BLAST-IT-ALL®	BLAST-IT-ALL® LEADING THE INDUSTRY IN SURFACE PREPARATION EQUIPMENT	**HESS MANUFACTURING, INC.** *185 Piper Ln.* *Salisbury, NC 28147* *(800) 535-2612* *LIVE CHAT- www.blast-it-all.com*

M-SERIES
REVERSE PULSE
DUST COLLECTOR
(M6) MM502

www.blast-it-all.com

** WARNING **

DO NOT USE SAND. SAND WILL CAUSE SILICA DUST, WHICH IS THE CAUSE OF SILICOSIS DISEASE, A CONDITION OF MASSIVE FIBROSIS OF THE LUNGS. THIS STATEMENT INDICATES A POTENTIAL PERSONNEL HAZARD. FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.

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List of Illustrations

SPECIFICATIONS AND INSTRUCTIONS

GENERAL DESCRIPTION

The MODEL M COLLECTORS are Cartridge Filter jet pulse type collectors. These collectors may be supplied as a complete unit. An air inlet is located on the top of the collector. The dirty air stream passes through the inlet and is deflected away from the cartridges to help prevent premature cartridge wear. As the dirty air enters the collection chamber the velocity reduces due to the expanded area. The heavier particles drop into the DUST CONTAINER. The air separates as it is drawn into the cartridge filter(s). The air goes through the cartridge media for the final separation of the solids (dirt) from the air stream. Solid particles are captured on the filter media as the air stream passes through and into the center section of the cartridge and is exhausted from the collector. Compressed air jets are used periodically to BACK FLUSH (CLEAN) the filter pleats causing the collected particles to fall down into the DUST CONTAINER.

DESIGN CONSIDERATIONS

- Maximum negative pressure: 15" WG.
- Design operating temperature: 150 F
- Compressed air supply: 80 to 90 PSIG operating pressure with a 100 PSIG being the maximum design.

INSTALLATION AND ARRANGEMENT

The user will place the unit on a flat level surface and Anchor the Legs to the Floor.

Fan Motor Selection will determine Installation:

- Single Phase Operation
- 3 Phase Operation
- Machine w/Control Panel (Refer to Machine Schematics)

User will provide Wiring to the Fan Motor as well as the Pulse Control Board

BASIC CONSTRUCTION

Basic Unit: The basic unit is fabricated from 12 gauge carbon steel. All seams are welded to form a solid seal. The air jet valves are designed especially for this type air pulse application and are operated through the sequence control by manual push buttons or by timed unit depending on the model of the unit.

Filter Cartridges: Each cartridge contains approximately 103 SQ.FT. FILTER AREA FOR EACH CARTRIDGE, and the number of filter units depends on the unit size.

Cleaning Control: The cleaning is actuated by one of two means. On the manual cleaning units a manual push-button is provided. On the AUTO CLEAN units a solid state controller is provided.

REVERSE PULSE JET AIR SYSTEM

The compressed air manifold is to be supplied with compressed air at 85 PSIG. The user must provide a pressure regulator to maintain this pressure. The air supply must be clean and free of moisture.

PAINT

All Units are Coated on the Interior and Exterior with an Industrial Grade Enamel that provides Excellent protection properties throughout the Life of the Unit.

SHIPMENT

The units are shipped assembled.

COMPRESSED AIR PIPING

The compressed air piping installed by the user shall be a minimum of 1/2" sch 40. IN ADDITION, A PRESSURE REGULATOR MUST BE PROVIDED AND INSTALLED BY THE USER.

PRE-START CHECK

Review all components to ensure that they are operational.

- ALL DUCTWORK - The inlet and exhaust ducting must be inspected to assure it is properly installed and complete.
- DUST CONTAINER - The FLEX HOSE MUST be installed and attached to the dust container. This container MUST be closed and secured before operation.
- COMPRESSED AIR PIPING - A pressure regulator MUST be installed and set for 85 PSI. Make sure the air is clean and dry.
- WIRING - Motors MUST be wired and installed with proper overload protection.
- SEQUENCE CONTROL BOX - Provide incoming wiring. Control will be pre-set.
- ELECTRICAL PROTECTION DEVICES - Fuses, circuit breakers, heaters, etc., MUST be properly sized and installed.
- SYSTEM FAN - Make sure the rotation of the fan is correct.

OPERATION

START-UP AND OPERATION

- Turn on compressed air supply
- Start system: CHECK FAN ROTATION
- Check seals.

FILTER CLEANING

- If the unit is equipped with an automatic pulse cleaning, the cleaning cycle will be timer activated when the unit is in operation.
- If the unit is Equipped with an ***Photohelic Gauge***, Automatic Pulse cleaning cycle will be based on the High Limit Setting of the Gauge.

If the unit is not equipped with a automatic pulse package, the filters are cleaned by manually pushing the clean pulse air valve. This will allow the cartridge to be pulse cleaned. **(PUSH AND RELEASE) THIS NEEDS TO BE OPERATED AT LEAST ONCE EACH HOUR OF OPERATION OR MORE IF A DIRTY CABINET CONDITION EXISTS.**

DUST CONTAINER

The collector must be shut down before any attempt is made to empty the dust container.

- Shut system down.
- Remove and empty container in to approved dust receptacle.
- Replace container and attach cover.

MAINTENANCE

Regular maintenance is consistent with satisfactory and efficient operation of any dust collector. Remember to clean and inspect the filters regularly and do not allow the dust container(s) to overfill.

WEEKLY

- Compressed air pressure set at 85 PSI.
- Drain all moisture from compressed air lines.
- Check and record pressure drop across the filters.
- Empty dust container. The container may have to be emptied more frequently depending on use.

MONTHLY

- Inspect dust container gasket(s).
- Remove and inspect filter cartridge.
- Replace cartridge if evidence of dirt is inside.

YEARLY

- Check all gaskets and replace if required.
- Remove all cartridges and inspect for wear. If evidence of dirt is inside replace filters.

FILTER REMOVAL

- Unscrew filter cover and remove filter.
- Pull out filters.

FILTER CARTRIDGE REPLACEMENT

- Brush any dust that may have fallen. Remove any bits of the old filter gasket that may have stuck to the filter plate.
- Slowly place cartridges in holes.
- Tighten cover plate.

TROUBLESHOOTING

- VISIBILITY POOR IN CABINET
  - Pulse Interval Time Too Long:

    Adjust the knob in the sequence control panel to shorter time.

  - Filter(s) Wet:

    Make sure there is no moisture in the compressed air lines.

  - Filter(s) Blinded:
    A. Blinded filters can be the result of operating the unit too long without cleaning or the cleaning interval is too long.
    B. The dust container is over full. A full container will cause severe dust retainment, which will overload (blind) the filters.

    Remove the filters from the unit and clean or replace.

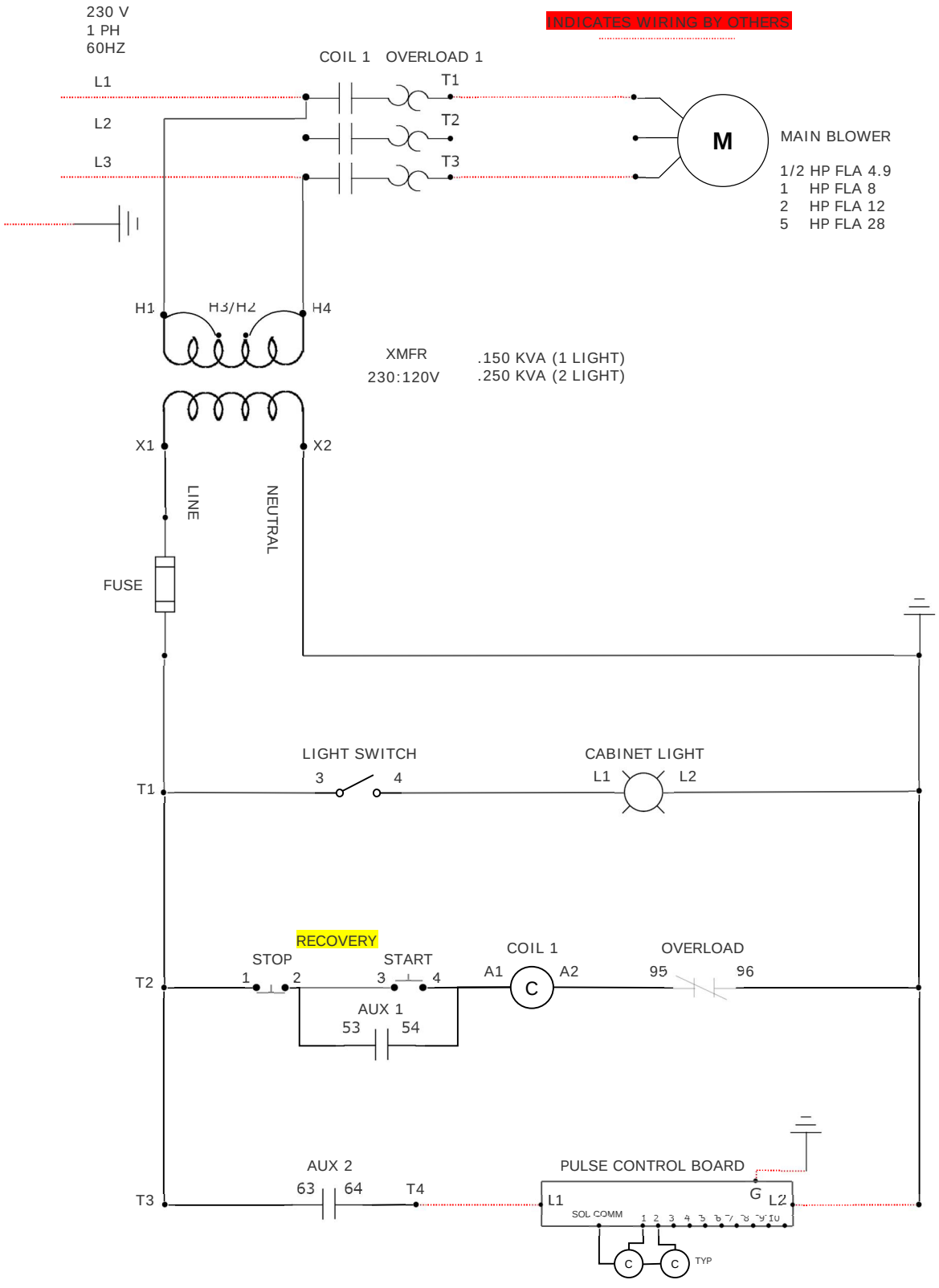
- CONTROL CIRCUIT FAILS TO OPERATE:

  If the diaphragm valve does not operate, this generally indicates a leak in the tubing. If the control tube has a leak the diaphragm valve will remain open and no pressure will build up in the log manifold.

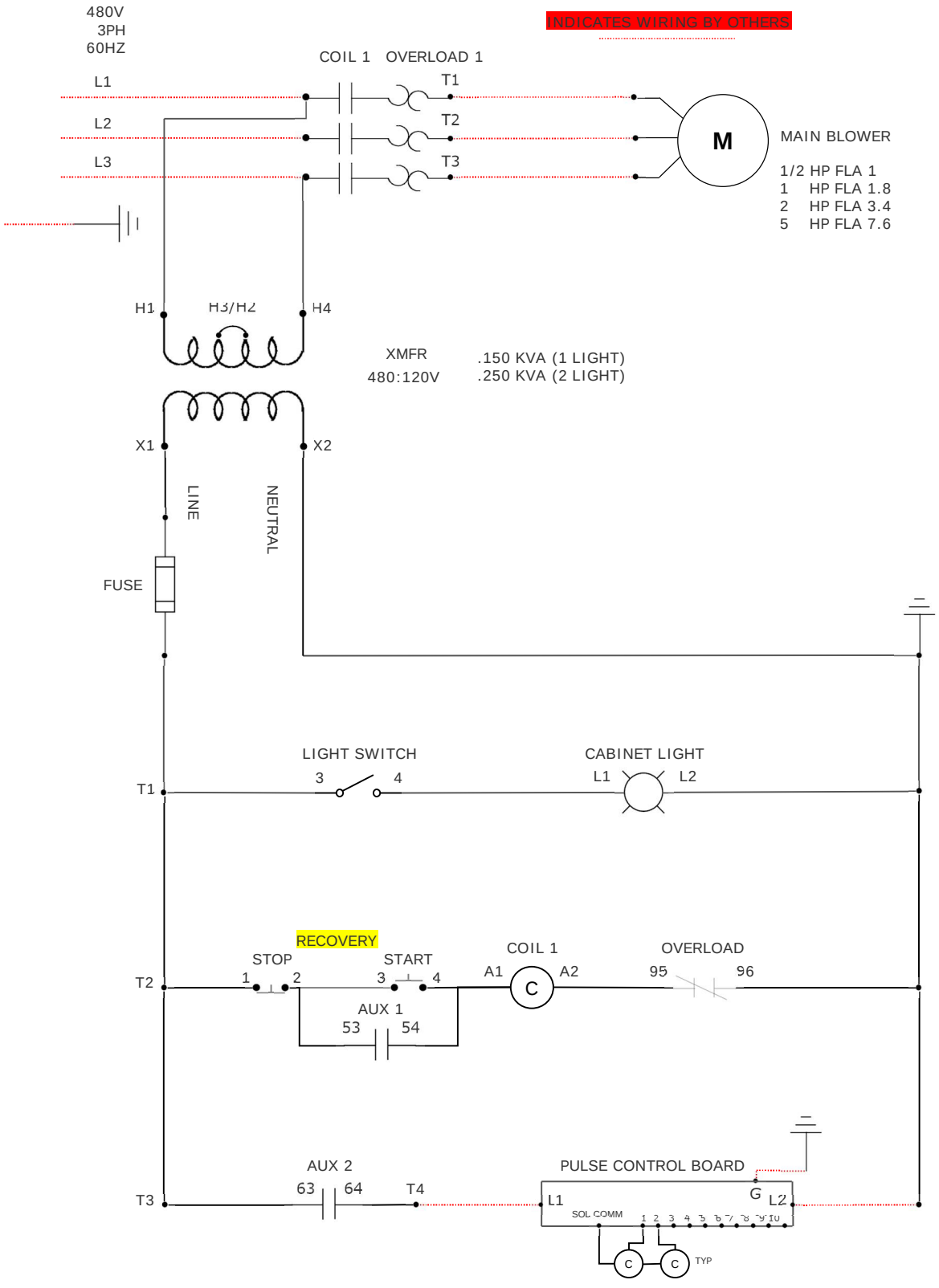
  - Compressed Air Bleed Down: If a diaphragm valve will not return to the closed position, this indicates either a break in the diaphragm, a leaking control line, or a control pulse solenoid is stuck in the open position.

  Check to make sure there is sufficient air pressure/flow to the log manifold.

- PUFF OF DUST OUT EXHAUST AFTER EACH CLEANING:
  - Cleaning Too Often: Clean less often or increase the interval on the control panel.
  - Filter Worn: Remove and inspect filters for pin holes, spots, or other locations where dust may be passing through the filter media. Replace filter cartridges if required.
- CONTINUOUS DUST OUT EXHAUST:
  - Broken, Torn, or Punctured filter media. Locate and replace cartridge.
  - Poor Seal Between Cartridge and Collector Plate: Look for dust patterns around the filter seals. Re-tighten or replace filter. Do not attempt to repair gasket seal.



Name: **230 VOLT 1 PHASE CONTROL BOX**		Drawing:	Project:	Drawn: JRL	Notes: ALL NEUTRALS JUMP MOTOR/DC WIRED BY OTHERS	**HESS MANUFACTURING INC. 185 PIPER LN SALISBURY, NC 28147**
Cat: **ELECTRICAL**		Scale: NTS	Date: JAN 2023	Rev: B		



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Cat: **ELECTRICAL**	Scale: NTS	Date: JAN 2023	Rev: B		

--M6 ASSY

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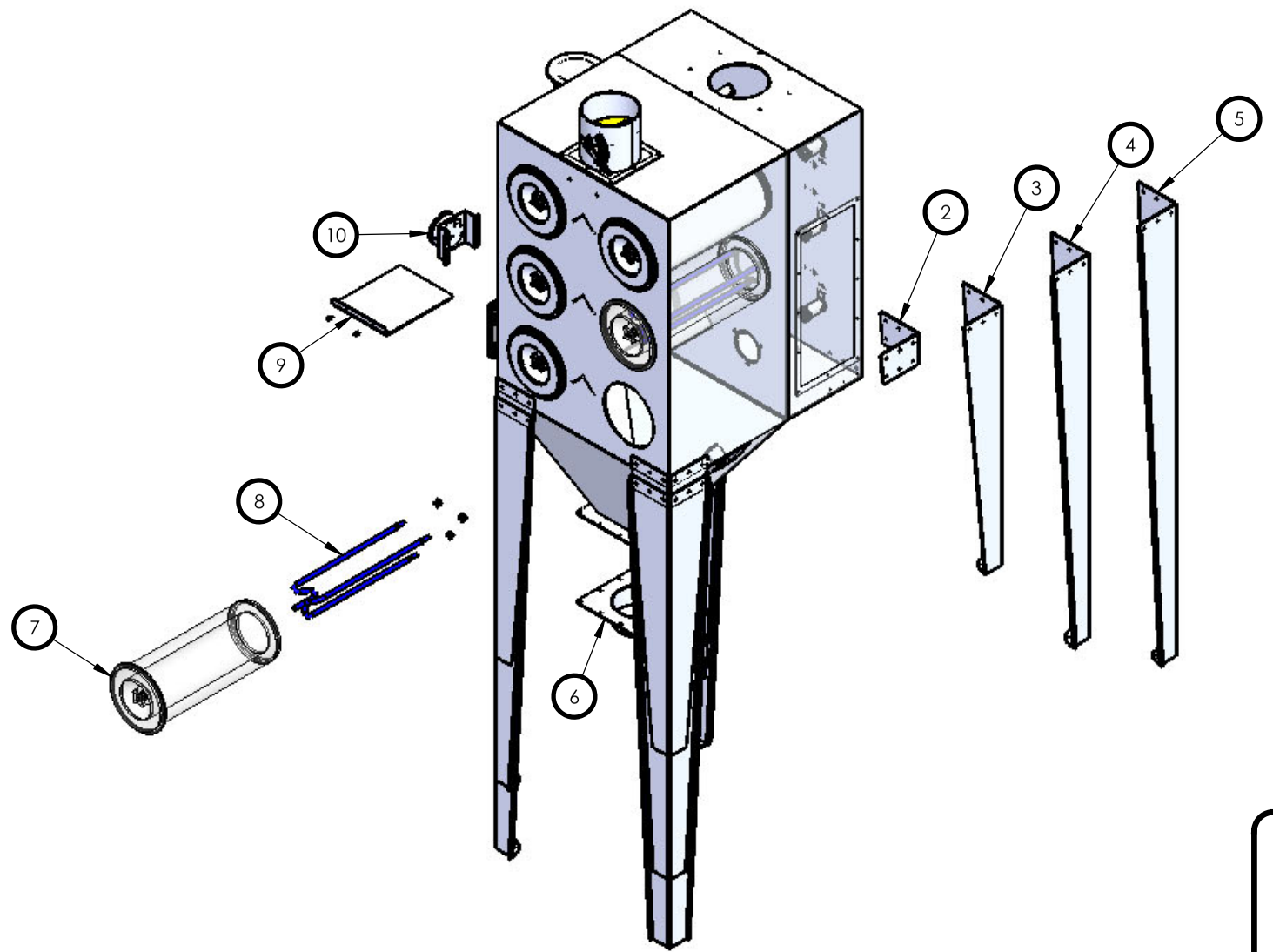

MODIFICATIONS:				
ZONE:	REV:	DESCRIPTION:	DATE:	BY :
	A	INITIAL RELEASE	8/22/2023	MTS

M6 BODY ASSY

#:	QTY:	DESC/ MAT:	PRT#:
10	1	MAGHELIC GAUGE ASSY	MAGHELIC GAUGE
9	1	BAFFLE	B2199-09
8	6	CARTRIDGE FILTER FRAME	B2185-04
7	6	CARTIDGE FILTER	011519
6	1	7-7/8 WASTE OUTLET FLANGE	B2198-10 ASSY
5	4	M4 / M6 55 GAL LEG ASSY	B2749
4	4	M4-M6 30 GAL LEG ASSY	A2786
3	4	M4 / M6 5 GAL LEG ASSY	B2748
2	4	LEG ADAPTER	A2748-LA
1	1	8 IN DAMPER ASSY	001046

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TITLE / DESC: M6 ASSEMBLY STD			SIZE: B
		DWG#: --M6 ASSY	DREV: 01
		PART#: M6 ASSY	XXXX: A
DWG BY: T.SHUE	DATE: 8/22/2023	SCALE: 1:20	
MAT:	SHT#: 1 OF 5	DWG TYPE:	

--M6 ASSY

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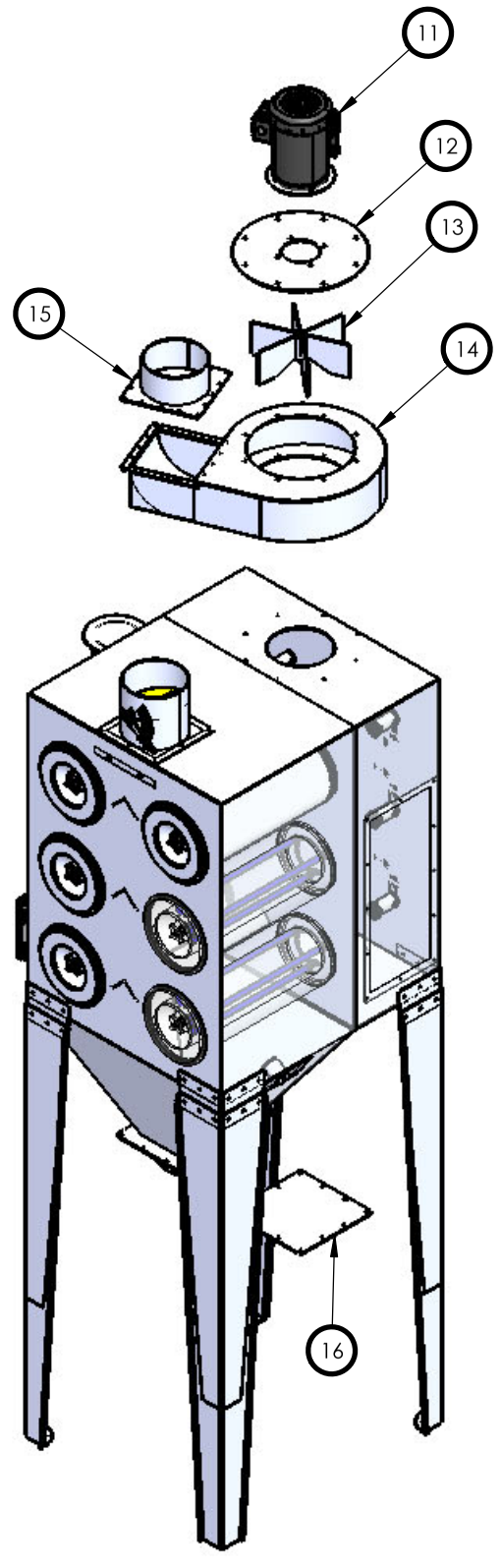

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ZONE:	REV:	DESCRIPTION:	DATE:	BY :
	A	INITIAL RELEASE	8/22/2023	MTS

M6 900 CFM ASSY

#:	QTY:	DESC/ MAT:	PRT#:
16	1	CVR PLATE	SWB2198-10CV
15	1	8 IN INLET	B12374
14	1	900 CFM BLOWER ASSY	A35346
13	1	900 CFM FAN BLADE ASSY	A12064
12	1	MOTOR PLATE	A12066-02
11	1	3 HP MOTOR	13-900

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TITLE / DESC: M6 ASSEMBLY STD		SIZE: B
	DWG#: --M6 ASSY	DREV: 01
	PART#: M6 ASSY	XXXX: A
DWG BY: T.SHUE	DATE: 8/22/2023	SCALE: 1:20
MAT:	SHT#: 2 OF 5	DWG TYPE:

--M6 ASSY

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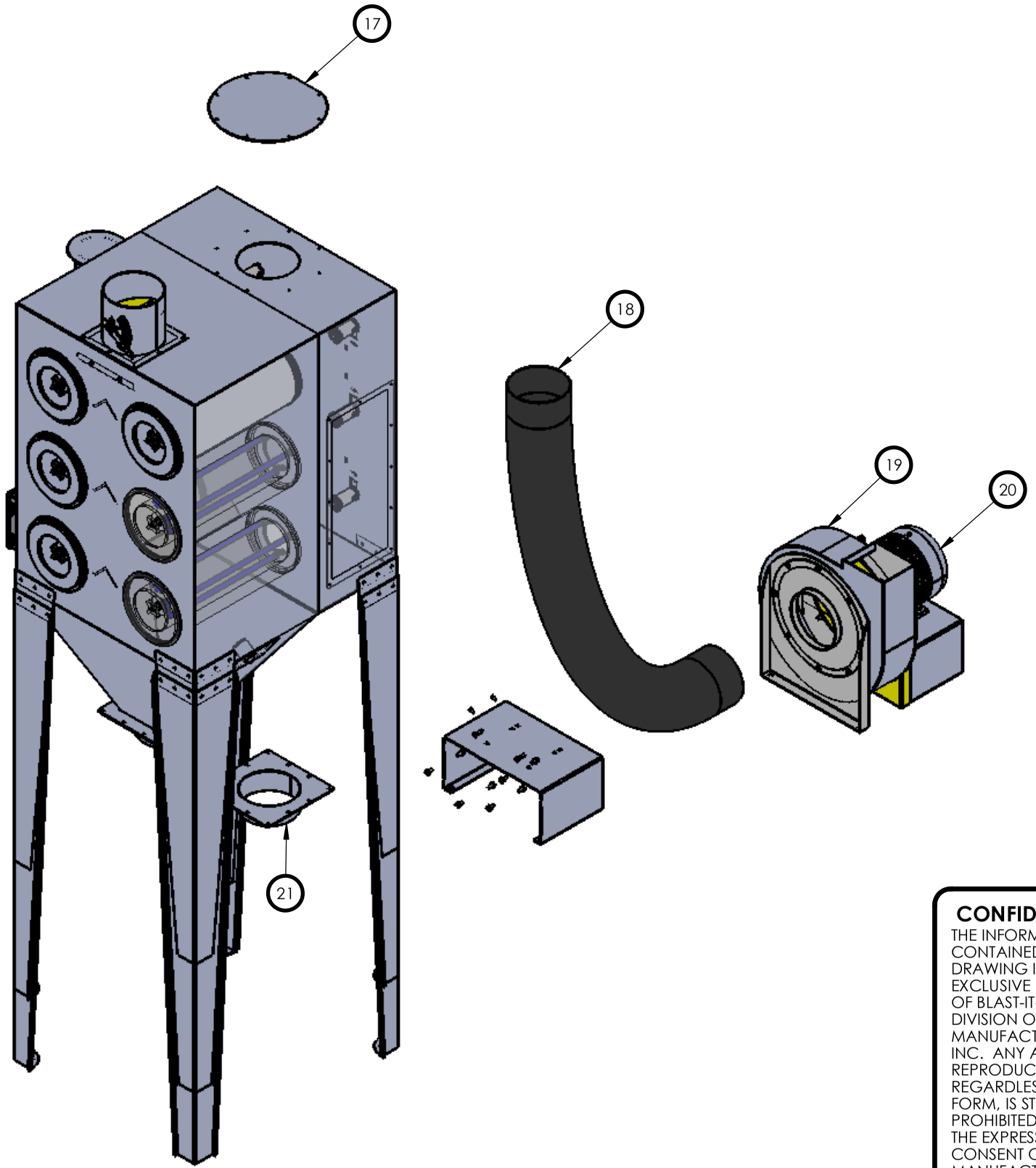

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	A	INITIAL RELEASE	8/22/2023	MTS

M6 1200 CFM FLOOR ASSY

#:	QTY:	DESC/ MAT:	PRT#:
21	1	7-7/8 WASTE OUTLET FLANGE	B2198-10 ASSY
20	3	MOTOR, 5 HP, 3 PHASE	000079
19	3	FAN, 1200 CFM	005331
18	1	8 IN FLEX HOSE	1200 FLEX HOSE
17	1	OUTLET CVR	B2245-08

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TITLE / DESC: M6 ASSEMBLY STD		SIZE: B
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	PART#: M6 ASSY	XXXX: A
DWG BY: T.SHUE	DATE: 8/22/2023	SCALE: 1:16
MAT:	SHT#: 3 OF 5	DWG TYPE:

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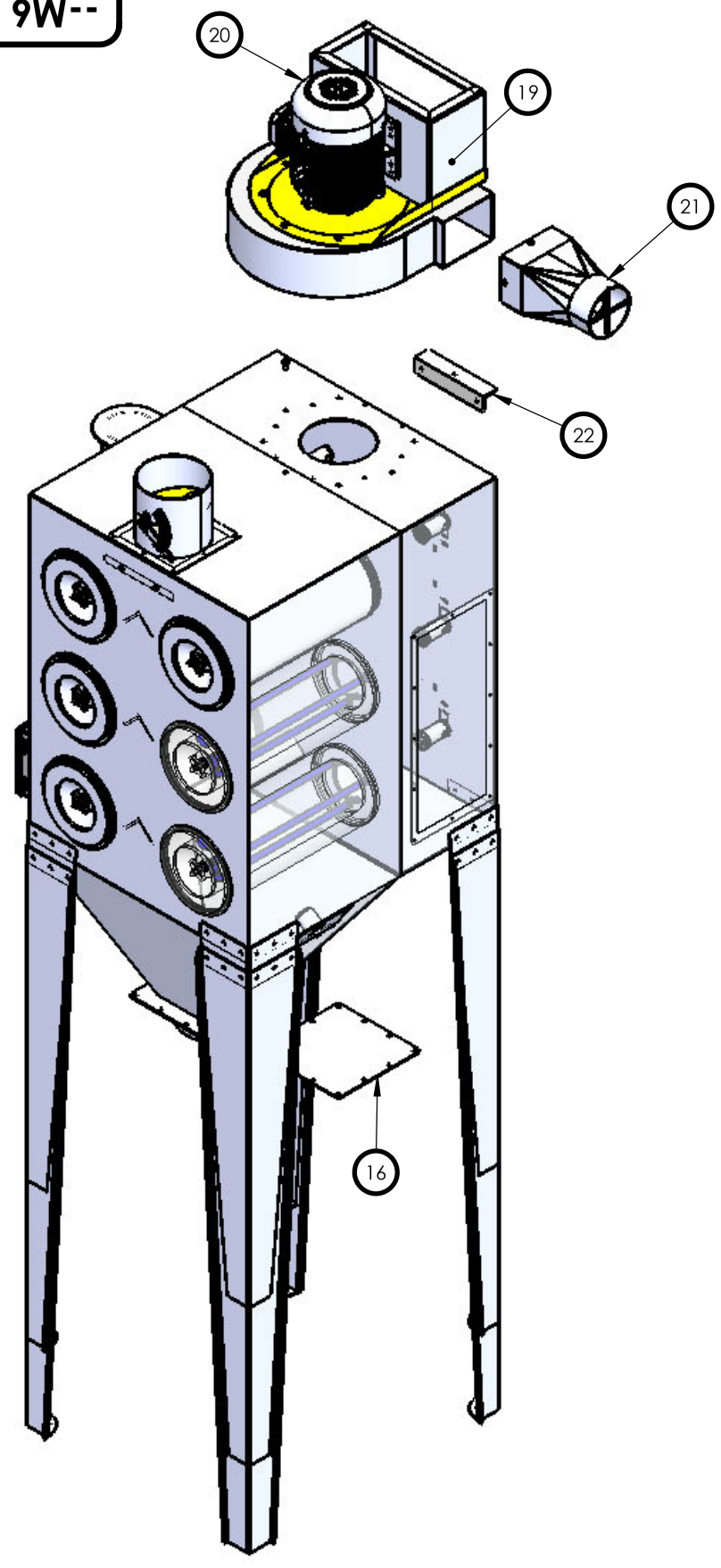

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	A	INITIAL RELEASE	8/22/2023	MTS

M6 1200 CFM TOP ASSY

#:	QTY:	DESC/ MAT:	PRT#:
22	1	TOP FAN SUPPORT ANGLE	TOP FAN SUPPORT ANGLE
21	1	TRANSITION TO 6 IN FLEX	A35111
20	1	MOTOR, 5 HP, 3 PHASE	000079
19	1	FAN, 1200 CFM	005331
16	1	CVR PLATE	SWB2198-10CV

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TITLE / DESC: M6 ASSEMBLY STD			SIZE: B
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DWG BY: T.SHUE	DATE: 8/22/2023		SCALE: 1:16
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--M6 ASSY

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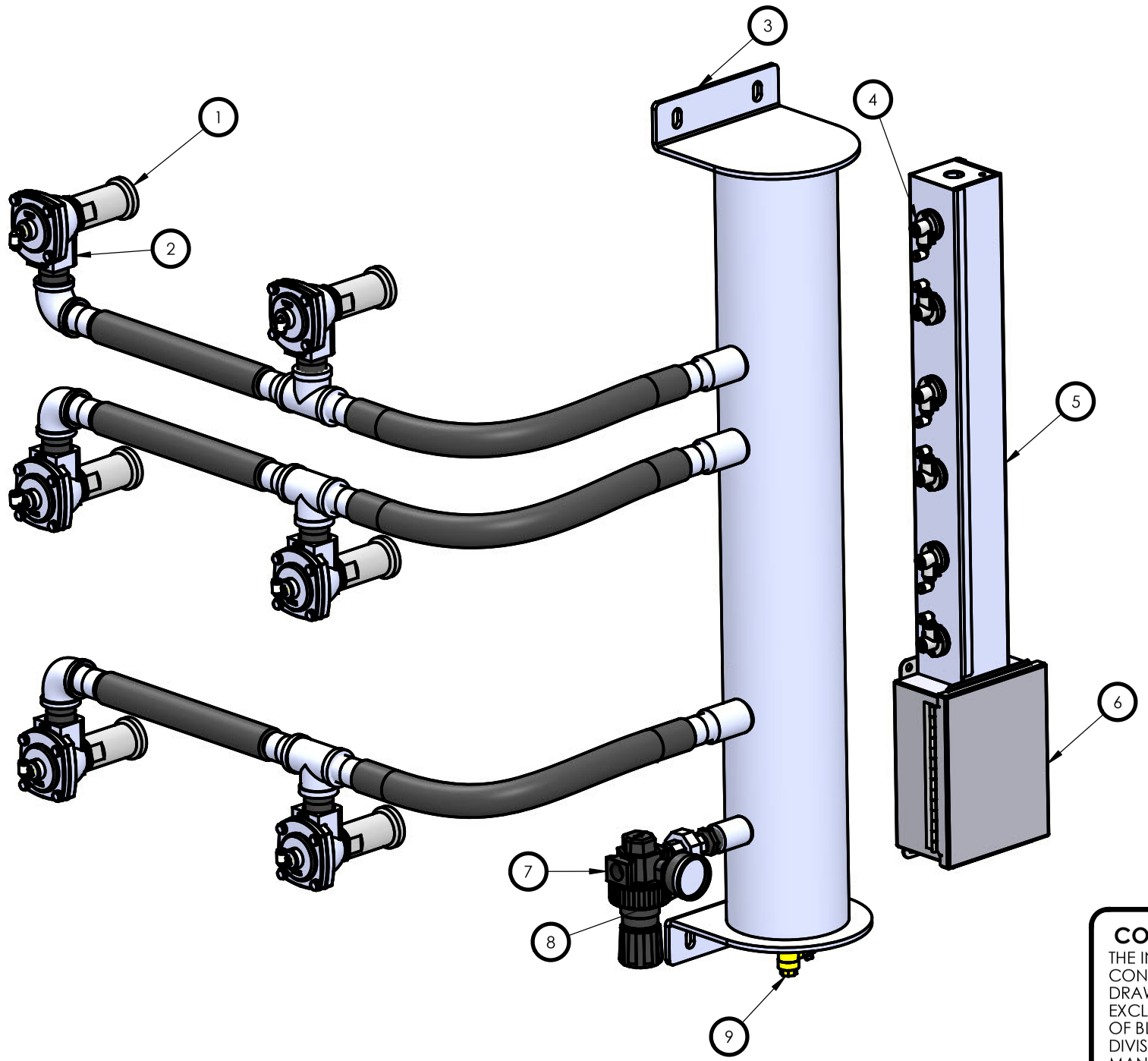

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ZONE:	REV:	DESCRIPTION:	DATE:	BY :
	A	INITIAL RELEASE	8/22/2023	MTS

M6 AIR STREAM ASSY

#:	QTY:	DESC/ MAT:	PRT#:
9	1	BALL VALVE	14-463
8	1	GAUGE, AIR, 1/4 NPT, 2 IN FACE, 160 PSI * MAT: VARIOUS	16-819
7	1	REGULATOR, ADJ, MANUAL, 1/2 NPT * VARIOUS	16-965
6	1	6 X 8 X 3.5 ENCLOSURE	003000-E
5	1	M6 ELECTRICAL BOX	A5212
4	6	SOLENOID VALVE	003285
3	1	5 IN PIPE HEADER - M6	B7140
2	7	PULSE VALVE - 1"	005410
1	6	PULSE DIFFUSER	A2663

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TITLE / DESC: M6 ASSEMBLY STD		SIZE: B
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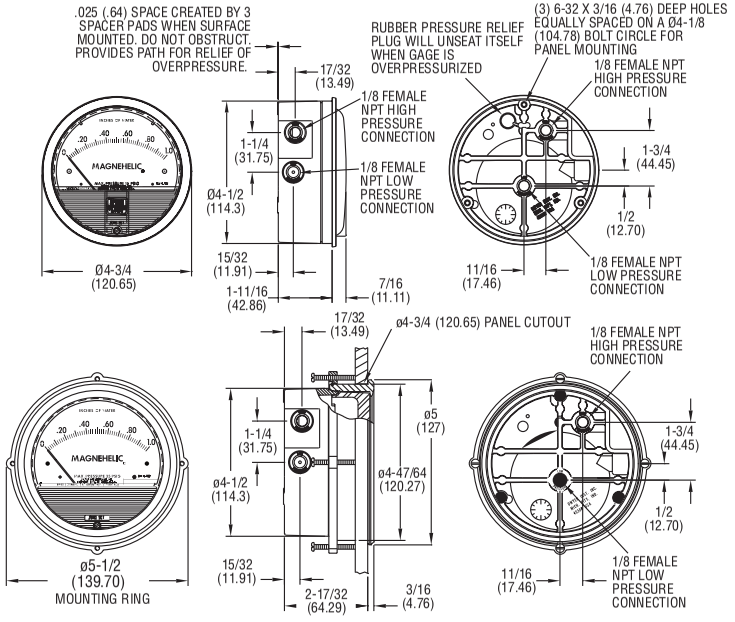
	PART#: M6 ASSY	XXXX: A
DWG BY: T.SHUE	DATE: 8/22/2023	SCALE: 1:6
MAT:	SHT#: 5 OF 5	DWG TYPE:

Magnehelic® Differential Pressure Gage

PART NO. 004457-10



**The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.*

STANDARD GAGE ACCESSORIES: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapters and three flush mounting adapters with screws.

MP AND HP GAGE ACCESSORIES: Mounting ring and snap ring retainer substituted for 3 adaptors, 1/4" compression fittings replace 1/8" pipe thread to rubber tubing adaptors.

OVERPRESSURE PROTECTION: Standard Magnehelic® Differential Pressure Gages are rated for a maximum pressure of 15 psig and should not be used where that limit could be exceeded. Models employ a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (excludes MP and HP models). To provide a free path for pressure relief, there are four spacer pads which maintain .023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases. (Natural Gas option available.)
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. (MP model has polycarbonate cover).
Accuracy: 2% of full scale (±3% on -0, -100PA, -125PA, -10MM and ±4% on -00, -60PA, -6MM), throughout range at 70°F (21.1°C); High accuracy version: ±1% on full scale (±1.5% on -0, -100PA, -125PA, -10MM and ±2% on -00, -60PA, -6MM).
Pressure Limits: -20″ Hg to 15 psig.† (-0.677 bar to 1.034 bar); MP option: 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).
Enclosure Rating: IP67.
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only. The blowout plug is not used on models above 180 inches of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
Temperature Limits: 20 to 140°F (-6.67 to 60°C). *Low temperature models available as special option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Agency Approvals: RoHS.

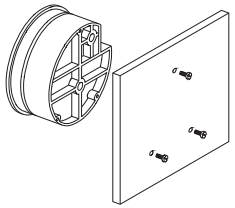
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

Note: May be used with hydrogen when ordering Buna-N diaphragm. Pressure must be less than 35 psi.

INSTALLATION

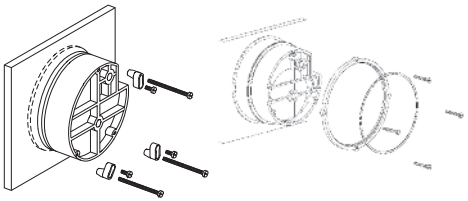
Select a location free from excessive vibration and where the ambient temperature will not exceed 140°F (60°C). Also, avoid direct sunlight which accelerates discoloration of the clear plastic cover. Sensing lines may be run any necessary distance. Long tubing lengths will not affect accuracy but will increase response time slightly. Do not restrict lines. If pulsating pressures or vibration cause excessive pointer oscillation, consult the factory for ways to provide additional damping.
All standard Magnehelic® Differential Pressure Gages are calibrated with the diaphragm vertical and should be used in that position for maximum accuracy. If gages are to be used in other than vertical position, this should be specified on the order. Many higher range gages will perform within tolerance in other positions with only rezeroing. Low range models of 0.5" w.c. plus 0.25" w.c. and metric equivalents must be used in the vertical position only.

SURFACE MOUNTING



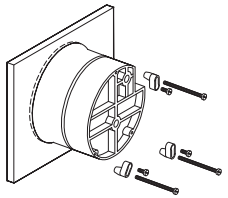
Locate mounting holes, 120° apart on a 4-1/8" dia. circle. Use No. 6-32 machine screws of appropriate length.

FLUSH MOUNTING



Provide a 4-9/16" dia. (116 mm) opening in panel. Provide a 4-3/4" dia. (120 mm) opening for MP and HP models. Insert gage and secure in place with No. 6-32 machine screws of appropriate length, with adapters, firmly secured in place.

FOR -SS BEZEL INSTALLATION



Provide a 4-9/16″ opening in panel. Insert gage and secure with supplied mounting hardware.

PIPE MOUNTING

To mount gage on 1-1/4" - 2" pipe, order optional A-610 pipe mounting kit.

TO ZERO GAGE AFTER INSTALLATION

Set the indicating pointer exactly on the zero mark, using the external zero adjust screw on the cover at the bottom. Note that the zero check or adjustment can only be made with the high and low pressure taps both open to atmosphere.

OPERATION

Positive Pressure: Connect tubing from source of pressure to either of the two high pressure ports. Plug the port not used. Vent one or both low pressure ports to atmosphere.
Negative Pressure: Connect tubing from source of vacuum or negative pressure to either of the two low pressure ports. Plug the port not used. Vent one or both high pressure ports to atmosphere.
Differential Pressure: Connect tubing from the greater of two pressure sources to either high pressure port and the lower to either low pressure port. Plug both unused ports.
When one side of the gage is vented in dirty, dusty atmosphere, we suggest an A-331 Filter Vent Plug be installed in the open port to keep inside of gage clean.

A. For portable use of temporary installation use 1/8" pipe thread to rubber tubing adapter and connect to source of pressure with flexible rubber or vinyl tubing.
B. For permanent installation, 1/4" O.D., or larger, copper or aluminum tubing is recommended.

MAINTENANCE

No lubrication or periodic servicing is required. Keep case exterior and cover clean. Occasionally disconnect pressure lines to vent both sides of gage to atmosphere and re-zero. Optional vent valves should be used in permanent installations. The Series 2000 is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

WARNING

Attempted field repair may void your warranty. Recalibration or repair by the user is not recommended.

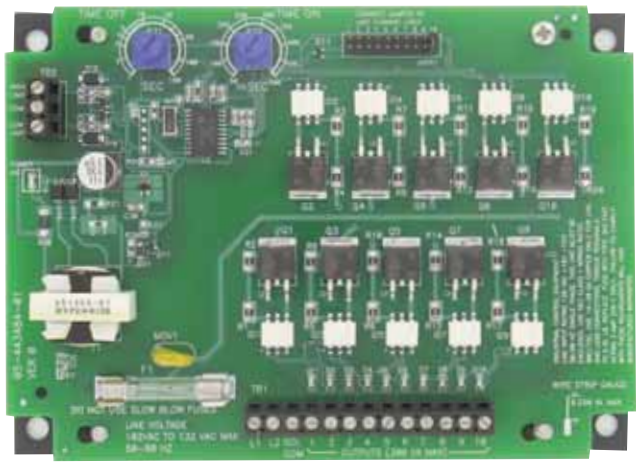
TROUBLE SHOOTING TIPS

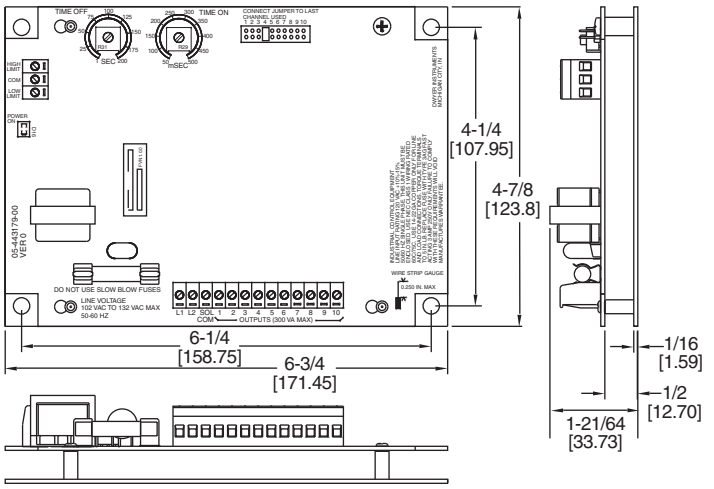
Gage won't indicate or is sluggish.

1. Duplicate pressure port not plugged.
2. Diaphragm ruptured due to overpressure.
3. Fittings or sensing lines blocked, pinched, or leaking.
4. Cover loose or "O"ring damaged, missing.
5. Pressure sensor, (static tips, Pitot tube, etc.) improperly located.
6. Ambient temperature too low. For operation below 20°F (-7°C), order gage with low temperature, (LT) option.

Series DCT500A Timer Controller

Specifications – Installation & Operating Instructions





Introduction

The Series DCT500A Timer Controller is a timing system for pulse-jet type dust collectors or pneumatic conveying systems in either continuous or on-demand cleaning applications. It is provided with either 4, 6, or 10 channels. The DCT500 was designed for ease of installation in your dust collector system. For installations requiring fewer channels than available on the board, a shorting plug is provided to allow selection of the last used channel. Time-on and time-off settings are selected using two potentiometers. High-limit and low-limit control inputs are provided for use with on-demand systems. When used in a continuous mode the high-limit input is jumped. For safety, the control circuitry including the control inputs and the last channel jumper, is isolated from the power line.

Installation

Warning: Always install and service this device with the power off and a lockout installed if required. Line voltages are exposed on the board. As a result, this device is not intended to be installed in any open location. It must be installed within an enclosure that meets appropriate safety and local code requirements. Follow applicable safety procedures when installing or servicing this product.

Warning: Always replace the fuse with the proper type and rating. The fuse is Type 3 AG fast acting 3 Amp @ 250V. DO NOT use slow-blow type fuses. Failure to comply with this requirement will pose a serious safety risk and will void manufacturer's warranty.

Warning: As a permanently installed piece of equipment, a power disconnect switch, circuit, or other approved disconnect device must be installed in close proximity to the installed board and within easy reach of the operator. This disconnect device must include a label indicating its function as a mains disconnect.

Power Requirements

The controller is designed for operation on 120 VAC 50/60 Hz power. The input voltage must be between 102 VAC and 132 VAC either 50 or 60 Hz. The solenoid loads must be rated for 120 VAC operation.

Location

The system must be located in an enclosure that meets relevant safety standards and electrical codes. There are no other special orientation requirements. Mount it using the four mounting holes in the baseplate. The baseplate back is flush, so no special spacers are needed to accommodate obstructions except for those imposed by the location itself.

Installed screws and other mounting hardware must maintain a spacing of 0.250 in (6.35 mm) from the circuit board.

SPECIFICATIONS

Output Channels: 4, 6, & 10 channels.
Voltage Requirements: 102 to 132 VAC (~) 50 or 60 Hz.
Power Consumption: 1.8 W.
Input Power: 302 VA max.
Load: 300 VA max, pilot rating C300.
Fuse: Type 3 AG, 3A @ 250 VAC (~).
Ambient Operation Temperature: -40 to 149°F (-40 to 65°C).
Storage Temperature: -40 to 176°F (-40 to 80°C).
Humidity Conditions: 5 to 95% noncondensing.
On Time: 50 to 500 msec.
On Time Accuracy: ±5% of setting.
On Time Repeatability: ±1 msec.
Off Time: 1 to 180 seconds.
Off Time Accuracy: 5% of setting.
Pollution Degree: 2.
Altitude: 6560 ft (2000 m) max.
Environment: Indoor use, must be installed in a weather-proof enclosure for outside applications.
Weight: 9 oz (255 g).
Agency Approvals: UL, cUL, CE.

Connections

The line and solenoid connections are located at the lower edge of the board. The terminal block is a "Euro" style connector system that clamps the wire within the connector body. The connector will accept wire sizes from 14 to 22 gages. Wire must be copper only with at least 60°C or 60/75°C rated insulation. These terminals should be torqued to 5 in. lb. The connectors are specified for single connection but multiple wires may be connected to a single lug provided local codes allow this and good workmanship practices are followed. When using stranded wire, make sure that there are no "stray" strands. These pose safety hazards and may cause system failure or damage. Connect the line power to L1 and L2. Connect the solenoids between the selected output and the solenoid common. Solenoid common and L2 are internally connected. Refer to Figure 2-1.

The wire should be stripped to no more than 0.25 in. A strip gauge is provided at the lower right corner of the board. Longer than this may cause shorts or expose line voltages to possible contact.

Switches connected to the control inputs at the top of the board must be isolated normally open contacts connected only to the relevant terminal and to the common terminals.

The following subparagraphs describe the external switch connections. Refer to figure 2-1 for switch connection illustration.

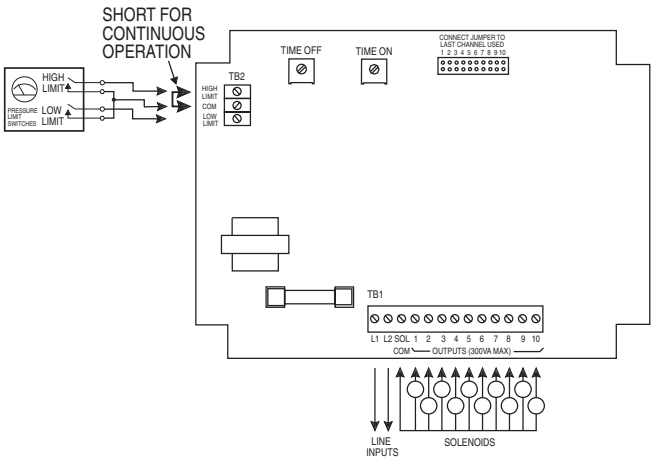


FIGURE 2-1 Switch Connections

External Limit Switch Connection

The controller may be used with an external pressure limit switch or sensor to provide demand-cleaning operation. A three pin terminal block provides connection for external high and low limit switches. A simple on-off system can be established with a single pressure switch connected to the high limit input. Better control can be achieved with a high and low limit switch/gage such as the Dwyer Photohelic® pressure gage. The switches must be isolated contacts between the high or low limit input and the common connection. The wiring from the switches must be two or three wires with no other connections made to these. The common line must not be connected to equipment ground or protective ground, since these may introduce electrical noise and cause improper operation or possible damage to the control board. The operation of these inputs is summarized as follows:

Current Operation	Low Limit Switch	High Limit Switch	Next Operation
Hold	Open	Open	Hold
Hold or Run	X	Closed	Run
Hold	Ø	Open	Hold
Hold	Closed	Ø	Run
Run	Closed	≠	Run
Hold	Closed	Ø	Run
Run	≠	Open	Hold

Ø – Transition from open to closed
≠ – Transition closed to open
X – Either open or closed

Operating Modes

Continuous Cycle Mode

The DCT500A has two operating modes available for different applications. Starting with the most basic mode, it is capable of operating in a continuous cleaning cycle. This can be initiated by placing a jumper between the high limit input and the common connection. Two setup parameters control operation: time off, time on. Time on and time off specifically deal with the solenoid on time and the time interval between the end of the on pulse and the start of the next.

Demand Mode

Demand mode operation can be configured using the high limit and low limit inputs. A simple on-off system can be setup with a single pressure switch connected to the high limit input. Better control can be achieved with a high and low limit switch set such as is provided in the Photohelic® pressure gage. In this on-demand mode, time on and time off may be programmed to define the cleaning cycle. When the cleaning cycle is completed, the controller will continue the cycle until the last channel is pulsed. The next cleaning cycle will always start on channel 1. A factory installed option is available that will not clean to the end of the cycle, but rather stop where the cleaning cycle ended. The next demand for cleaning will start the subsequent channel where the last cleaning cycle left off.

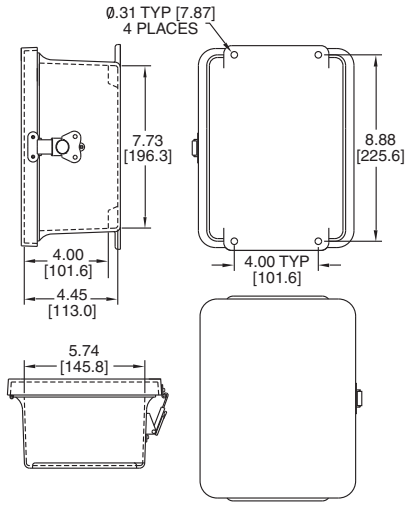
System Setup

Last Channel Selection

A jumper connector is provided to select the last channel used. Place the jumper on the two pins corresponding to the last channel used in the installation.

Time Off and Time On Setup

Time off defines the period of time between solenoid activations when no channels are enabled. This value may be set between 1 second and 200 seconds with a resolution of 1 second. Time on defines the solenoid on time. The value may be set between 50 msec and 500 msec with a resolution of 10 msec. If adjustments are made while the system is in operation, the new setting will take effect in the following solenoid cycle. Do not use excessive force to turn the potentiometers. This will damage the unit. A factory installed option is available for a time on range of 0.05 to 10 seconds.



Weatherproof Enclosure Option

Explanation of Symbols:

Symbol	Description
	Caution: Risk of electric shock
	Caution: Risk of danger, refer to user's manual for further information
~	Alternating current

Agency Approvals and Test Standards:

UL: UL508: 2008
IEC 61010-1: 2001-02

CE: IEC 61000-4-2: 2001
IEC 61000-4-3: 2006
IEC 61000-4-4: 2004
IEC 61000-4-5: 2005
IEC 61000-4-6: 2006
IEC 61000-4-11: 2004
CENELEC EN 55022: 2007
FCC Part 15 CFR Title 47: 2007
ICES-003: 2004 Digital Apparatus (Industry Canada)
ANSI 63.4-2003
CENELEC EN 61326-1: 2006
2004/108/EC EMC Directive

Series A3000 Photohelic® Differential Pressure Switch/Gage

Specifications - Installation and Operating Instructions

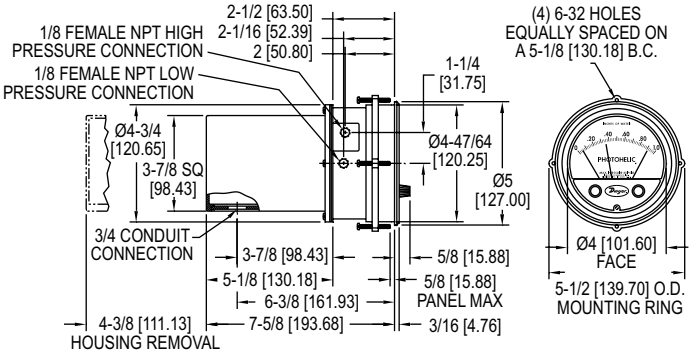


Figure A

Note: Detailed dimension drawings are available from our Customer Service Dept. for PHOTOHELIC® switch/gages as installed in two optional enclosures. For weatherproof housing, request no. 13-700132-00. /For explosion-proof housing, request no. 13-700113-01.

The **SERIES A3000** PHOTOHELIC® Switch/Gage is a versatile 2-in-1 instrument combining a time-proven Magnehelic® differential pressure gage with low/high pressure switches. It is designed to measure and control positive, negative or differential pressure of air or other non-combustible, non-corrosive gases. Gage reading is unaffected by switch operation. Switch set points are easily adjusted with knobs located on gage face. Applied pressure and switch set points are fully visible at all times. Deadband is one pointer width, less than 1% of full scale. Each set point controls a DPDT relay and both relays can be interlocked to provide variable deadband control.

INSTALLATION

1. Location: Select a clean, dry, vibration-free location where ambient temperatures will be between 20 and 120°F (-6.67 and 48.9°C). Tubing supplying pressure to the instrument can be practically any length but long runs will increase response time slightly.

2. Position: The PHOTOHELIC® Switch/Gage is factory calibrated for use with scale in a vertical plane. Operation at other angles may affect accuracy and/or require zero adjustment. Most models can be specially calibrated at the factory for other positions if specified at time of ordering. Ranges below 1 in w.c. must be used only with scale vertical.

3. Mounting: The PHOTOHELIC® Switch/Gage is normally mounted before making electrical connections. The electrical enclosure is removable at any time regardless of mounting method.

(A) Panel Mounting: Normal mounting is flush or through panel as shown in Figure B. Allow 4-3/8″ (111.13 mm) clearance behind the unit for removal of electrical enclosure. Make a 4-13/16″ (122.24 mm) diameter hole in panel. Insert the PHOTOHELIC® Switch/Gage unit from front of panel and slip mounting ring over case from behind with stepped side facing rear. Fit the snap ring into narrow groove at back edge of the bezel. Thread four 6-32 x 1-1/4″ mounting screws into tapped holes in mounting ring and seat it against snap ring. Tighten screws against back of panel. See Figure B.

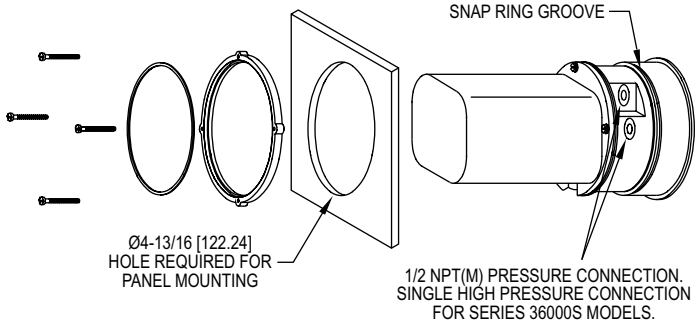


Figure B

SPECIFICATIONS

GAGE SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Accuracy: ±2% of full scale at 70°F (21.1°C). ±3% on -0 and ±4% on -00 models.
Pressure Limits: -20″ Hg. to 25 psig (-0.677 to 1.72 bar). MP option; 35 psig (2.41 bar), HP option; 80 psig (5.52 bar). 36003S – 36010S; 150 psig (10.34 bar). 36020S and higher;1.2 x full scale pressure.
Temperature Limits: 20 to 120°F (-6.67 to 48.9°C) Low temperature option available.
Process Connections: 1/8″ female NPT.
Size: 4″ (101.6 mm) dial face, 5″ (127 mm) O.D. x 8-1/4″ (209.55 mm).
Weight: 4 lb (1.81 kg).

SWITCH SPECIFICATIONS

Switch Type: Each setpoint has 2 Form C relays (DPDT).
Repeatability: ±1% of full scale.
Electrical Rating: 10A @ 28 VDC, 10A @ 120, 240 VAC.
Electrical Connections: Screw terminals. Use 167°F (75°C) copper conductors only.
Power Requirements: 120 VAC, 50/60 Hz; 240 VAC & 24 VAC Power optional.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Set Point Adjustment: Adjustable knobs on face.
Agency Approvals: CE, CSA, UL.

(B) Surface Mounting with Remote Relays: Where it is preferred to mount the amplifier-relay unit separate from the gage assembly, the gage is mounted as shown in Figure B (without amplifier-relay package) or surface mounted as shown in Figure C. Use the dimensions in Figure D to locate holes.

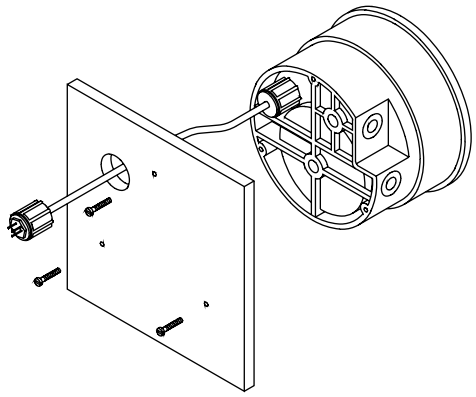


Figure C

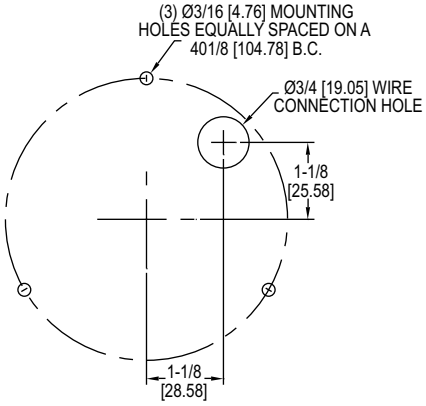


Figure D

(C) Remote Relays Mounting: On factory supplied RMR (remote mounted relay) units, the amplifier-relay package will be furnished attached to a mounting plate as shown in Figure E. Use the hole layout in Figure F for this option. A five foot cable assembly is included for connecting the two components. Longer cable lengths are available from the factory.

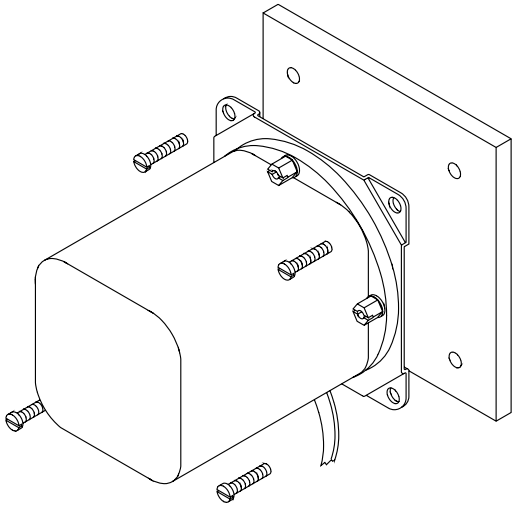


Figure E

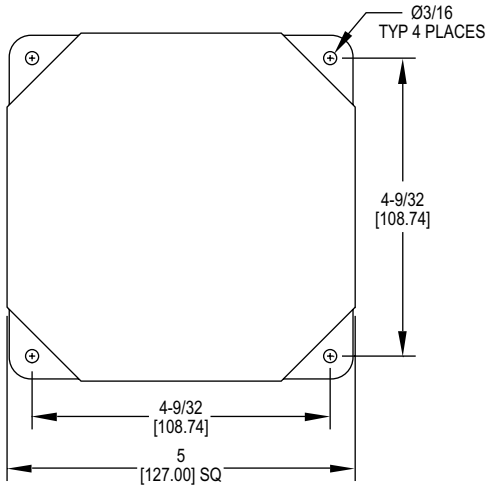


Figure F

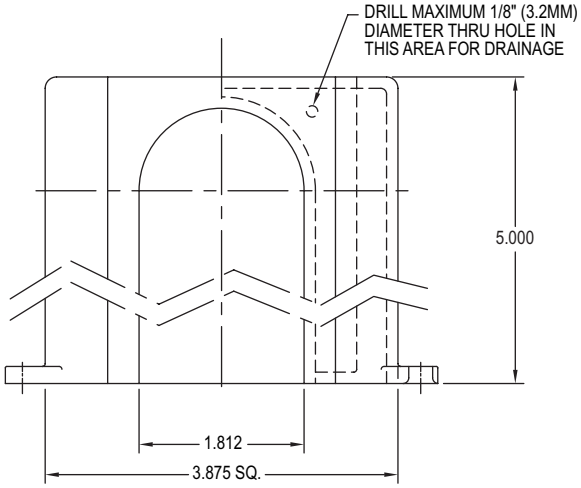


Figure G

(D) Type 2 Environment Installation Requirements: When installing in an indoor location where the amplifier-relay unit is exposed to falling or dripping water, a drain opening must be drilled in the bottom of the amplifier-relay enclosure. Drill the opening as shown in Figure G.

4. Pneumatic Connections & Zeroing: After installation but before making pressure connections, set the indicating pointer exactly on the zero mark, using the zero adjust screw located at the bottom of the front cover. Note that this adjustment can only be made with the high and low pressure taps both open to atmosphere.

Connect the high and low pressure taps to positive, negative, or differential pressure sensing points. Use 1/4″ diameter metal or other instrument tubing and 1/8″ NPT adapters at the PHOTOHELIC® pressure switch/gage. Adapters for rubber or soft plastic tubing are furnished with the instrument for use where this type of connection is preferred.

If the PHOTOHELIC® Switch/Gage is not used to sense differential pressure, one of the pressure taps must be left open to atmosphere. This will allow the reference pressure to enter. In this case, installation of a Dwyer Instruments, Inc. No. A-331 Filter Vent Plug or similar fitting in the reference pressure tap is recommended to reduce the possibility of dust entering the instrument.

Note: If the PHOTOHELIC® switch/gage is over pressured, pointer may “jump” from full scale back to zero and remain there until the excess pressure condition is relieved. Users should be aware of possible false zero pressure indications under this condition.

ELECTRICAL CONNECTIONS

1. Cover: The amplifier-relay unit has an easy to remove housing. Remove the three (3) screws as shown in Figure H and slide the housing off. Make all the electrical connections before reinstalling and refastening the housing.

2. Conduit: Electrical access to the connection box portion of the relay housing is by bottom opening for 3/4˝ conduit. Use of flexible conduit is recommended. It should be supported from the panel or other suitable surface to prevent the wiring system from exerting undue strain on the instrument. See Figure H.

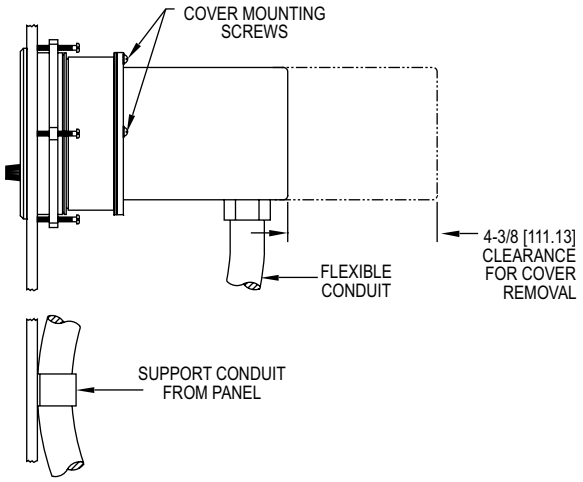
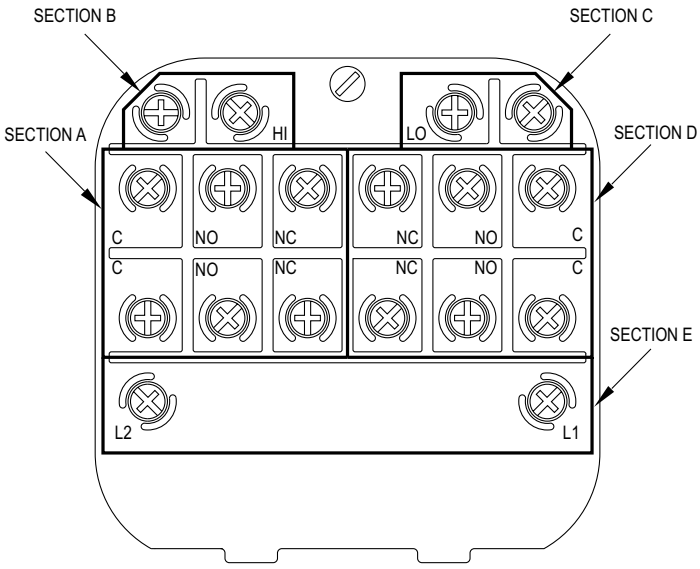


Figure H

3. Terminal or Connection Board Layout: In Figure J "Terminal Board," **Section A** contains the connections for the load or slave relay actuated by the high or right set point. This relay is a double pole, double throw type. The two right connections are normally closed, the two middle connections are normally open, and the left connections are the common pair. The relay is in its normal or De-Energized position when pressure is below the right hand set point.

Section D is exactly the same as **Section A** except that its load or slave relay is controlled by the low or left set point. The De-Energized position is below the left hand pointer set point.

Section B contains the external connections to the holding coil circuit for the high or right set point relay and **Section C** contains similar connections for the low or left set point relay. The function and use of these connections varies somewhat depending on the circuit style of the instrument. See paragraphs 5 and 6 for details.



CAUTION: Do not apply electrical current to terminals in Sections B and C.

Figure J

Section E contains the power connections for the control unit transformer primary. The transformer in turn supplies reduced voltage power for the LED, phototransistor, amplifier unit, and load relay pull in and hold coils. Connections must always be made to this section in order to put the unit in operation. Standard units are designed for 120 VAC input to the transformer. Special units are also available for other voltages.

Separate Ground Wire attachment is provided for by a No. 6-32 screw on the mounting bracket near the conduit opening. An additional ground wire connection is located on the side of the gage body for use when the amplifier-relay unit is mounted remotely.

Single Set Point instruments are furnished with the right or high set point components and circuitry in place. These are connected to Sections A and B of the terminal board. The left or low set point components are omitted.

4. Circuit Style: The PHOTOHELIC® SWITCH/GAGE is available with several factory installed optional internal circuits. They are identified as to style by a label shown in Figure K. This label is mounted prominently on the terminal board of each instrument. The letter H denotes a circuit in which the relay can be made to latch or remain energized after pressure increase to its set point.

The letter L denotes a circuit in which the relay can be made to latch or remain de-energized after pressure decrease to its set point. Two letters are required to fully identify a dual set point unit. Thus, circuit style HH, which is standard, is a dual set point circuit which has provisions for latching on pressure increase to either set point. Single relay unit or L for the special low latch unit. Units for use with other than standard 120 VAC will be so indicated on the label.

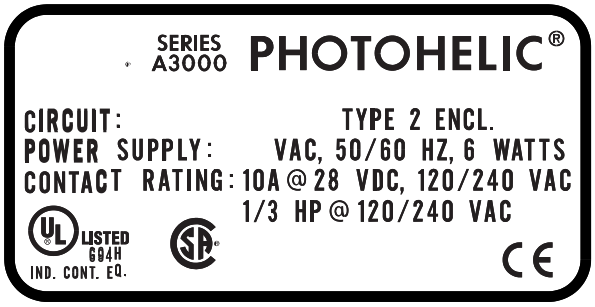
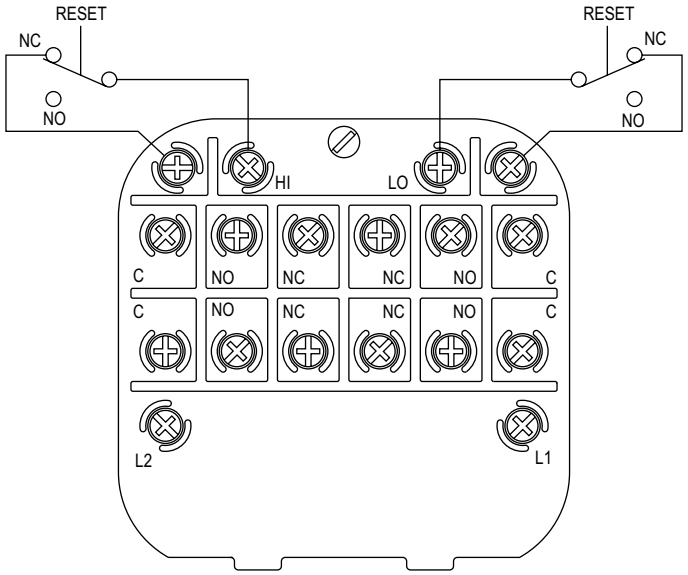


Figure K

5. Dual Set Point Automatic Reset: Circuit Style HH is used for simple on-off switching applications. To place in service, connect load circuits to the appropriate terminals in Section A (Figure J) for the right set point and Section D for the left set point. Note that the N.O. contacts are open when the gage pressure pointer is to the left of the set point pointers. No connections are necessary in Sections B and C. Make external ground connections as required and connect power to Section E for the control unit. To use circuit style LL for automatic reset, a jumper wire must be installed between the two terminals in Sections B and/or C.

6. Dual Set Point Manual Reset: Circuit Style HH may also be used for manual reset applications where it is required to maintain contact on either relay following pressure increase above its set point. Load or signal connections are made to the appropriate terminals in Sections A and D (as in paragraph 5 above). Connect terminals in Sections B and C through normally closed switches or push buttons as shown in Figure L. Use of "dry-circuit" type switches such as a Dwyer Part No. A-601 with paladium, gold, etc. or rotary wiping action type contacts is recommended. Make external ground connections as required and connect power to Section E for the control unit.

Circuit style LL is used for manual reset applications which require that contact be maintained following pressure decrease below the set point. Load connections are made to the appropriate terminals in Sections A and D. A normally open type manual reset switch such as Dwyer® Instruments, Inc. Part No. A-601 is connected to the terminals in Sections B and C. The circuit must be “armed by momentarily closing the switch while the black pointer is to the right of the set point. From that point on, the circuit will latch on pressure decrease below the set point and remain latched on pressure increase until manually reset with the optional switch.

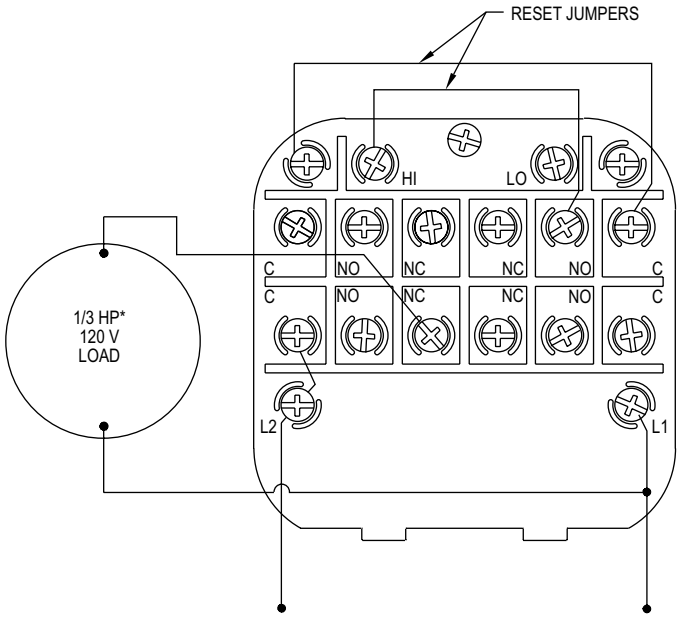


CAUTION: Do not apply electrical current to terminals in Sections B and C.
Manual Reset with Circuit HH

Figure L

11. Single Set Point Special: Manual reset after actuation on falling pressure can be obtained by using Circuit Style SRL. Consult the factory for special units and detailed instructions regarding their use.

12. Placing in Service: In normal operation each relay is de-energized when the pressure applied to the instrument is below its set point. Special low-latching units will ordinarily have to be reset before placing on the line in normal operation.



***Note:** For larger motors, use the Photohelic® Switch/Gage in a maintained contact, 120 Volt Control or Push Button Circuit of the motor starter.

Figure M

7. Dual Set Point Automatic and Manual Reset Combinations: Circuit Style HH may be used with either set point wired and operating as in paragraph 5 above and the other set point wired and operating as in paragraph 6.

8. High Low Limit Control - Dual Set Point: Circuit Style HH may be used to control fans, dampers, pumps, etc., between the set points of a PHOTOHELIC® Switch/Gage. To accomplish this, use one set point relay to reset the other as shown in the wiring diagram Figure M. In this typical application, the load (for instance a fan) would be connected to the N.C. contacts for the right set point relay Section A (Figure J). On pressure rise to the right set point, its relay would pull in and hold even though pressure might then fall below that set point. I the pressure continued to fall to the left set point, its relay would automatically be DE-ENERGIZED, return to its normal position and in so doing, open the holding coil circuit from Section B (Figure J). The right set point relay would thus be reset and the cycle could repeat.

9. Dual Set Point Special Purpose Circuits: Circuit Style LL may be used where manual reset following maintained contact on pressure decrease to either set point is required. Circuit Styles HL and LH are combination units. For special combinations of features, special units, and detailed instructions regarding their use, consult the factory.

10. Single Set Point PHOTOHELIC®: The single set point PHOTOHELIC® Switch/Gage is furnished with the right set point only. Terminals in Sections A and B (Figure J) are connected to this relay. Circuit Style SRH is wired for automatic reset as in paragraph 5 above. Manual reset is accomplished by adding a normally closed reset switch or push button to the circuit as described in paragraph 6 above.

13. Failure Mode: The PHOTOHELIC® Switch/Gage circuit design provides certain protection in the event of a loss of pressure or electrical power. In either case, both relays will de-energize, returning to their normal “zero pressure” state. The exceptions to this are models with center zero ranges. Because the relays on all standard models are always energized when the indicating (black) pointer is to the right of their respective set points, the relay action on loss of pressure will depend on set point position, since either of them could be located to the left of zero. As an example; if the left pointer were set at -2 in. w.c. and negative pressure was -3 in. w.c., a loss of that pressure would allow the black pointer to return to the center and thus cause the low set point relay to energize.

If the LED should burn out, only the left-low relay will de-energize. The right-high relay will react as if pressure were above its set point and will remain energized even though pressure might be below that setting. In this situation, only termination of electrical power will allow the right-high relay to de-energize.

MAINTENANCE

Dwyer Instruments, Inc. PHOTOHELIC® Switch/Gages are precision instruments, expertly assembled and calibrated at the factory. They require no lubrication or periodic servicing. If the interior is protected from dust, dirt, corrosive gases and fluids, years of trouble-free service may be expected. Zero adjustment should be checked and reset occasionally to maintain accuracy. The PHOTOHELIC® Switch/Gage is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization (RGA) number before shipping.

BLAST-IT-ALL®

A Division of Hess Manufacturing Inc.
185 Piper Lane Salisbury, NC 28147
P O Box 1615 Salisbury, NC 28145
Toll Free 800-535-2612
Fax 704-638-9311

Hess Manufacturing Inc. Warrants to the original purchaser of the merchandise sold, to be free from defects in material or workmanship under normal use and service for a period of (**5**) years. **This warranty does not cover typical wear items.** Upon prompt notification by the purchaser, to HM, components that are determined by HM to be defective will be repaired or replaced at no additional charge F.O.B. our factory.

This warranty requires the following:

1) **A completed and returned Warranty Registration card.**
2) **Use of Genuine Blast-it-all® OEM replacement parts purchased through Hess Manufacturing Inc. Blast-it-all® to include common wear items. For the entire period of the warranty.**
3) **Failures to provide proof of the purchase of Blast-it-all® OEM wear Items voids warranty.**

Manufacturer shall have the right to inspect prior replacing all merchandise in question.

Manufacturer shall not be required to pay any removal or installation charges whatsoever

Manufacturer shall not be held liable for prospective profits, special or consequential damages, nor shall any recovery of any kind against manufacturer be greater in amount the cost of the repairs of defects in workmanship

This warranty does not apply to damage caused by accidents, damage occurring during transit, alterations by unauthorized personnel, abuse or damage by flood, fire or acts of God, nor by artificially generated electric currents or any other cause whatsoever except defects in material or factory workmanship.

In ALL cases, defective parts must be returned to Hess Manufacturing Inc. before credit is issued.

This warranty is in lieu of all other warranties expressed, written or implied and releases Hess Manufacturing Inc. of all other obligations and liabilities whatsoever. This warranty neither assumes nor authorizes any person any obligation other than those specified by this warranty.

<u>DO NOT USE SAND!</u> SAND WILL CAUSE SILICA DUST, WHICH IS THE CAUSE OF SILICOSIS DISEASE, A CONDITION OF MASSIVE FIBROSIS OF THE LUNGS. THIS STATEMENT INDICATES POTENTIAL PERSONEL HAZARD. FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN PERSONAL INJURY.