ENERVEX
MEC 18 MECHANICAL EXHAUST CONTROL

3916010 06.16 **Installation & Operating Manual**

READ AND SAVE THESE INSTRUCTIONS!

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ENERVEX®
VENTING DESIGN SOLUTIONS

The MEC 18 Mechanical Exhaust Control is ETL Listed in the U.S. and Canada: under file #302882A

Symbol Legend

The following terms are used throughout this manual to bring attention to the presence of potential hazards, or to important information concerning the product.

DANGER: Indicates an imminent hazardous situation which, if not avoided, will result in death, serious injury or substantial property damage.

WARNING: Indicates an imminent hazardous situation which, if not avoided, may result in personal injury or property damage.

How to use this manual

This installation manual does not contain any system design documentation. System design documentation is available from any authorized ENERVEX representative. Accessories, fans, and variable frequency drives are not covered by this manual. Please refer to these component's individual manuals.

TO REDUCE THE RISK OF FIRE, ELECTRICAL SHOCK OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

1. Use this unit in the manner intended by the manufacturer. If you have questions, contact the manufacturer at the address or telephone number listed on the front of the manual.
2. Before servicing or cleaning the unit, switch off at service panel and lock service panel to prevent power from being switched on accidentally.
3. Installation work and electrical wiring must be done by a qualified person(s) in accordance with applicable codes and standards.
4. Follow the appliance manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), and the American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), and the local code authorities.
5. This unit must be grounded.

Content

1. PRODUCT INFORMATION

1.1 FUNCTION

The ENERVEX MEC 18 is a Mechanical Exhaust Control used to monitor and maintain a constant pressure in a duct system. This is achieved by modulating the speed of a fan or ventilator. The MEC 18 can be used with ENERVEX Models EFH, RSV, BESB and BESF. It can control the fan speed directly or via a Variable Frequency Drive (VFD). It is a component in the MDVS, Mechanical Dryer Venting System™ and the MBES, Modulating Building Exhaust System™.

The MEC 18 is typically used to control the pressure in duct systems serving clothes dryers, bathrooms, kitchen hoods and other building venting applications.

The control monitors the pressure in a duct system via connection to a pressure sensor (XTP2) , and maintains the pressure by modulating the fan speed.

The control has an integrated safety system that assures the appliance shuts down in the event of fan and/or control failure.

The use of the MEC 18 is not restricted to any type of duct or venting application. When the appliance is activated, the control sends maximum voltage to the fan or VFD. Once the specified pressure is achieved, the control regulates the voltage to the fan or VFD to manintain the specified pressure (the value can be viewed on the display).

If desired, the control can be interlocked with an appliance. When the appliance is activated, the control sends maximum voltage to the fan or VFD. Once the specified pressure is achieved, the control releases the appliance for operation and continues to regulate the voltage to the fan or VFD to maintain the specified pressure (the value can be viewed in the display). In the event of insufficient pressure, the control assures the appliance(s) shuts down after 15 seconds. When the appliance shuts down, the control turns off the fan.

The control can be used in one of two ways:

- Interlocked with the appliance to pre-purge the duct prior to appliance start-up and post-purge the duct for 3 minutes after appliance shut down, or,
- Set to run the fan continuously.

In most cases, local codes will require continuous fan operation.

The control has an integrated safety function. It can be operated with a manual reset function (reset button) or an automatic reset function. All terminal connections are monitored by LED's for easy service and troubleshooting.

ENERVEX's MEC 18 is tested and listed to the Standard for Industrial Control Equipment, UL Standard 508, 16th Ed. and CSA C22.2 No. 14-95 as well as UL378, Standard for Pressure Equipment. It is also tested and listed as a part of an ETL listed MDVS System (ETL Report J99*18091-004) for exhausting of lint-laden air from single or multiple type I and type II residential and commercial clothes dryers whether electric or gas-fired.

1.2 SHIPPING

Standard packing list

The MEC 18 contains the following:

- MEC 18 control unit
- Pressure transducer (XTP)
- Silicone tubing
- Duct probe
- Jumpers

If other components are shipped, these will appear as separate items on the shipment packing list.

1.3 WARRANTY

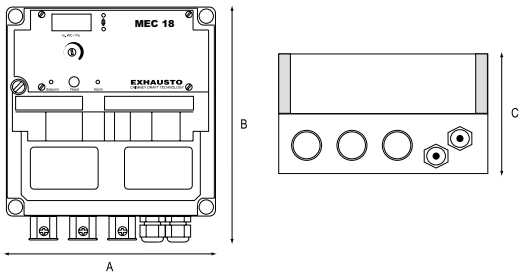
2-Year Factory Warranty. Complete warranty conditions are available from ENERVEX, Inc.

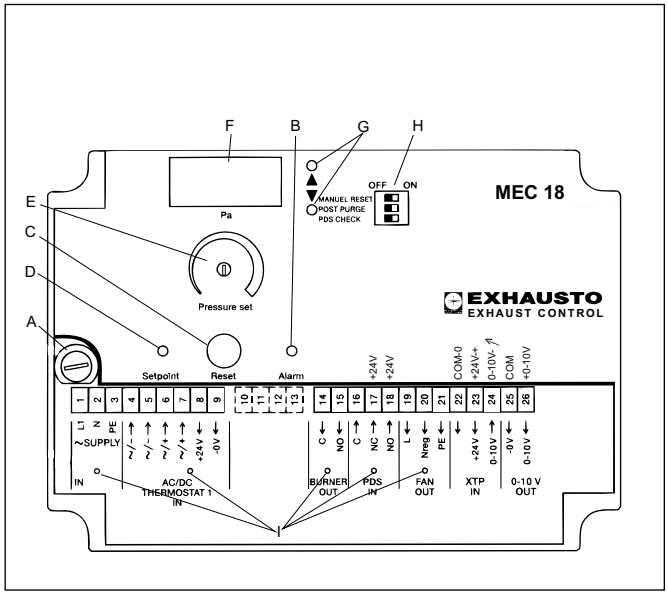
2. SPECIFICATIONS

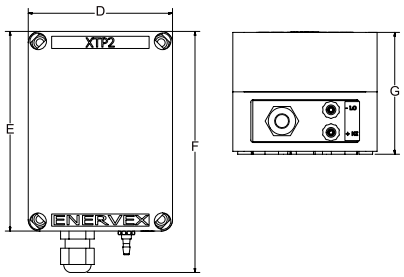
2.1 DIMENSIONS AND CAPACITIES

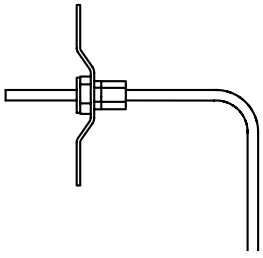
Specifications

MEC 18 Control		
Power supply	V	1x120VAC
Amperage	A	6.3
Operating temperature	°F/°C	-4 to 122 / -20 to 50
Range of operation	inWC / Pa	0-0.6 / 0-150
Tolerance	inWC / Pa	0.01 / 3 +/-10%
Output Current	mA	max. 10
Max. Load		120 VAC / 8A
Real-time PID Control Method		Infinitely variable
Real-time PID Signal Stability		+/- 0.5%
Ramp Up/Down Time	Seconds	max 20
Output	VAC	10-120
	VDC	0-10
Dimensions	A in / mm	7.17 / 182
	B in / mm	7.09 / 180
	C in / mm	4.37 / 111
Weight	lbs/kg	3.0 / 1.5
EMC standard	Emission	EN50 081-1
	Immunity	EN50 082-2
XTP Sensor		
Power supply	VDC	12-36
Amperage	mA	<20
Output	VDC	0-10
Operating temperature	°F / °C	0 to 160 / -18 to 71
Accuracy		+/- 0.08%
Dimensions	D in / mm	3.70 / 94
	E in / mm	5.12 / 130
	F in / mm	6.18 / 157
	G in / mm	3.13 / 80
Weight	lbs / kg	.6 / .3
Stack Probe		
Dimensions	H in / mm	4.25 / 108
	I in / mm	3.50 / 89









Symbols:

Fig. 1-A	Fuse holder
Fig. 1-B	Alarm-red LED
Fig. 1-C	Reset button
Fig. 1-D	Set point button
Fig. 1-E	Potentiometer for pressure setting
Fig. 1-F	Display
Fig. 1-G	LEDs (yellow) showing increasing/decreasing speed
Fig. 1-H	Dipswitch block
Fig. 1-I	LEDs (green) showing ON/OFF status

3. MECHANICAL INSTALLATION

3.1 LOCATION

The control and transducer must be installed indoors. The control does not need to be installed in an enclosure. See Fig. 2 for component connections.

> The transducer cannot be mounted inside an airtight enclosure. It uses the atmoshpheric pressure as reference pressure.

3.2 MOUNTING OF CONTROL

The control can be mounted directly to a wall or similar. Remove the cover. The mounting holes are located under the plastic screws that hold the cover in place. See Fig. 3.

The distance between the control and the transducer should not exceed three hundred (300) feet.

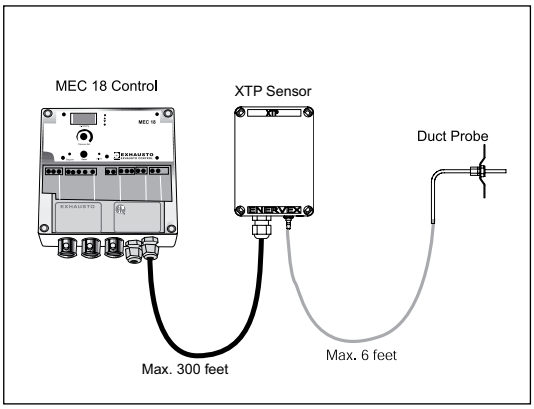


Fig. 2

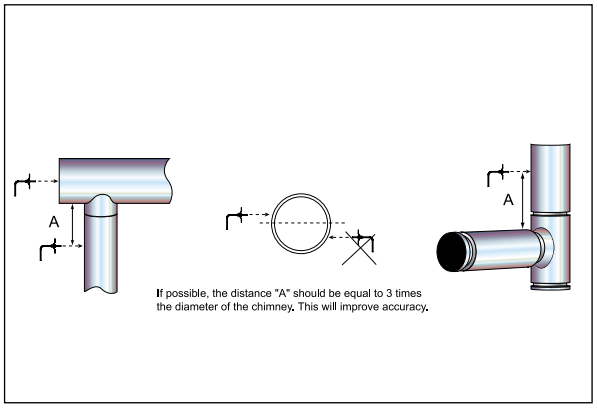


Fig. 2a

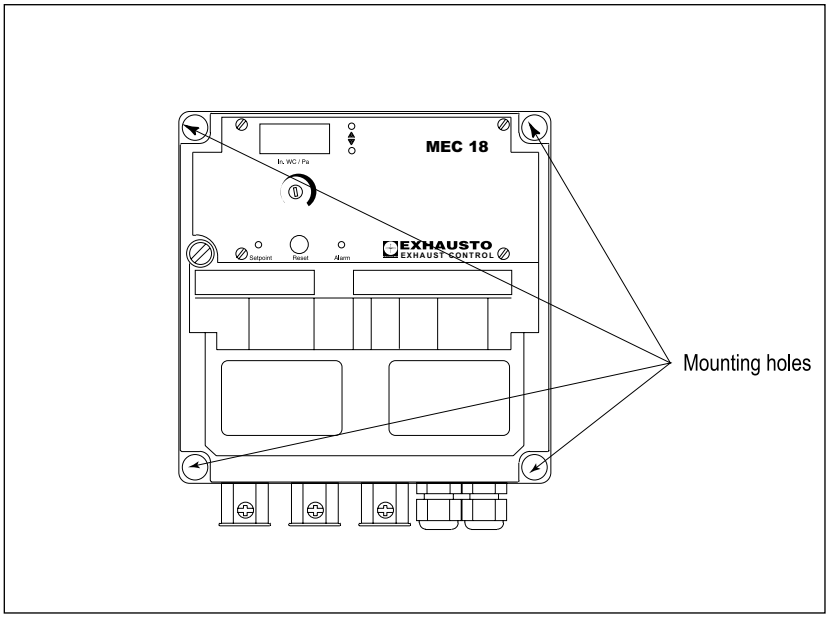


Fig. 3

3.3 MOUNTING OF TRANSDUCER

Attention must be paid to the location of the transducer. The transducer can be mounted in any orientation but preferably with the pressur eports facing down.

The transducer should be mounted within six (6) feet of the duct probe.

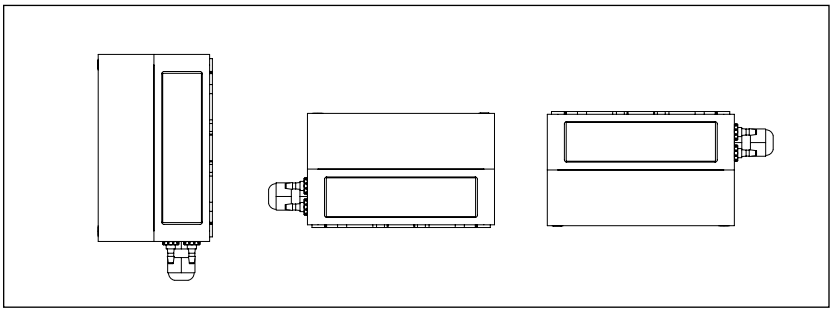


Fig. 4

3.4 MOUNTING OF DUCT PROBE

The probe (Fig. 2a on page 6) is inserted into the duct or vent at a point where the pressure is kept constant.

This could be at the appliance outlet, in the common duct or similar.

Make sure the tip of the tube is flush with the inner wall of the duct. Protrusion into the duct may affect the reading and thereby the operation.

3.5 CONNECTING TRANSDUCER TO DUCT PROBE

The transducer (XTP) is connected to the duct probe via a silicone tube. Connect one end of the silicone tubing to the duct probe and the other end to the NEGATIVE port of the transducer as shown in Fig. 5.

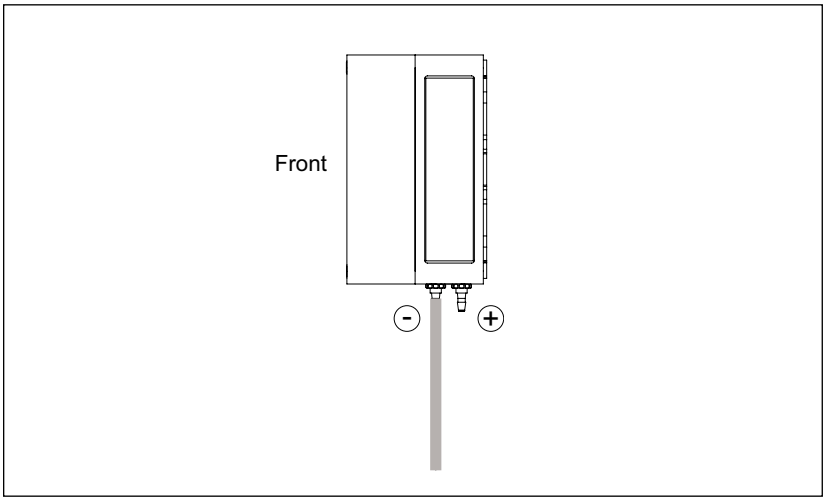


Fig. 5

4. ELECTRICAL INSTALLATION

4.1 GENERAL

DANGER

Turn off electrical power before servicing. Contact with live electric components can cause shock or death.

MEC 18 is designed for a 1x120VAC power supply only. Fan output is regulated on the neutral side and cannot be connected to other circuits.

The control can be used in one of two ways:

- Interlocked with an appliance so the appliance operation indirectly controls the fan operation (see Chapter 4.2). NOTE: This option is not available when used with a VFD.
- Connected so the fan runs continuously independent of appliance operation (see Chapter 4.3).

In both cases, the control monitors and maintains a constant pressure.

There are two types of safety systems available:

- Integrated Proven Pressure Switch (standard).
- Integrated Proven Pressure Switch with External Proven Pressure Switch (accessory) backup (see Chapter 4.4).

The terminals are connected as shown on Fig. 6:

Terminal	Use
1	Power Supply-L1
2	Power Supply-N
3	Power Supply-Ground
4-5	Voltage Input from Appliance thermostat Optocoupler (-) (10-120VAC/CDC
6-7	Voltage Input from Appliance thermostat Optocoupler (+) (10-120VAC/DC)
8	24VDC power supply to dry set of contacts (appliance thermostat)
9	0VDC power supply to dry set of contacts (appliance thermostat)
14	Appliance relay contact-Common (max. 120 VAC, 8 Amps.)
15	Appliance relay contact-Normally Open (max. 120VAC, 8 Amps.)
16	PDS-C (Common) Proven Pressure Switch
17	PDS-NC (Normally Closed) Proven Pressure Switch
18	PDS-NO (Normally Open) Proven Pressure Switch
19	Fan-L1
20	Fan-N (regulating)
21	Fan-Ground
22	XTP-0VDC Power Supply(transducer)
23	XTP-24VDC Power Supply (transducer)
24	XTP-0-10VDC Return Signal (transducer)
25	Control signal 0VDC
26	Control signal 0-10VDC

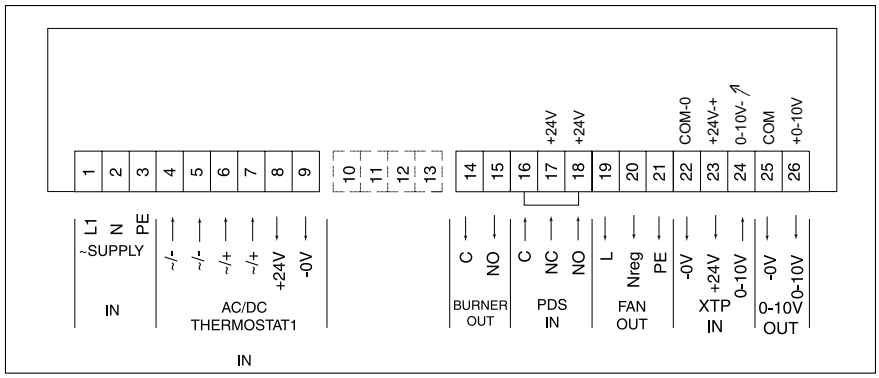


Fig. 6

4.2 CONTINUOUS FAN OPERATION

For continuous fan operation, connect the fan to the control as described below.

- Connect a 1x120 VAC power supply to terminals 1, 2 and 3
- Jump terminals 5 and 9.
- Jump terminals 6 and 8.
- Connect the appliance:
  - Connect the start signal from the appliance to terminals 14 and 15.
- Connect the fan:
  - If using a 1x120V fan, connect it to terminals 19, 20 and 21. Refer Fig. 7 and the fan's Installation Manual.
  - If using a 3-phase fan and VFD, connect the VFD to terminals 25 and 26 as shown in Fig. 10 and 11. DO NOT connect the fan directly to the MEC 18 control.
- Connect the transducer (XTP) to terminals 22, 23 and 24.

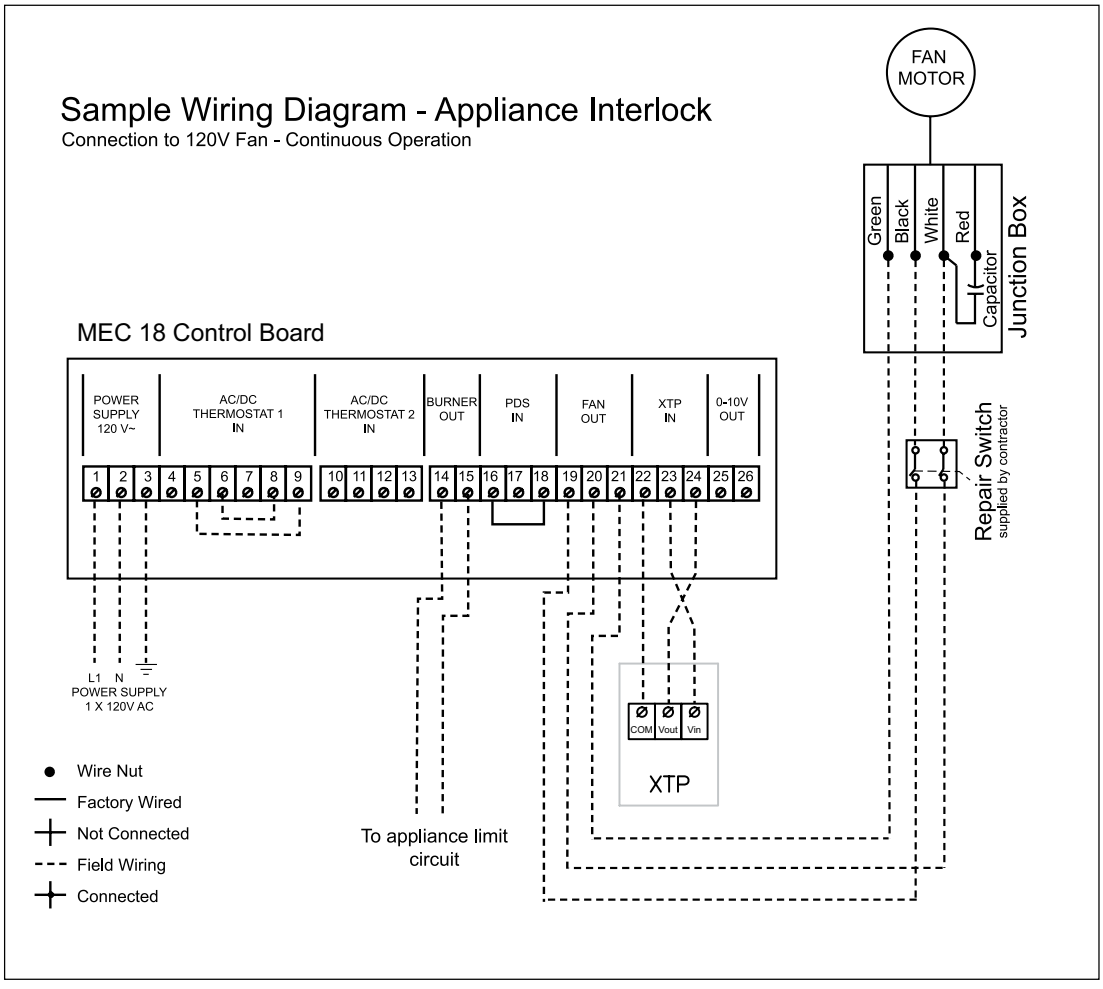


Fig. 7

4.3 INERMITTENT FAN OPERATION

The control can be set up for intermittent operation in one of two ways:

It can be interlocked directly with the appliance control or with a dry set of contacts.

Interlock with Appliance

Fig. 8 shows how an appliance control signal (10-120V AC/ DC) is connected to the MEC 18:

- Connect the power supply to terminals 1, 2 and 3.
- Connect the appliance:
  - Connect the appliance start signal to terminal 4.
  - Jump terminals 5 and 14.
  - The start signal to the appliance is now activated by terminal 15.
  - Connect Neutral to terminal 6.
- Connect the fan:
  - If using a 1x120V fan, connect the fan to terminals 19, 20 and 21. Make sure the neutral line is dedicated to the fan and control (term. 20) only. Refer to the fan's Installation Manual.
  - If using a 3-phase fan and VFD, connect the VFD to terminals 25 and 26 as shown in Fig. 10 and 11. DO NOT connect the fan directly to the MEC 18 control.
- Connect the transducer (XTP) to terminals 22, 23 and 24.

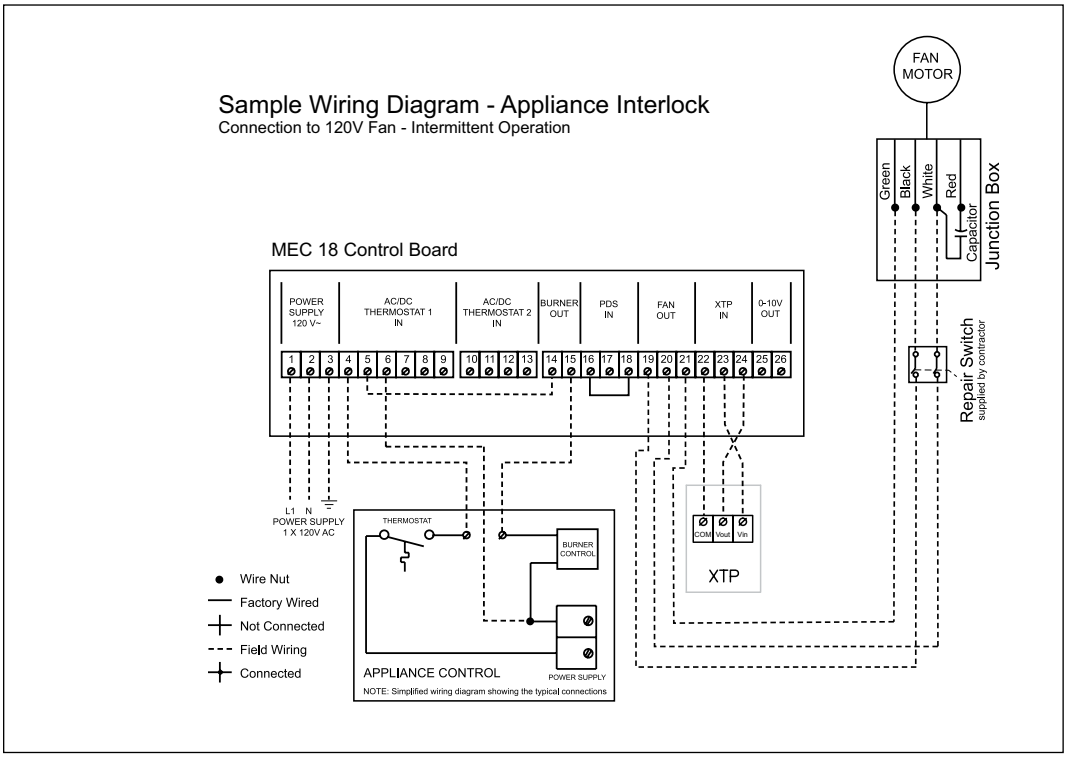


Fig. 8

Interlock with Dry Set of Contacts

Fig. 9 shows how a dry set of contacts is connected to the MEC 18:

- Connect the power supply to terminals 1, 2 and 3.
- Connect the appliance:
  - Connect the dry set of contacts to terminals 6 and 8.
  - Jump terminals 4 and 9.
  - Connect the start signal to the appliance to terminals 14 and 15
- Connect the fan:
  - If using a 1x120V fan, connect the ventilator or fan to terminals 19, 20 and 21. Refer to the fan's Installation Manual.
  - If using a 3-phase fan and VFD, connect the VFD to terminals 25 and 26 as shown in Fig. 10 and 11. DO NOT connect the fan directly to the MEC 18 control.
- Connect the transducer (XTP) to terminals 22, 23 and 24.

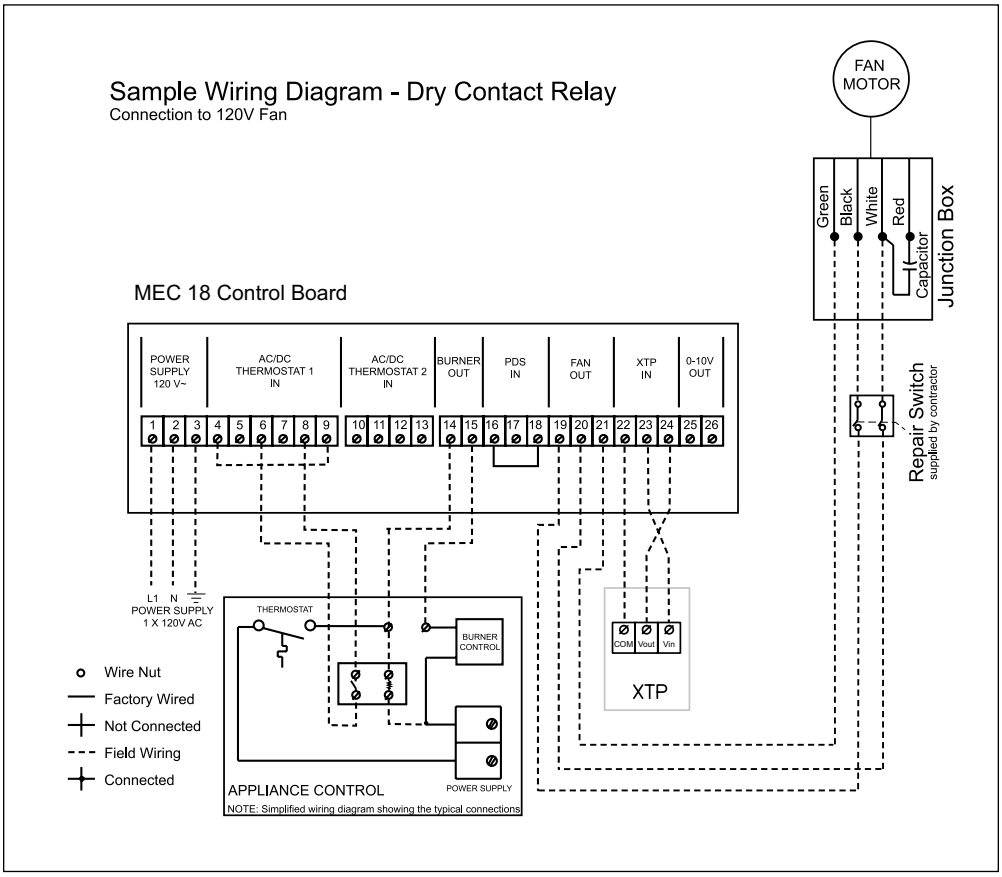


Fig. 9

4.4 CONNECTION TO A VARIABLE FREQUENCY DRIVE

To connect the 3-phase fan and variable frequency drive (VFD), connect the VFD to terminals 25 and 26 of the MEC 18. DO NOT connect the fan directly to the control.

Wire the ABB ACS320 series variable frequency drive according to Fig. 10.

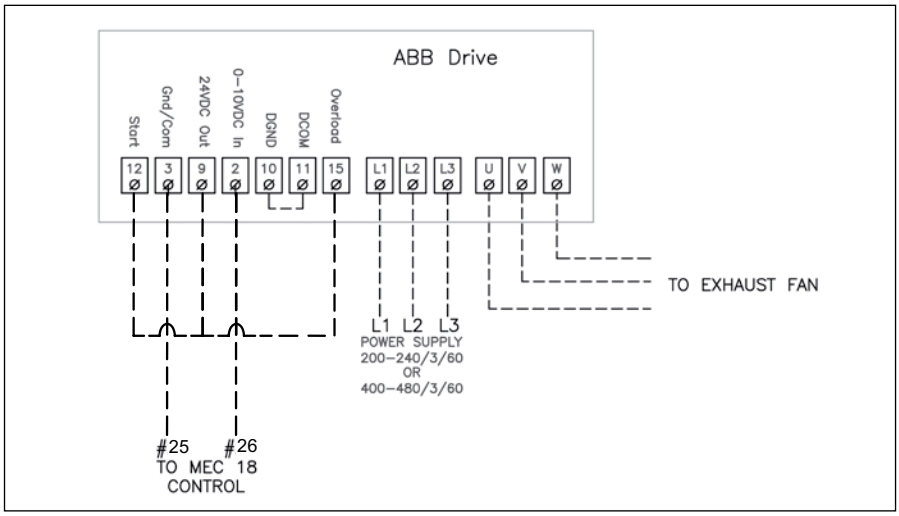


Fig. 10

Wire the VLT Micro Drive variable frequency drive according to Fig. 11.

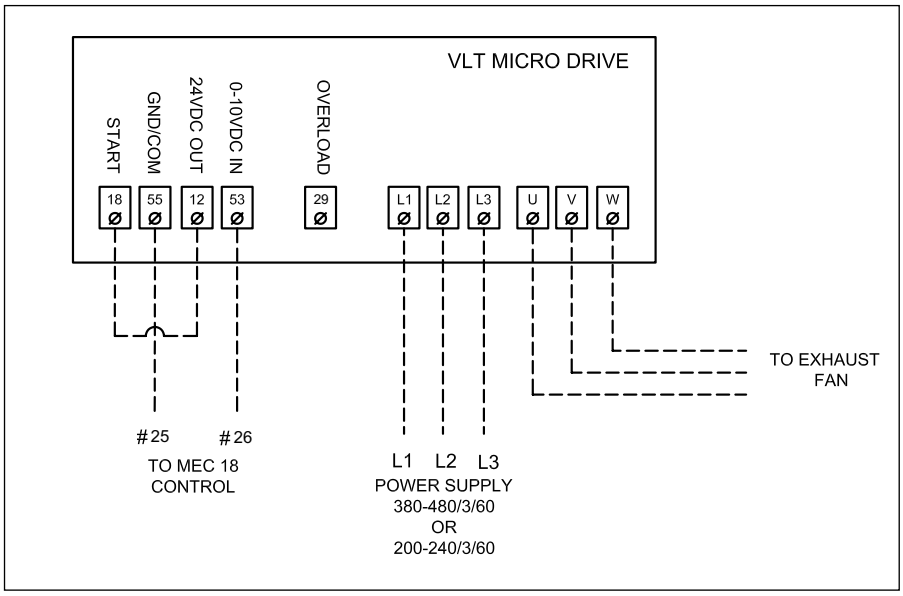


Fig. 11

4.5 INTEGRATED WITH EXTERNAL PDS

Fig. 12 shows how to connect a external Proven Pressure Switch (PDS) to the MEC 18. The external PDS is a backup to the integrated PDS and both must be satisfied by sufficient pressure to release the appliance:

- Remove the factory installed jumper over terminals 16 and 18.
- Connect the switch to terminals 16, 17 and 18 as shown in Fig. 12.

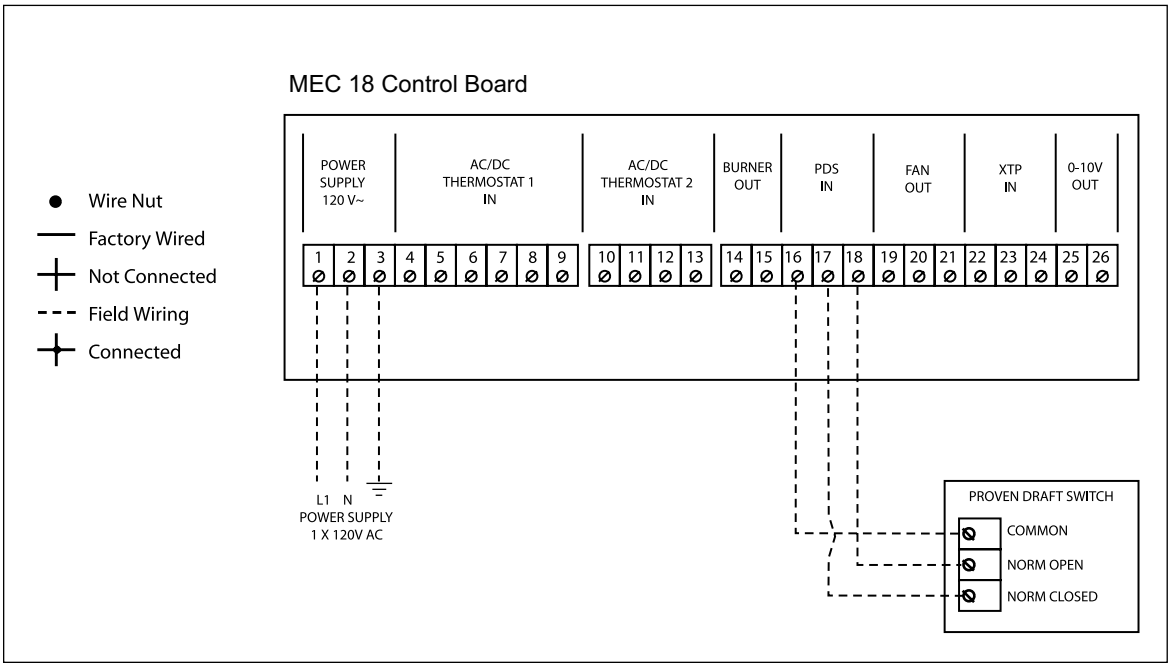


Fig. 12

5. STARTUP AND CONFIGURATION

5.1 GENERAL

Prior to startup please review the paragraph below titled Dipswitch settings.

Dipwitch settings

Prior to setting the system, check to see if the dipswitch settings are as required:

- Default factory setting: All OFF
- If the factory setting must be changed, remove the black cover plate to gain access to the dipswitches (see Fig 13-A):
  1. Remove the potentiometer dial.
  2. Remove the (4) flathead screws and lift the top plate off the board.
  3. Change the dipswitch settings.

DIP SWITCH	NAME	OFF	ON
1	MANUAL RESET	Automatic reset at power failure or insufficient pressure	Manual reset at power failure or insufficient pressure
2	POST PURGE	No post-purge	3 minutes of post-purge
3*	PDS CHECK*	No monitoring to see if the PDS was in NC position prior to start	The PDS must be in NC position prior to start

*Always OFF if the Proven Pressure Switch (PDS) is not connected.

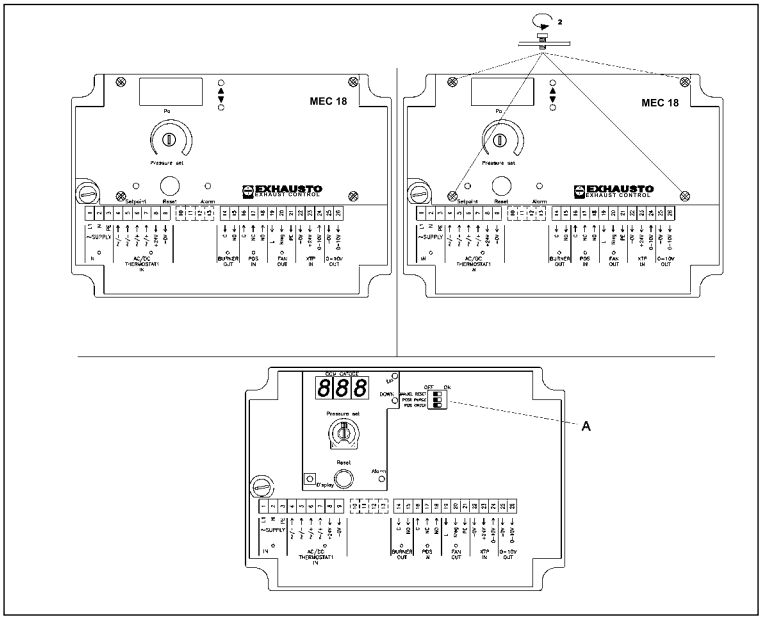


Fig. 13

5.2 SETTING OPERATION PRESSURE

The pressure setting of the MEC 18 must be adjusted to assure proper pressure for the appliance.

The display (Fig. 13-C) has two functions. It shows what the pressure set-point is, and it shows what the actual pressure is.

The default mode shows the actual pressure. To change the mode, the set-point button must be pressed continuously.

To adjust the pressure set-point follow this procedure:

Temporary adjustment of the pressure:

1. Press the set-point button continuously with a pen or screwdriver (Fig. 14-A) until the pressure setting appears on the display. While continuing to press the set-point button, use the potentiometer (Fig. 14-B) to set the required pressure in WC/Pa on the display (Fig. 14-C). Release the set-point button; the actual pressure will now show up on the display.
2. Start the heating system and wait until the thermostat (Fig. 15-A) closes and the pressure has stabilized (none of the yellow diodes are lit).

Final adjustment of the pressure:

3. Check the pressure at the appliance outlets and make any necessary adjustment by following the procedure described under step 1 above.
4. If used, check that the safety system disconnects the appliance (Fig. 15-B). An error can be simulated by disconnecting the silicone tubing from the negative port on the transducer (XTP).
5. Check the start function after the final pressure setting adjustments have been made.

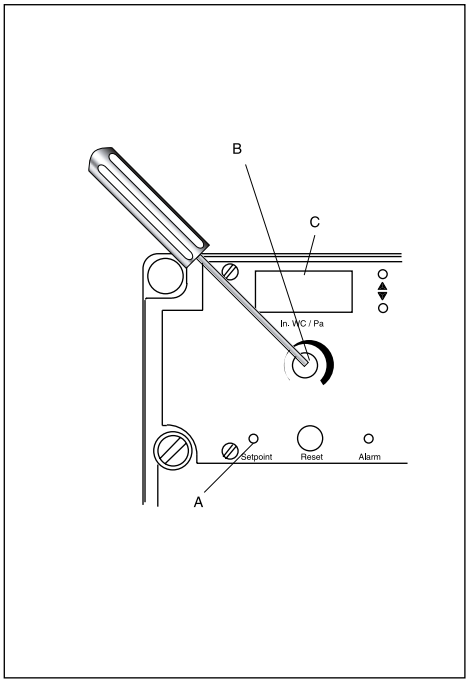


Fig. 14

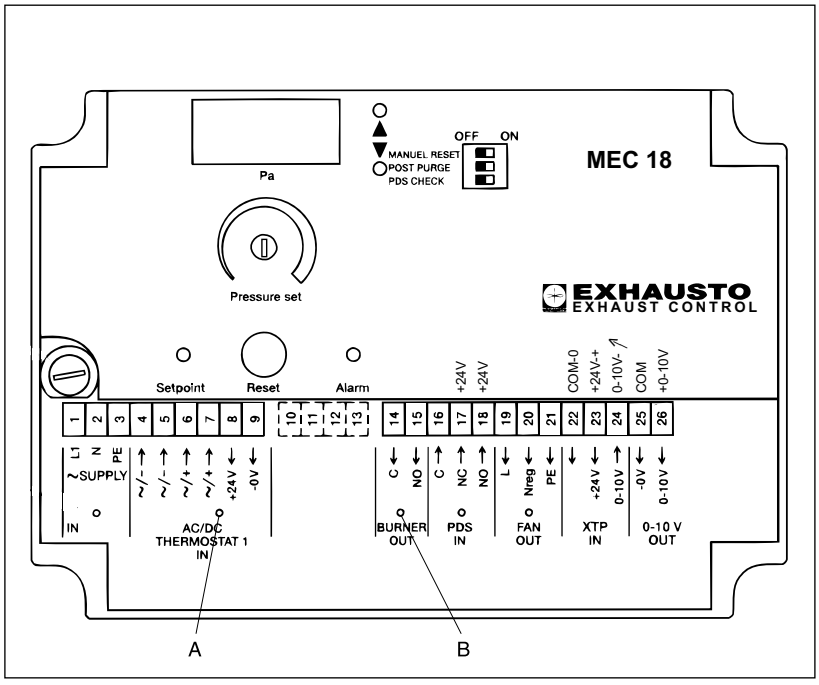


Fig. 15

6. MAINTENANCE AND TROUBLESHOOTING

6.1 TROUBLESHOOTING

Observation	Problem	Solution
No light in the SUPPLY diode (Fig 16-A)	Blown fuse or interrupted power supply	1) Check the fuse (Fig. 16-B) and the fan power. 2) Check the power supply.
Constant light in "Increasing Speed" diode (Fig 16-E)	System fault	1) Check that the probe is connected to the "-" port on the XTP transducer. 2) Check that the probe is not clogged. **CAUTION: Do not blow into the XTP transducer.** 3) Check that the fan is running. 4) Set-point is too high for the fan capacity. Check/reduce setting. 5) Check the entire system's adjustment, including any balancing baffles installed. 6) Check duct for leakages. 7) Check the power supply to the XTP..
Constant light in "Decreasing Speed" diode (Fig 16-D)	System fault	1) The natural stack effect prevents the system from reaching the set-point. Check the adjustment. If necessary, install a balancing baffle or other resistance in the duct. 2) The probe may be in a bad location..
Constant light in ALARM diode (Fig. 16-H), but no light in FAN diode (Fig. 16-G) (Can only occur when MANUAL RESET is ON (Fig. 16-F)	Power outage	Press the RESET button (Fig. 16-C) for (1) second — see warning.
Constant light in Alarm diode and light in fan diode (Fig. 16-H)	Insufficient pressure	1) Press the RESET button (Fig. 16-C) — see warning. 2) Check that the service disconnect switch is working properly. 3) Check the connectors, chimney and fan for blocking restrictions.
Flashing ALARM diode (Fig. 16-H) Can only occur when PDS CHECK is ON (Fig. 16-F)	Error in safety system (PDS)	1) Check that a PDS is installed. 2) Check the setting of the safety system (the natural stack effect can prevent close/alternatively the PDS CHECK dipswitch can be moved to its OFF position. 3) Check the connection to the PDS and the PDS itself.
The MEC 18 does not regulate and the fan is running at full speed	The neutral connection is shared with other devices.	1) Check the amp-draw on terminal Nreg. If it is "0", the neutral connection to the fan is being shared.

Some appliances require a certain startup procedure after a shutdown. Follow this procedure prior to pressing the RESET button (Fig. 16-C).

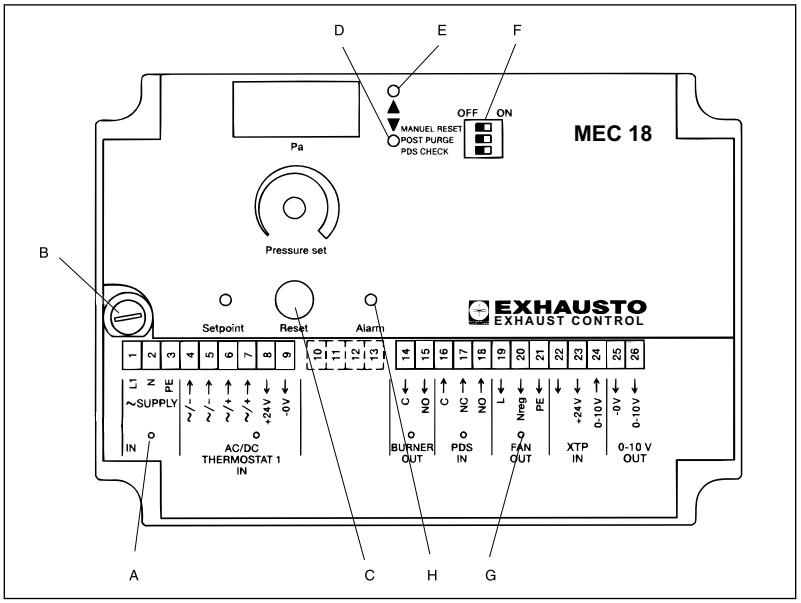


Fig. 16

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