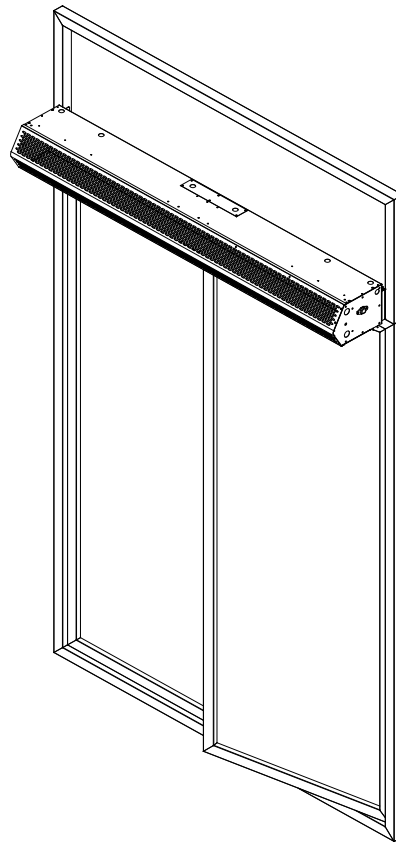
LoPro2 Submittal Package

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# LPV2 Unheated Series 2

LoPro Series 2  
Air Curtain  
Submittal Package



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

<b>P.O.#</b>	
<b>S.Q.</b>	
<b>Company</b>	
<b>Print Name</b>	
<b>Signature</b>	
<b>Date</b>	

(Electronic Signature Preferred)

**Company Seal or Stamp**

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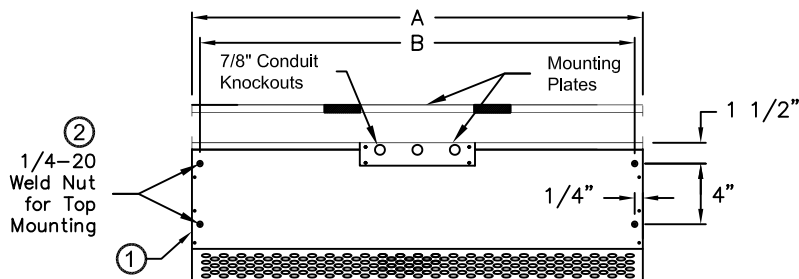
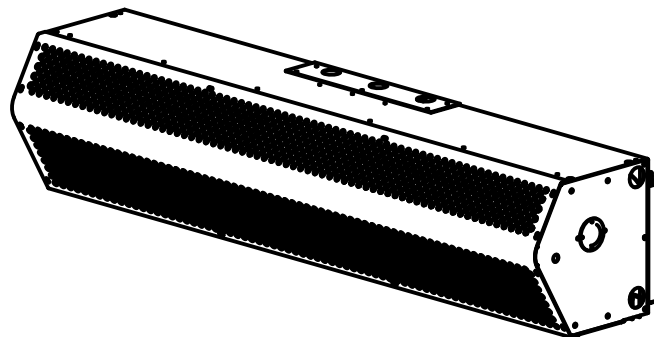
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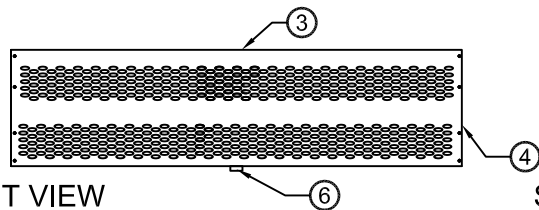
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# Unheated Drawing

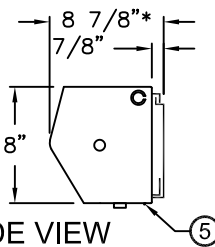
## LPV2 (LoPro2 Variable Speed) Series



TOP VIEW

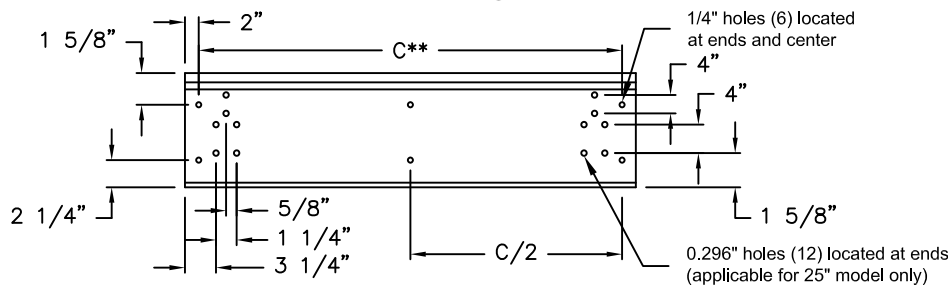


FRONT VIEW



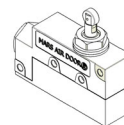
SIDE VIEW

\*Depth for Air Curtain with SimpleLink option will be 11 3/4"

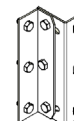


REAR VIEW

### ⑧ Recommended Accessories



Door Limit Switches  
(Mechanical plunger/roller style shown)



Brackets  
(Offset mounting style shown)

\*- Use corresponding letters in "Electrical Data" columns to complete the model numbers.

\*\*- "C" only applies to single units up to 72" units. Dims are not applicable for units 84" and longer.

MODEL NUMBER	OVERALL LENGTH A (in)	MOUNTING LENGTH B (in)	REAR MOUNTING CENTER C (in)
LPV225-1U*-OB	25	24 1/2	21
LPV236-1U*-OB	36	35 1/2	32
LPV242-1U*-OB	42	41 1/2	38
LPV248-1U*-OB	48	47 1/2	44
LPV260-1U*-OB	60	59 1/2	56
LPV272-1U*-OB	72	71 1/2	68
LPV284-2U*-OB	86	85 1/2	N/A
LPV296-2U*-OB	98	97 1/2	N/A
LPV2108-2U*-OB	110	109 1/2	N/A
LPV2120-2U*-OB	122	121 1/2	N/A
LPV2144-2U*-OB	146	145 1/2	N/A

### Notes:

- This product is designed to meet the National Electric Code (NEC) and ETL Listed (UL 507 and CSA 22.2).
- 1/4" mounting holes provided for wall mounting (4) and overhead mounting (4), (2) on each end. Additional 0.296" mounting holes (12) provided.
- All units have a self contained one piece cabinet up to 72", fire retardant and corrosion proof paint lock metal double protected with baked on Obsidian Black color, rust preventative electrostatic polyurethane powder coating.
- Cabinet has sufficient strength for fastening to wall on both ends without intermediate support. Units greater than 72" are double units joined with a 2" mounting bracket located in the center and must be center supported, field installed.
- Unit is to be installed such that air flow is unobstructed. Air discharge nozzle containing an adjustable air directional vane with 40° sweep front to back.
- Mounted adjustable speed controller knob allows air velocity to meet a wide range of field conditions. Units greater than 72", the speed controller will be located on the right hand unit and controls both units, field wired.
- Circuit protection as per NEC by others.
- Optional door limit switch and mounting brackets are field installed and/or wired by others. The door limit switch is to be mounted such that the air curtain turns on as door begins to open. To prevent unit damage, the mounting brackets must be installed such that the bottom of the air curtain is not below the door header.

# LPV2 (LoPro2 Variable Speed) Series

Unheated

Model Lengths 25" – 144"



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## Unheated Data Sheet

**Applications: Environmental Separation (up to 8') and Insect Control (up to 7')**

LPV2 (Low Profile Variable 2) Series 2	Mechanical Data						Lab Data	
Model Number	Nozzle Length (in)	Length (in)	Depth (in)	Height (in)	Motor (hp)	Weight (lbs)	Max Velocity (fpm)	Max Volume (cfm)
LPV225-1U*-OB	25	25	9	8	1/6	20	1800	625
LPV236-1U*-OB	36	36	9	8	1/6	32	1800	900
LPV242-1U*-OB	42	42	9	8	1/6	35	1800	1050
LPV248-1U*-OB	48	48	9	8	1/6	40	1800	1200
LPV260-1U*-OB	60	60	9	8	1/6	48	1800	1500
LPV272-1U*-OB	72	72	9	8	1/6	58	1800	1800
LPV284-2U*-OB	86	86	9	8	Two 1/6	75	1800	2100
LPV296-2U*-OB	98	98	9	8	Two 1/6	83	1800	2400
LPV2108-2U*-OB	110	110	9	8	Two 1/6	92	1800	2700
LPV2120-2U*-OB	122	122	9	8	Two 1/6	102	1800	3000
LPV2144-2U*-OB	146	146	9	8	Two 1/6	122	1800	3600

\* - Use corresponding letters in "Electrical Data" columns to complete the model numbers

Note: Data above is for 60 Hz, 17% reduction in the performance data with 50 Hz.

### Features:

- ❖ 1/6 HP continuous duty motors
- ❖ Sleek self-contained one-piece light gauge corrosion-resistant paint lock metal design
- ❖ ETL-certified to conform to UL 507 (US) and CSA 22.2 (Canada) standards (Indoor/Outdoor Use)
- ❖ Dynamically balanced corrosion-resistant aluminum crossflow wheels
- ❖ Very low-profile design, 8" (H) x 8 7/8" (D)
- ❖ Variable speed controller
- ❖ Wall mounting bracket removable for easy installation
- ❖ 1/4" mounting holes provided for wall mounting (4) and overhead mounting (4), 2 on each end
- ❖ Cabinet has sufficient strength for fastening to wall on both ends without intermediate support up to 72". (Models 84" to 144" require intermediate support in the center.)
- ❖ Adjustable air directional vane with 40° sweep front to back
- ❖ Standard color is Obsidian Black
- ❖ Rust preventative electrostatic polyurethane powder coating
- ❖ 5-year parts warranty
- ❖ Freight included (FOB continental USA)
- ❖ Proudly Made in the USA

### Mars Recommended Accessories (See Submittals for additional details):

- ❖ Door Limit Switches
  - 99-014, Combination mechanical switch, 250v, 1HP Max
- ❖ 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)
- ❖ Brackets
  - B0042, Transom mounting bracket set for LPV2
- ❖ Filters
  - J05\*\*, 1/2" aluminum pressed frame bank filters (\*\* = Model Length)
- ❖ Clean Air Sections
  - UVCL\*\*-\*-OB, UV Section (\*\* = Model Length, \* = Voltage Code)
- ❖ Severe Duty and Finish
  - HSG-304SS-LP, 304 Stainless steel housing construction

Electrical Data (FLA)	Unit Voltage (Voltage Code)	
	115v/1Ø (A)	208/230v/1Ø (D)
LPV225-1U*-OB	2.4	1.2
LPV236-1U*-OB	2.4	1.2
LPV242-1U*-OB	2.4	1.2
LPV248-1U*-OB	2.4	1.2
LPV260-1U*-OB	2.6	1.4
LPV272-1U*-OB	2.6	1.4
LPV284-2U*-OB	4.8	2.4
LPV296-2U*-OB	4.8	2.4
LPV2108-2U*-OB	5.0	2.6
LPV2120-2U*-OB	5.2	2.8
LPV2144-2U*-OB	5.2	2.8

\* - Use corresponding letters in "Electrical Data" columns to complete the model numbers.

Alternate voltage codes with FLA (Full Load Amp) data:

220v/1Ø/50Hz (U) - 0.9A per motor

For total FLA, multiply motor FLA by # of motors.

Ampacity (MCA) = total FLA X 1.25

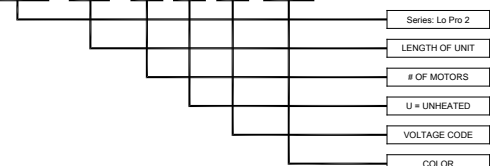
### Sound Levels: (measured at 10' in an open field)

(25" & 36") - 49 dBA, (42") - 50 dBA, (48") - 52 dBA, (60"-96") - 53 dBA & (108"-144") - 54



EXAMPLE

LPV2 72 - 1 U D - OB



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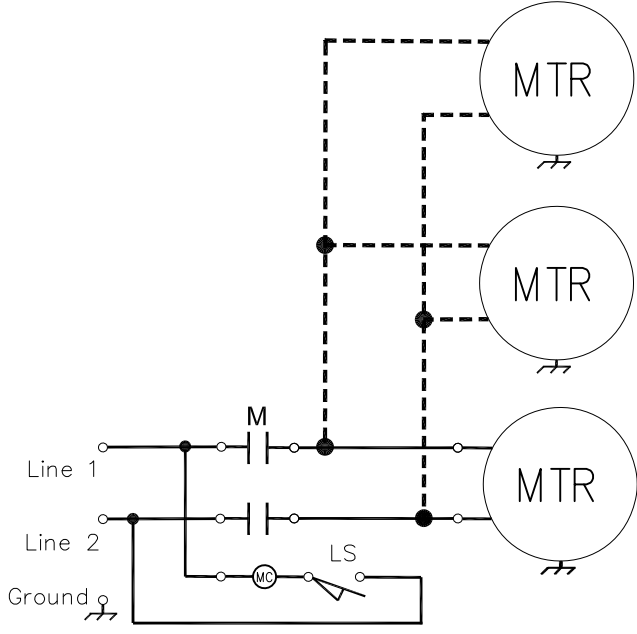
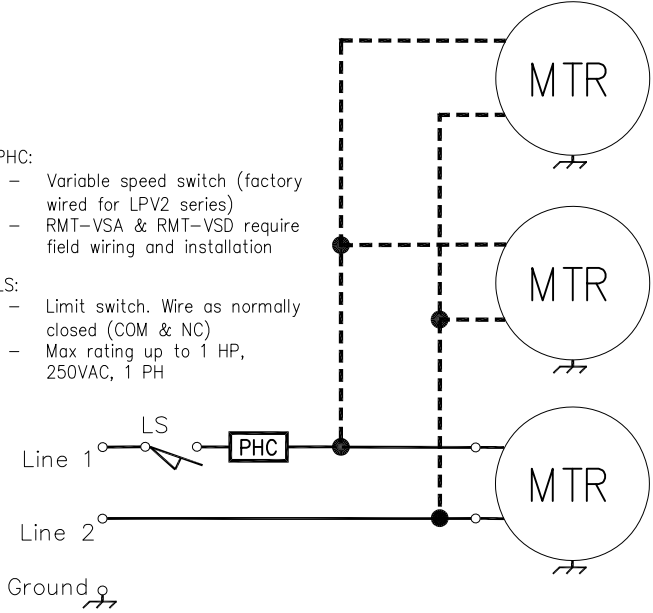
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## SINGLE PHASE TYPICAL UNHEATED DIAGRAMS

- PHC:
- Variable speed switch (factory wired for LPV2 series)
  - RMT-VSA & RMT-VSD require field wiring and installation
- LS:
- Limit switch. Wire as normally closed (COM & NC)
  - Max rating up to 1 HP, 250VAC, 1 PH



120/208-240/277v Single Phase Motor

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

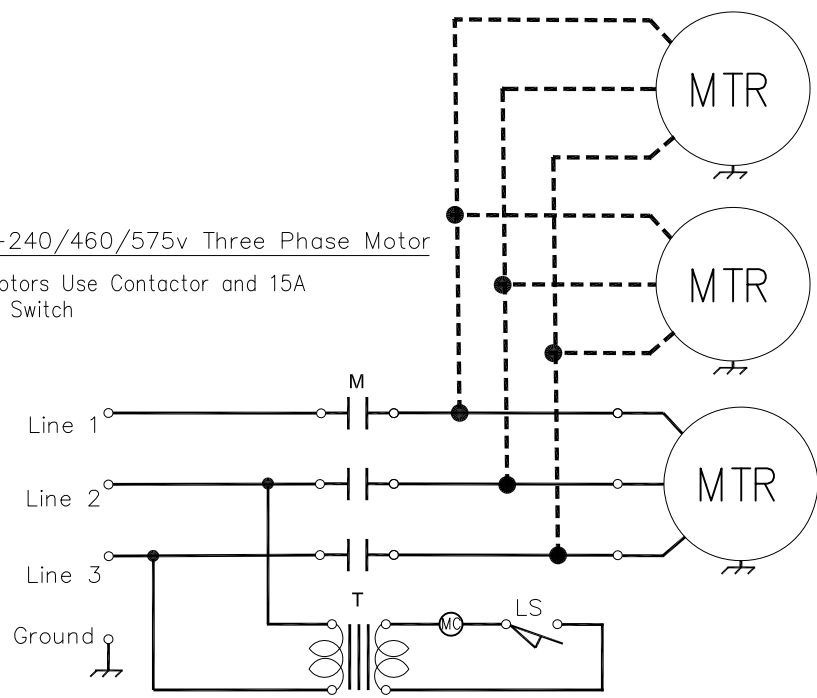
120/208-240/277v Single Phase Motor

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

## THREE PHASE

208-240/460/575v Three Phase Motor

All Motors 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

### SYMBOLS

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

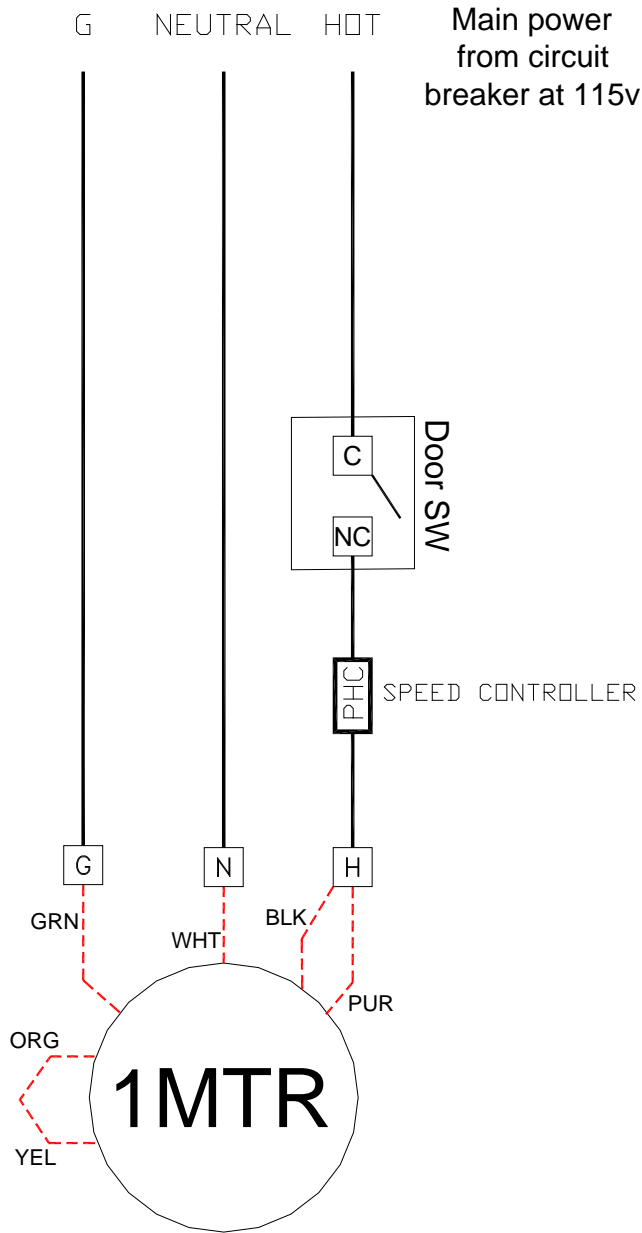


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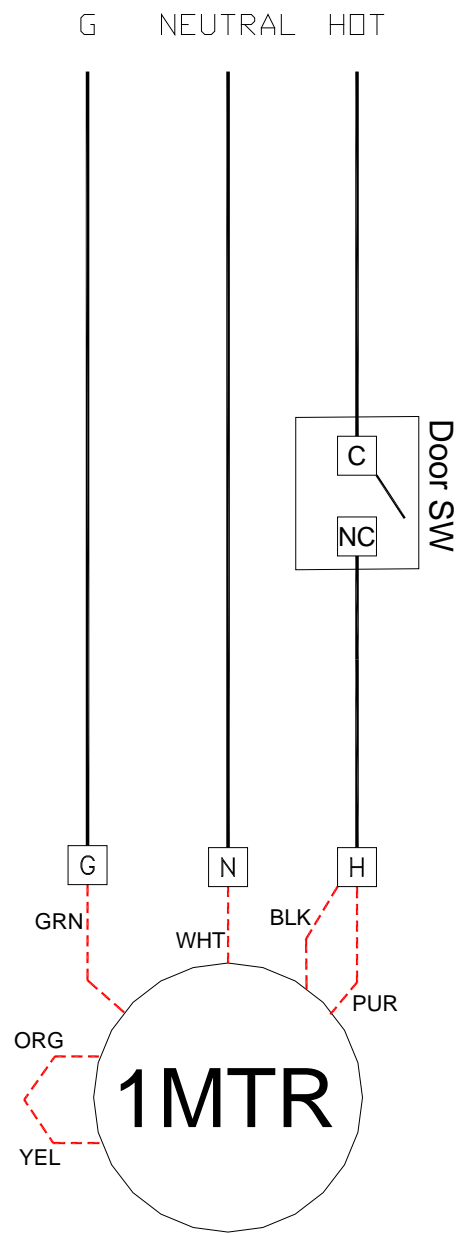
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### LPV2/LPN2 115V Unheated Wiring diagram with Door switch

#### LPV2 Wiring



#### LPN2 Wiring



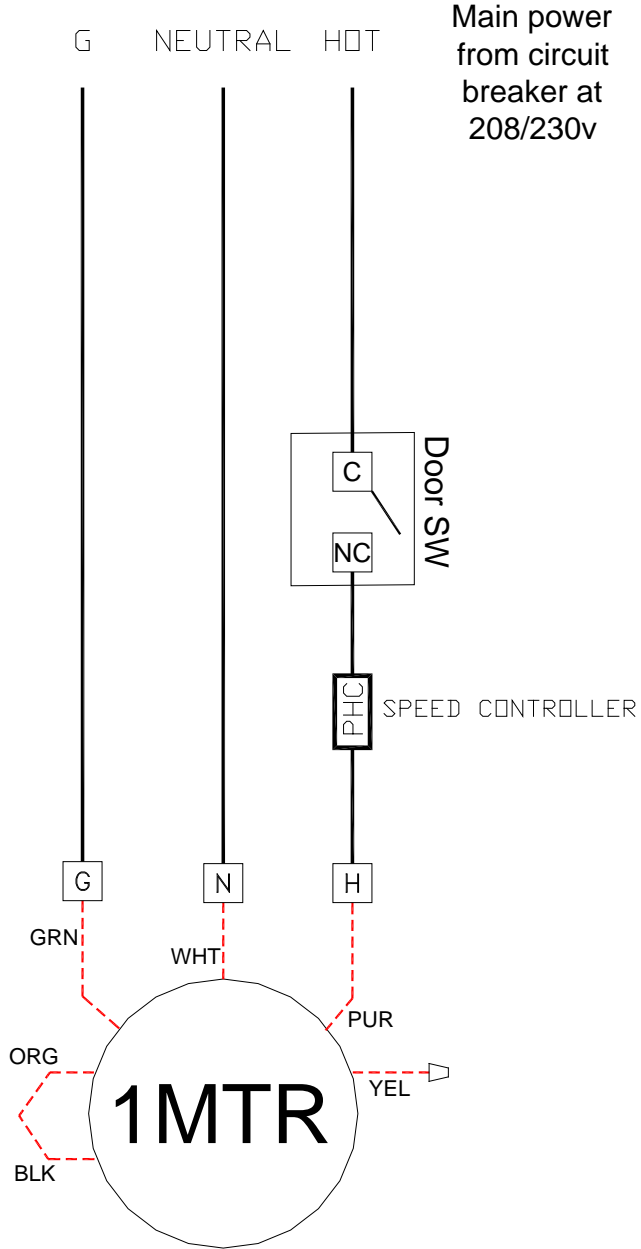


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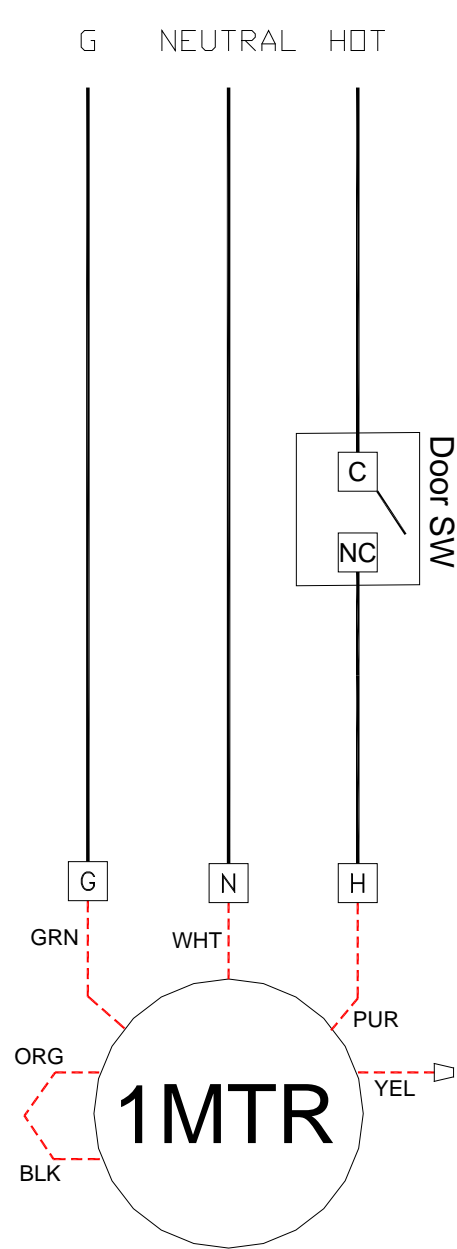
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### LPV2/LPN2 208/230V Unheated Wiring diagram with Door switch

#### LPV2 Wiring



#### LPN2 Wiring



## 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)

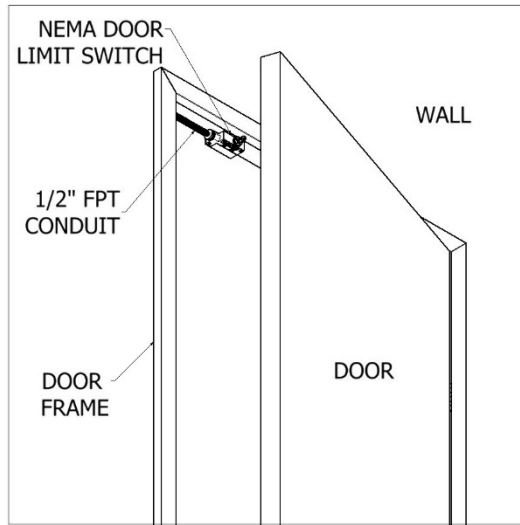


FIG. 1

2. Use light gauge materials when field fabricating brackets to activate and deactivate the door limit switch(es). (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.

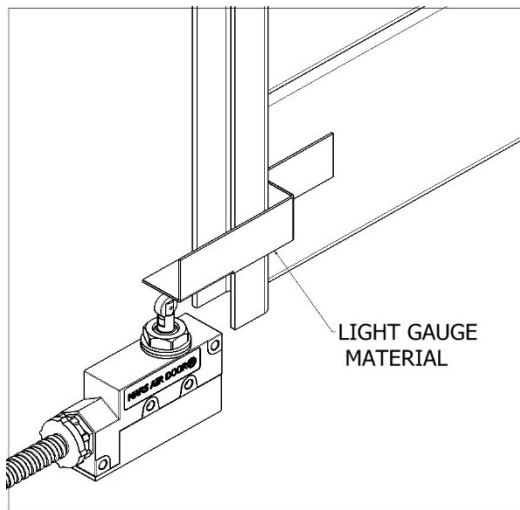


FIG. 2

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.

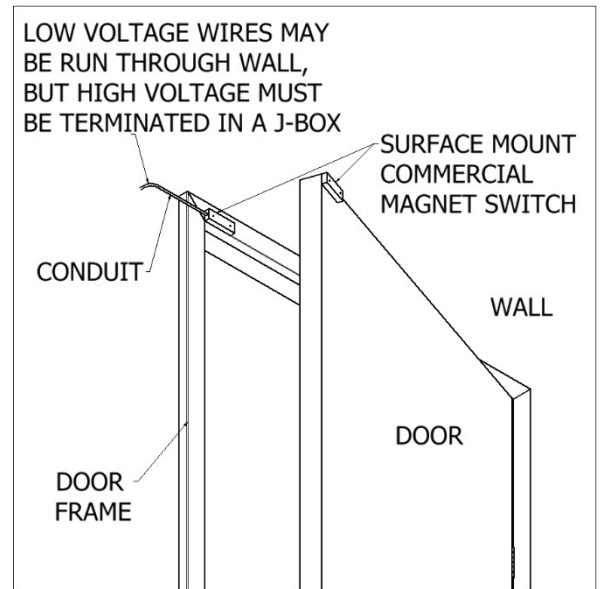


FIG. 3

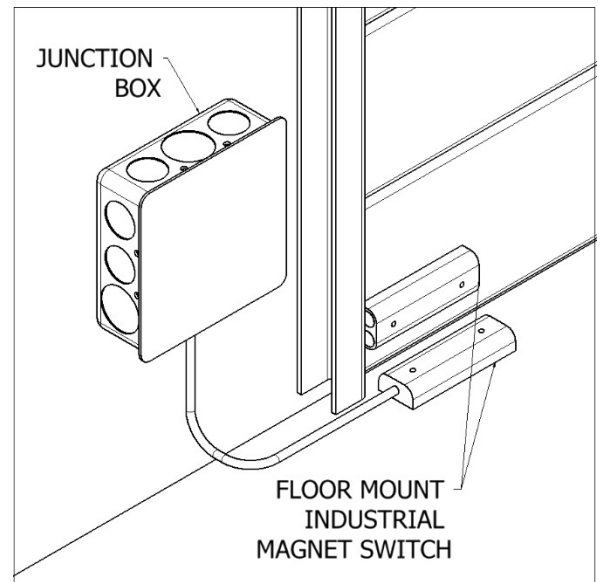


FIG. 4



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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)

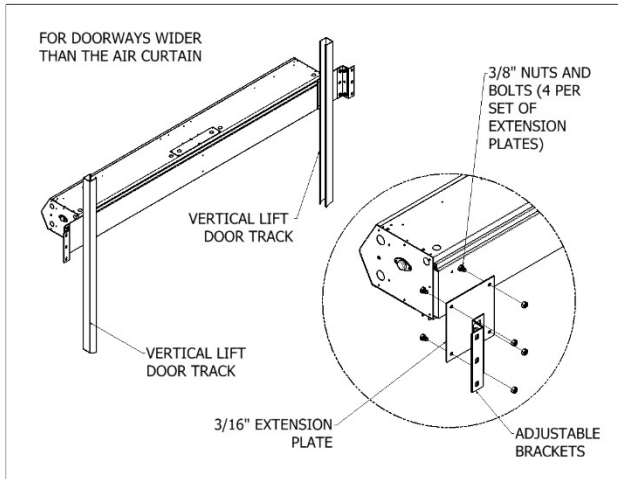


FIG. 5 (LPV SHOWN)

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

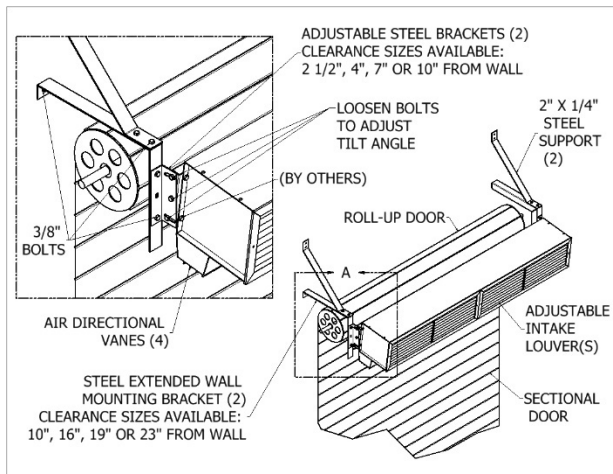


FIG. 6 (STD SHOWN)

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.

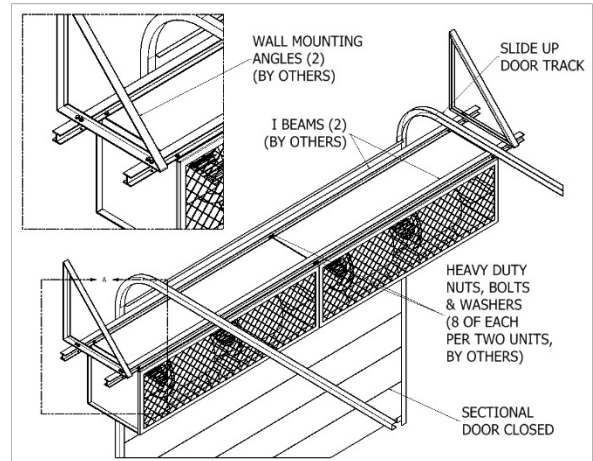


FIG. 7 (WMI/WMH SHOWN)

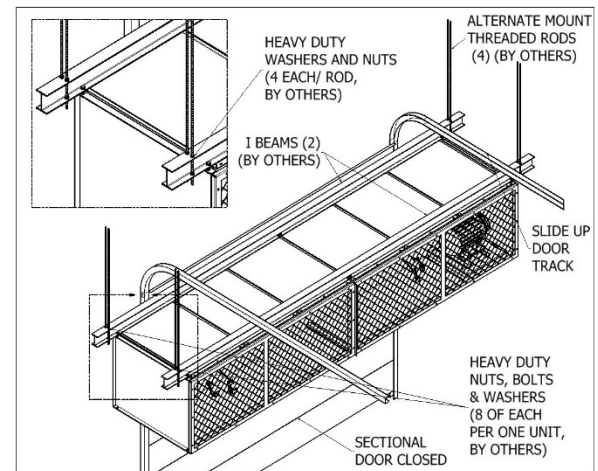


FIG. 8 (BD SHOWN)

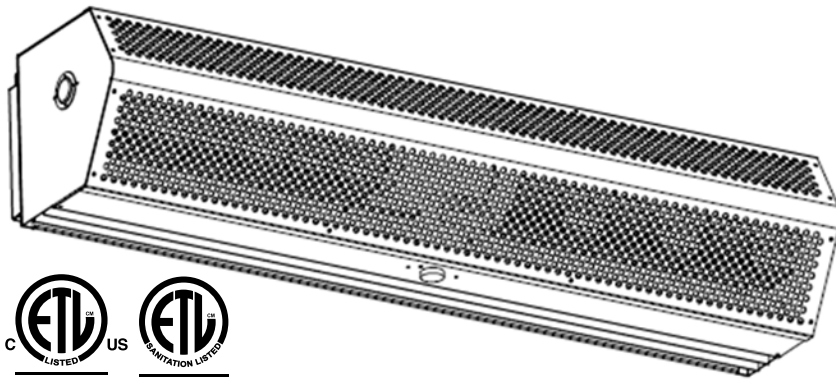
## LOW PROFILE (LPV2) VARIABLE SPEED AND LOW PROFILE (LPN2) ETL SANITATION CERTIFIED COMMERCIAL SERIES

### 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.

#### 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

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



#### 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.

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).



## 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.

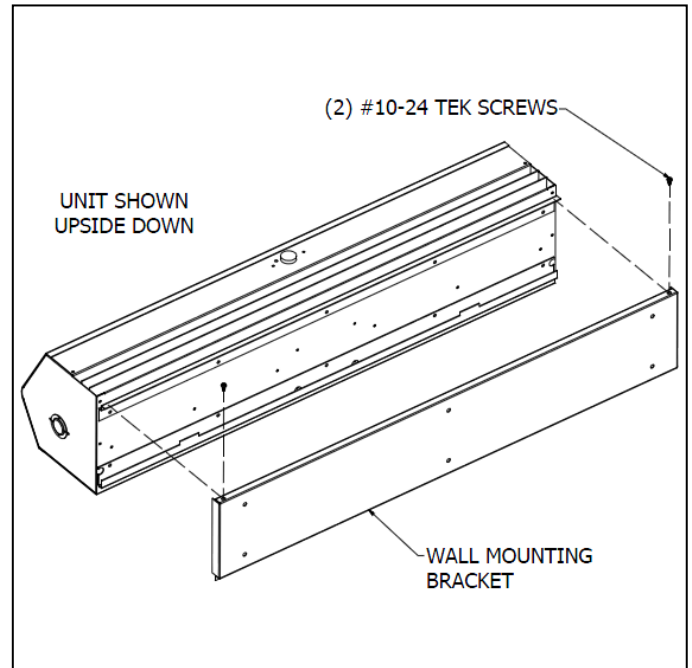


FIG. 1

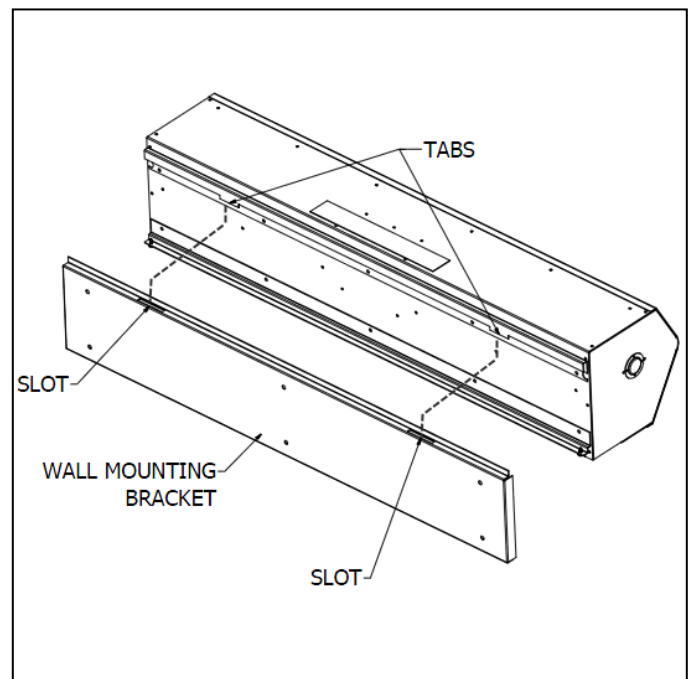


FIG. 2

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.

- 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)

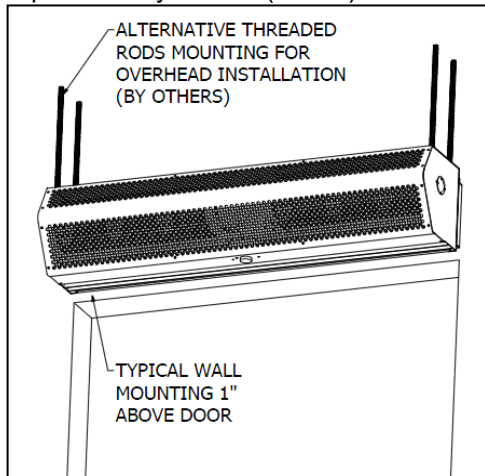


FIG. 3

- 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**)
- 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**)
- 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.
- 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)

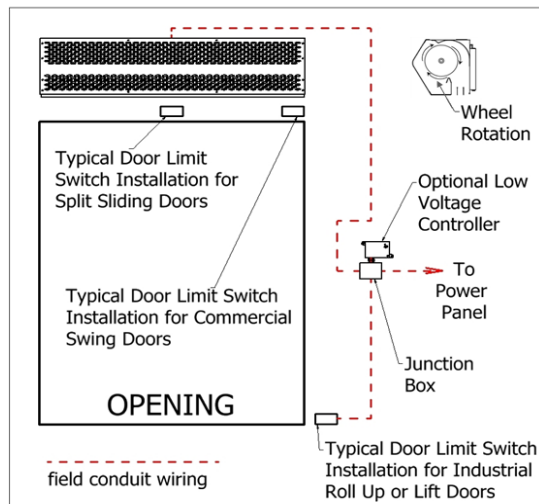


FIG. 4

### 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

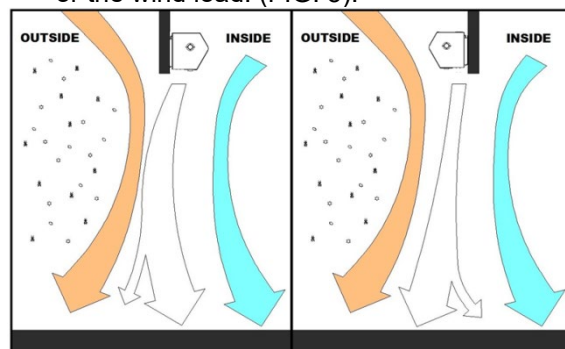
Prevent hazard of electrical shock. More than one disconnect switch may be required to de-energize this product.



### WARNING

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

- Re-check that the product has been installed properly and is level and secure.
- 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.
- Verify proper voltage prior to powering the product. (See product label for reference).
- Check all field wired components "if supplied" are wired correctly.
- Check that the inlet air supply and the discharge air supply are free of obstructions.
- Check that all air filter(s) and/or air intake grille(s) are in place and installed properly, as originally shipped.
- Verify voltage to the product once more and turn power on.
- 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.

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.

## 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.

## TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
NO AIR BLOWING OUT OF DISCHARGE NOZZLE	<ul style="list-style-type: none"> <li>- No power being supplied to the unit from the electrical power source</li> <li>- Circuit breaker is tripped</li> <li>- Blown fuses on power supply</li>   <li>- Motor overload is open or tripped</li>   <li>- Motor contactor / relay defective (if applicable)</li> <li>- Failed switch</li> </ul>	<ul style="list-style-type: none"> <li>- Confirm power source / check if in on position</li>   <li>- Reset circuit breaker</li> <li>- Replace fuses</li> <li>- 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</li> <li>- Check voltage to coil; check contacts to see if they are pulling in</li> <li>- Replace or repair limit switch</li> </ul>
MOTOR IS RUNNING BUT FANS ARE NOT SPINNING	<ul style="list-style-type: none"> <li>- Loose or broken coupling (belt drive)</li>   <li>- Loose set screws on wheel hubs</li> <li>- Fan spinning inside fan housing</li> <li>- Broken fan hub</li> </ul>	<ul style="list-style-type: none"> <li>- Replace or tighten coupling</li>   <li>- Tighten set screws on motor shaft flats</li> <li>- Tighten fan on shaft or replace fan</li> <li>- Replace fan wheels</li> </ul>
ELECTRICAL CONTROLS NOT WORKING WHEN DOOR IS OPEN	<ul style="list-style-type: none"> <li>- Switch is in off position</li>   <li>- Door limit switch is not operating</li> </ul>	<ul style="list-style-type: none"> <li>- Turn unit's switch to the on position</li>   <li>- Repair or replace door limit switch</li> </ul>
UNIT WILL NOT TURN OFF	<ul style="list-style-type: none"> <li>- Door limit switch is permanently closed or energized</li> </ul>	<ul style="list-style-type: none"> <li>- 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.</li> </ul>
LOW AIR FLOW	<ul style="list-style-type: none"> <li>- Discharge air vanes out of adjustment</li> <li>- Obstruction on intake or discharge</li> <li>- Power leads out of polarity</li>   <li>- Blower motor rotating below normal speed</li> <li>- Fan rubbing against housing</li> <li>- Blower wheels clogged with dirt</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust vanes to proper position (Refer to Start-Up Section in this manual)</li> <li>- Remove obstruction or move air curtain</li> <li>- Switch power leads to correct polarity (3 phase models only)</li> <li>- Apply proper voltage per unit requirement (see unit label) / Adjust adjustable motor speed knob (if applicable)</li> <li>- Free fan from housing</li> <li>- Clean and remove dirt from blower wheels</li> </ul>
EXCESSIVE AIR VELOCITY AT DOOR OPENING	<ul style="list-style-type: none"> <li>- Nozzle out of adjustment and not angled far out enough (BD only)</li> <li>- Air temperature too cold</li> <li>- Air stream pushing air outside of the building</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust nozzle angle to outside</li>   <li>- Add auxiliary heat to overcome wind chill</li> <li>- Adjust discharge angle back into building</li> </ul>
AIR NOT HITTING THE FLOOR	<ul style="list-style-type: none"> <li>- Low air velocity</li>   <li>- Obstruction in the direction of air flow</li>   <li>- Negative building pressure</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust vanes to proper position or check installation height (Refer to Start-Up Section in this manual)</li> <li>- Remove obstruction or move air curtain (Move out 3/8" for every 1" up from the door)</li> <li>- Provide a make-up air system to relieve negative building pressure</li> </ul>
UNEVEN AIR	<ul style="list-style-type: none"> <li>- Shaft rotating inside fan</li> <li>- One motor not functioning</li> </ul>	<ul style="list-style-type: none"> <li>- Replace fan or tighten fan on shaft</li> <li>- Replace or repair motor</li> </ul>
EXCESSIVE NOISE AND OR VIBRATION	<ul style="list-style-type: none"> <li>- Loose or broken coupling (belt drive)</li> <li>- Loose set screws on wheel hubs</li> <li>- Fan spinning inside fan housing</li> <li>- Broken fan hub</li> <li>- Bearing end caps worn</li> <li>- Damaged blower wheel</li> <li>- Bearing end caps worn</li> <li>- Pillow block bearings make noise</li> <li>- Balancing clips missing</li> </ul>	<ul style="list-style-type: none"> <li>- Replace or tighten coupling</li> <li>- Tighten set screws on motor shaft flats</li> <li>- Tighten fan on shaft or replace fan</li> <li>- Replace fan wheels</li> <li>- Replace Bearing end caps</li> <li>- Replace Blower Wheel</li> <li>- Replace Bearing end caps</li> <li>- Grease Bearing</li> <li>- Replace Blower Wheel</li> </ul>

# 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												
 atmosphere is everything										MOTOR WIRES OR TERMINAL (T) OHM READINGS		
										HIGH SPEED (1750)	MEDIUM SPEED (1650)	LOW SPEED (1450)
Applicable Air Curtain Series	Mars Part #	Manufacturer Part #	Brand	Motor Rating	HP	Voltage	Phase	Capacitor Rating	Motor Frame	Black Motor Wire & White Motor Wire	-	-
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	48517T439	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	P55YDHB-1527	US	Nema 1	1/2	208-230	3	48	16.1	16.1	16.1	
	03-008	P55YDHB-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 - 215TTF6027	Marathon	Nema 1	10	208-230	3	215T	0.4	0.4	0.4	
	03-033	U639A - 215TTF6027	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:** \_\_\_\_\_



atmosphere is everything

**14716 S. Broadway St., Gardena, CA 90248**

**(310) 532-1555 • (800) 421-1266**

**Fax: (310) 324-3030**

**Please go to our website at [www.marsair.com](http://www.marsair.com) for a downloadable version of this document.**





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SECTION 23 34 33

AIR CURTAINS

*Important Note: This specification contains hidden text appearing in red. To show or remove hidden text in MSWord, click the "File" tab or "Office" icon on the top-left corner, select "Options," select "Display," and check or uncheck the box marked "Hidden Text."*

## 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



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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)**