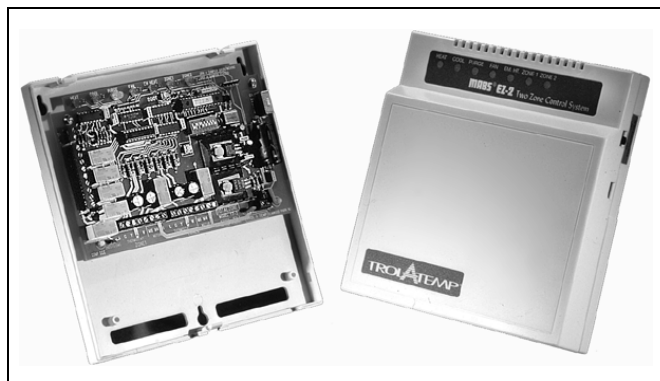


Mastertrol® Automatic Balancing System™ (MABS®) EZ Zone (EZ-2 and EZ-4) Control Panels



PRODUCT DATA



FEATURES

- MABS EZ-2 controls two zones and MABS EZ-4 control four zones. For systems requiring five or more zones, the TotalZone series of control panels is used.
- Uses standard four-wire (R,W,Y,G) thermostats.
- Any zone thermostat changeover is based on first call.
- Bank of eight DIP switches provides easy system configuration.
- Adjustable purge timing of two minutes or three and one-half minutes.
- Adjustable heating and cooling limit with optional ZoneMAX Sensor.
- Stage control allows built-in timer to control heating and cooling stages.
- Use any four-wire thermostat.

APPLICATION

The MABS EZ-2 and EZ-4 are microprocessor-based forced air zone control panels that provide automatic or manual changeover control of single- and two-stage heating and cooling and heat pumps with or without auxiliary heat.

For Internet access: www.trolatemp.com or

www.honeywell.com/yourhome/zoning/zoning_home.htm

For technical support, call 1-800-TAT-Temp (1-800-828-8367).

To download Zoning literature: <http://hbctechlit.honeywell.com>

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SPECIFICATIONS

Electrical: 24 Vac, 60 Hz.

Dimensions: 9-3/8 in. high x 7-5/8 in. wide x 1-5/8 in. deep.

Mounting: Mount with screws (supplied) through holes in cabinet back.

Wiring: 18-gauge wire for all equipment and system connections

Wiring Connections:

Thermostat: L, G, Y, R, W.

Dampers: M6 (Closed); M4 (Open); M1 (Common) Zone-MAX TL, TL

Transformer: TR1 (Common), TR2 (Hot)

Equipment: Y2, Y1, O, R, G, B, W1, E, W2

Thermostats (See Table 1):

Conventional four-wire (R,W,Y,G) thermostats.

Manual or automatic changeover switching subbase for each zone thermostat.

MABS EZ second-stage timer and emergency heat switch replace multi-stage or heat pump thermostat.

MABS EZ with heat pump thermostat controls Emergency Heat mode from thermostat and MABS EZ panel switch.

- Requires separate W1 and Y1 outputs for the heat and cool calls.
- Requires L terminal energized when Emergency Heat switch is on.
- W2 thermostat terminal is not used.
- MABS EZ panel timer turns on auxiliary heat when not in Emergency Heat mode.

Table 1. Recommended Thermostats.

System	Trol-A-Temp Logo		Honeywell Logo	
	Mechanical	Programmable	Non-Programmable	Programmable
Manual Changeover	T87F3715/Q539A1436 T87F3707/Q539A1428	T8131C1020	T87F1859/Q539A1014 Q87F4010/Q539A4026 T8400R	T8000C1002 T8000C1010
Auto Changeover		T8601D2027	Y594D1347	T8600D2069 T8600D2028 T8601D2019 T8602D2018 T8602D2000
Heat Pump				T8011R1006 T8011R1014 T8411R1002 T8411R1028

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Relations
Honeywell, 1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V4Z9.

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

Dampers: See Fig. 3-7 for hookup drawings. See Table 2 for recommended dampers.

Accessories:
For required accessories, see Table 3.

Table 2. Recommended Dampers.

Honeywell Damper Types	Round	Rectangular
Power-open/ power-closed	MARD	AOBD AOBD-BM CDO-51
Spring-open/ power-closed	ARD	ZDB ZDS

Table 3. Required Accessories (Not Supplied With Panel).

Accessory	Description	Bypass Rated Capacity (cfm)
40 VA Transformer	AT140D1046 (PMT-40)	–
Capacity Protector	ZMS/C7735	–
Round Static Pressure Regulator Damper (SPRD)	7 SPRD 8 SPRD 9 SPRD 10 SPRD 12 SPRD 14 SPRD 16 SPRD 18 SPRD	300 400 600 750 1200 1800 2400 3200
Rectangular Static Pressure Regulator Damper (SPRD)	12 x 8 SPRD 12 x 10 SPRD 12 x 12 SPRD 20 x 8 SPRD 20 x 10 SPRD 20 x 12 SPRD	1000 1200 1400 1600 2000 3000

INSTALLATION

Mounting



CAUTION

Equipment Damage Hazard.
Do not mount MABS EZ inside HVAC equipment.
Mount only on wall or on cold air return

1. Mount the thermostats in each zone of the living space using the installation instructions provided with each thermostat.
2. Mount the dampers in the ductwork using the installation instructions provided with each damper.
3. Mount the MABS EZ Zone Panel near the HVAC equipment; locate it on a wall or on the cold-air return.
4. Level the MABS EZ for appearance only.

Wiring



CAUTION

Voltage Hazard.
Can cause electrical shock or equipment damage.
Disconnect power before continuing installation.

Wiring must comply with applicable codes, ordinances, and regulations.

1. Connect thermostats as shown in Fig. 1 and 2.
2. Connect dampers as shown in Fig. 3-7.
3. Connect the ZMS (not supplied) to the TL terminals. The wires are not polarized. See Fig. 9.
4. Connect the HVAC equipment to the equipment terminals on the left side of the panel. See Figures 10-13.
5. Connect a 40 VA, 24 volt transformer (not supplied) to TR1 (common) and TR2 (hot). This must be a dedicated transformer. See Fig. 8.

Wiring Diagrams

See Table 1 for recommended thermostats. See Fig. 1-15 for wiring appropriate wiring diagrams.

NOTE: The common wire (C to M1) is used only on thermostats that require it.

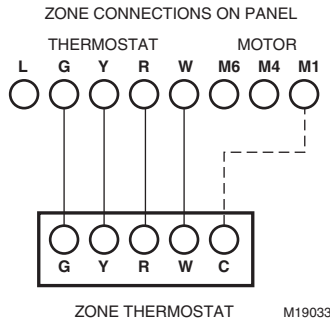


Fig. 1. Typical single-stage thermostat hookup diagram.

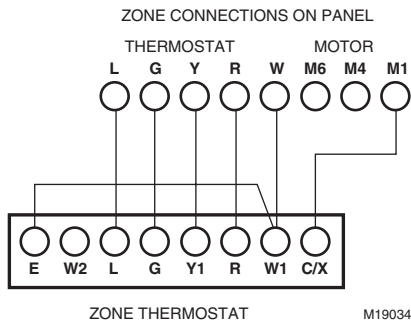


Fig. 2. Heat pump thermostats with separate heat and cool outputs.

Use only thermostats listed in Table 1.

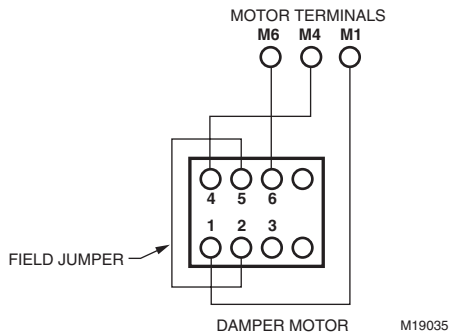


Fig. 3. AOBD damper wiring (single).

NOTE: Wiring is the same for AOBD, AOBD-BM and IOBD Dampers.

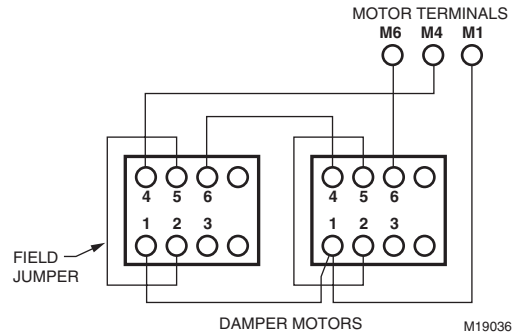


Fig. 4. AOBD Damper wiring (multiple).

NOTE: For three or more AOBD dampers on one zone, a Slave Damper Control Relay (SDCR) is required.

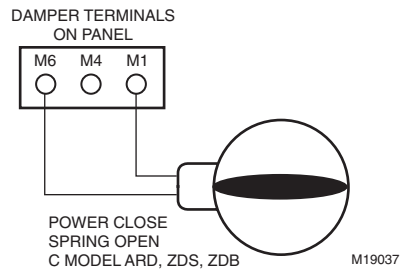


Fig. 5. ARD or ZD Damper wiring diagram.

NOTE: Multiple dampers can be wired in parallel, with up to five dampers wired to each panel.

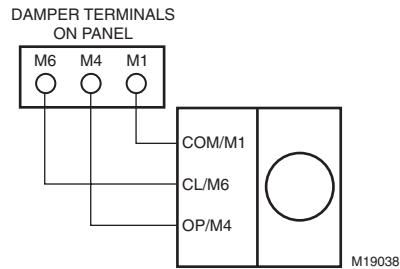


Fig. 6. MARD and CDO-51 Damper wiring diagram.

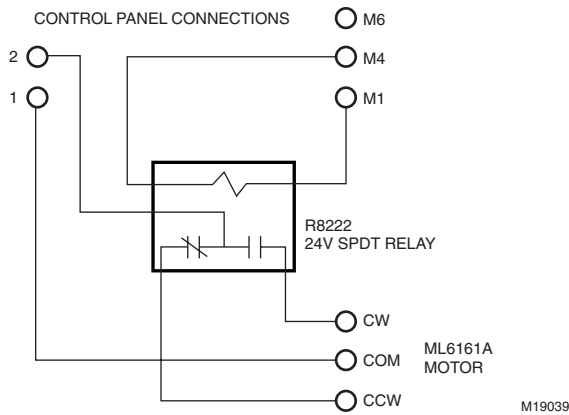


Fig. 7. ML6161 Damper Motor Actuator wiring diagram.

NOTE: The R8222 relay is not required for operation, but if it is not used, the zone damper LED will be constantly green.

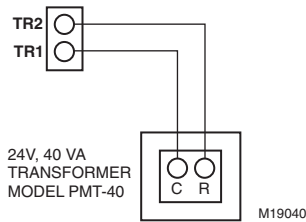


Fig. 8. Transformer wiring diagram.

NOTE: A dedicated 40 VA, 24 Vac transformer must be used.

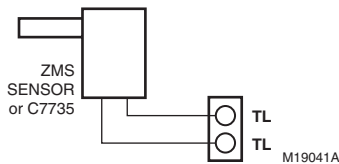


Fig. 9. ZoneMAX or C7735 Sensor wiring diagram.

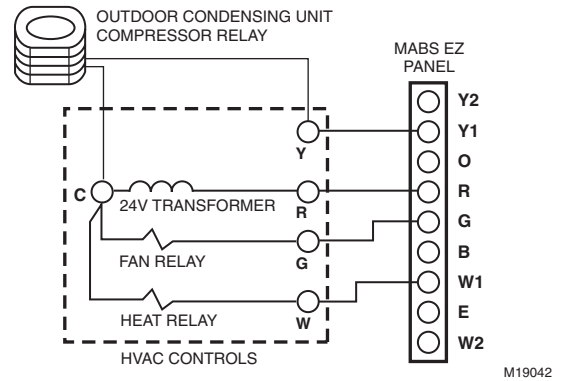


Fig. 10. Single-stage heating and cooling equipment wiring diagram.

NOTES:

- Electric Furnace: Set DIP switch 8 to On to energize the fan with a call for heat.
- Oil Furnace: See Fig. 11 for hookup.
- Hydro-Air: Wired similarly except the zone valve or circulator relay is connected to the W1. (If the circulator relay has powered terminals, an isolation relay may be needed. See Fig. 11.) DIP switch 8 must be set to On to energize the fan with a call for heat.

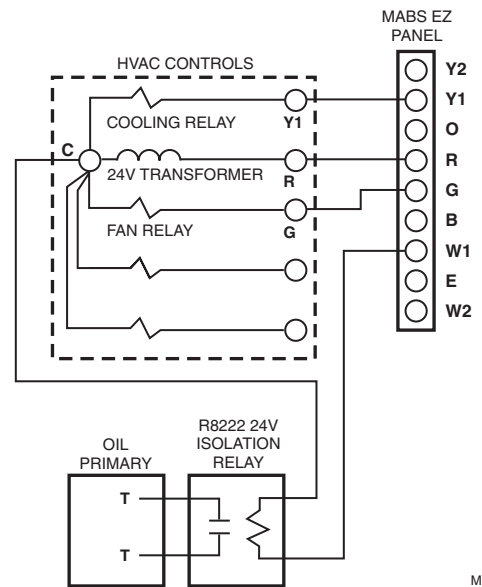
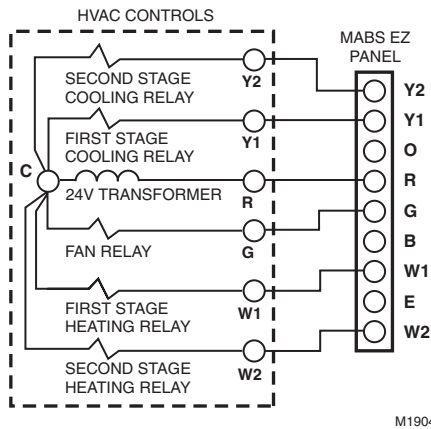


Fig. 11. Oil furnace and air conditioning wiring diagram.

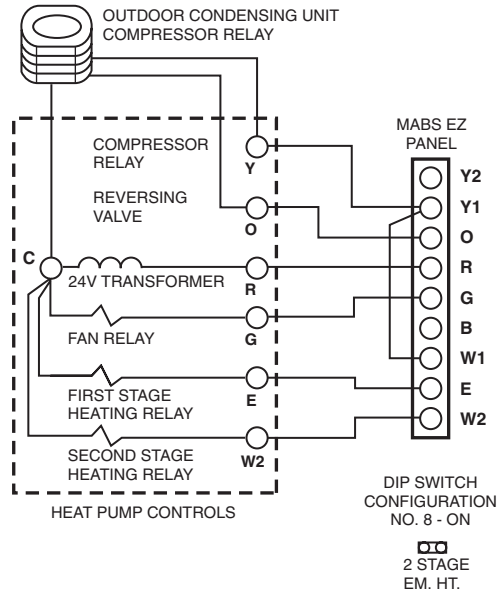
NOTE: The isolation relay is required to isolate the cooling transformer from the heating transformer.



M19044

Fig. 12. Two-stage heating and cooling wiring diagram.

NOTE: The stage timer energizes the second stage equipment.



M19045A

Fig. 13. Heat pump wiring diagram.

IMPORTANT

*Y1 must be jumped to W1 for compressor control.
Set DIP switch 8 to On to energize the fan with a call for heat.*

NOTES:

- Fossil Fuel Kits with Heat Pumps: The wiring for these heat pumps is similar but the manufacturer's fossil fuel control must be used. The EZ equipment terminals are wired using the thermostat terminals shown on the heat pump manufacturer's wiring diagrams.
- Two-speed Compressors: For two-speed compressors or two-speed compressors with auxiliary heat, the EMM-3U or TotalZone panels are recommended. Call Honeywell Zoning at 800-828-8367 for assistance.

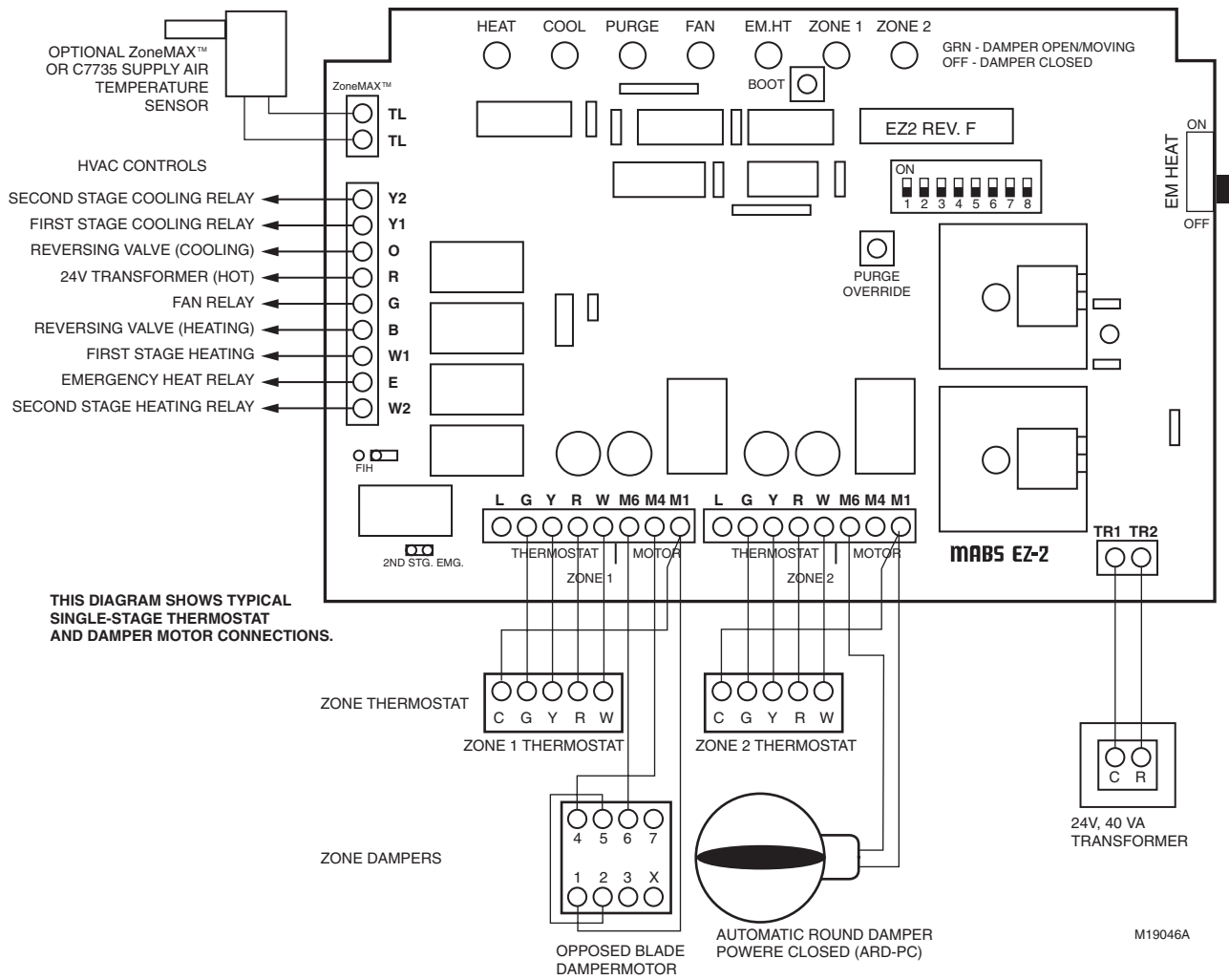


Fig. 14. MABS EZ-2 wiring diagram.

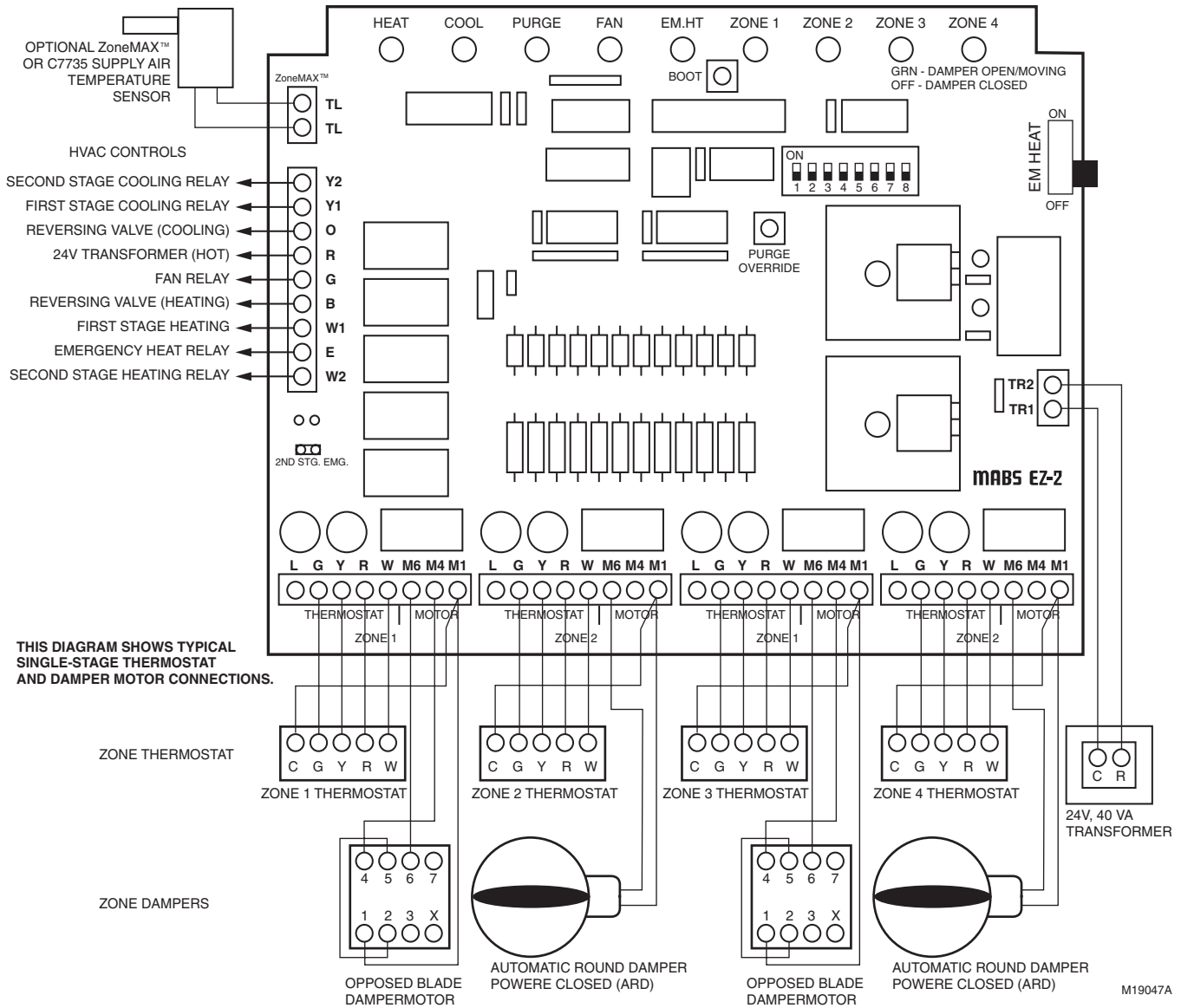


Fig. 15. MABS EZ-4 wiring diagram.

STARTUP AND CHECKOUT

After the installation is complete, verify the operation:

1. Put the Em Heat switch in the off (down) position.
2. Be sure the DIP switches are set correctly. See Sequence of Operation and Table 6 for correct configuration. The default position is in the off (down) position.
3. Power up the MABS EZ and set the thermostats so no zones are calling. Verify that the board enters the Purge mode.

NOTE: During the two- or three and one-half- minute Purge, the Purge LED should be amber. During this mode, the dampers are open and the damper LEDs are lighted green.

4. Set the zone one thermostat to heat and raise the setpoint to call for heat. The Heat LED is red and the zone one damper remains green while the other damper LEDs turn off.
5. Lower the setpoint in zone one and raise the setpoint in zone two to call for heat. Verify that zone one LED turns off (also zones three and four turn off when used on MABS EZ-4) and zone two damper is green.
6. When using a MABS EZ-4, repeat for zones three and four and verify correct operation.
7. Alternately, the setpoint can be lowered to call for cooling. Then the green cool LED lights.

OPERATION

Sequence of Operation

On a call for heating or cooling, the zone damper to the calling zone stays open, and the dampers close to the zones that are not calling. The MABS EZ panel brings on the heating or cooling and conditioned air is delivered to the calling zone until the zone is satisfied. When the call is satisfied, the system enters the Purge mode. This holds open the damper of the last zone calling and purges into that zone. The Purge time can be set to three and one-half or two minutes.

Individual Zone Fan Control

When all zones are satisfied, each zone thermostat Fan switch controls the fan operation for each zone. When circulation is desired, place the Fan switch in the On position. The fan runs and closes the dampers to the zones where the Fan switch is set to Auto.

Multi-Stage Operation

MABS-EZ can control up to two stages of heating and cooling using single-stage thermostats. The panel uses a timer to control the second stage and is adjustable from five minutes to 30 minutes using DIP switches 5, 6, and 7. See Table 4.

When a call for heating or cooling is not satisfied within the time set on the stage time, the panel energizes the second stage of heat or cool and both stages remain on until the call is satisfied.

Table 4. Stage timer configuration.

Minutes	DIP Switch 5	DIP Switch 6	DIP Switch 7
5	Off	Off	Off
8	On	Off	Off
10	Off	On	Off

Table 4. Stage timer configuration.

Minutes	DIP Switch 5	DIP Switch 6	DIP Switch 7
12	On	On	Off
15	Off	Off	On
20	On	Off	On
25	Off	On	On
30	On	On	On

Changeover Operation

The MABS EZ panel uses a standard heating and cooling thermostat for each zone to allow any zone to call for heating or cooling. When opposite calls are made from different zones, MABS EZ accepts the first call. Once the first call is satisfied, or a maximum of 20 minutes elapses from the start of an opposite call, MABS EZ allows the opposite call. Automatic changeover thermostats can also be used to provide automatic zone changeover.

When opposite calls occur, the panel ensures that both calls are acknowledged. If the first call is not satisfied within 20 minutes, the panel drops the existing call and goes into the Purge mode. After completion of the Purge, the panel switches to the opposite mode until it is satisfied or until 20 minutes elapses. Then it goes back into the Purge mode and back to the original call. The system continues to switch back and forth until both calls are satisfied.

Purge Mode

At the end of every call for heat or cool, the panel enters a Purge mode that holds the last zone damper open for three and one-half or two minutes. During this time, the panel or HVAC equipment can operate the fan. Purge is a time delay that prevents short cycling of the heating and cooling equipment after each call. The Purge LED lights when the system is in Purge mode. Press Purge Override button when the purge LED is lighted to override Purge.

Table 5. Purge DIP switch settings.

DIP Switch No.	Setting	Action
1	Off	3.5 minutes
1	On	2 minutes
2	Off	Panel control of fan in Purge
2	On	HVAC control of fan in Purge

LED Indicators

The panel features several LED status indicators visible through a window in the cover. See Table 6.

Table 6. LED Status Indicators.

LED	Color	Status		
		Lighted	Not Lighted	Flashing
Heat	Red	Heat call	Not in heat call	ZMS high temperature limit tripped
Cool	Green	Cool call	Not in cool call	ZMS low temperature limit tripped
Purge	Amber	Purge mode	Not in Purge mode	—
Fan	Green	Fan only call	No fan only calls	—
Em Heat	Red	Emergency heat switch on or thermostat in emergency heat	Not in emergency heat mode	—
Zone 1,2,3,4	Green	Damper open or moving	Damper closed	—

Re-Booting the Microprocessor

When conditions hang up the microprocessor, press and release the Boot button to re-boot the system and enter the Purge mode.

ZoneMAX Sensor Leaving Air Temperature Sensor

The ZMS (not included) is a duct-mounted temperature probe that monitors the supply of air temperature to control capacity and prevent over-heating or coil icing. The sensor attaches to the TL terminals at the upper left corner of the panel. See Fig. 9.

IMPORTANT

The ZMS wires must be at least 12 in. away from line voltage wiring to ensure correct operation. When not possible, shielded cable must be used.

ZoneMAX Sensor Configuration

DIP switches 2 and 3 set the ZoneMAX Sensor temperature limit. See Table 7. The recommended setting for fossil fuel/heat pump systems is 160°F (71°C). For heat pump systems, the recommended setting is 120°F (49°C). The cooling temperature limit can be set to 40°F (4°C) or 48°F (9°C).

Table 7. ZoneMAX Sensor Configuration.

DIP Switch No.	Setting	
	Off (Default)	On
2	ZMS 160°F (71°C) heating limit	ZMS 120°F (49°C) heating limit
3	ZMS 40°F (4°C) cooling limit	ZMS 48°F (9°C) cooling limit

OPERATION

If the system trips due to exceeding a high or low temperature, the heating or cooling system shuts down and the fan continues running to dissipate the conditioned air from the plenum. If the low limit was tripped, the cool LED flashes continuously until it resets. If the high limit was tripped, the Heat LED flashes continuously until it resets.

The ZoneMAX Sensor resets and allows normal system operation when the supply air temperature rises ten degrees in cooling mode, or falls ten degrees in heating mode. The ten degrees provide adequate time to prevent short cycling of the unit.

Circuit Breaker Protection

A built-in thermal circuit breaker protects the panel against shorts in the thermostat and damper wiring and the remote occupied/unoccupied switch. It does not protect against shorts in the HVAC equipment wiring into the panel.

OPERATION

None of the LEDs light when the circuit breaker tripped. The fuse is a yellow square or rectangular disk located right of the TR1 and TR2 terminals. If it is hot to touch, remove panel power for ten seconds to allow the circuit breaker to cool off and reset.

Thermostats

The panel can use almost any four-wire (R,W,Y,G) thermostat. Each zone requires its own switching subbase with either manual or automatic changeover. See Table 1 for recommended thermostats.

HEAT PUMP OR MULTI-STAGE THERMOSTATS

Heat pump or multi-stage thermostats are not required for the MABS EZ panels because a timer in the panel brings on the second stage. A heat pump thermostat is used only when emergency heat control from the thermostat is desired. Use only Table 1 recommended heat pump thermostats.

EMERGENCY HEAT MODE

An emergency heat switch is located on the side of the panel and can be accessed without removing the cover. A heat pump thermostat is used only when emergency heat control is desired from the thermostat instead of from the panel.

Energizing the L terminal on the zone thermostat or switching the Emergency Heat switch to the On position places the system in Emergency Heat mode. This switch does not initiate a call for emergency heat and prevents the first stage (heat pump) from being used on a call for heat.

Fan On In Heat

The system fan can be set to come on with a heat call, as required, with a hydro-air, heat pump, or electric heat system. Set DIP switch 8 to the On position to activate this mode. Otherwise, leave it in the default Off position.

Second Stage Emergency Heat Jumper

A jumper is installed on the jumper block to energize W2 output during a call for emergency heat. If there are two forms of auxiliary heat, one can be connected to W2 as the second stage of heat and the other to E as the emergency heat stage. See Fig. 4.

Table 8. DIP Switch Settings.

DIP Switch NO.	Switch Function with DIP Switch Off (Default)	Switch Function with DIP Switch On
1	3.5 minute Purge with fan on	2 minute Purge with fan off
2	ZMS 160°F (71°C) heating limit	ZMS 120°F (49°C) heating limit
3	ZMS 40°F (4°C) cooling limit	ZMS 48°F (9°C) cooling limit
4	Normal operation	Test mode; accelerated timings
5	See Table 4.	—
6	See Table 4.	—
7	See Table 4.	—
8	HVAC unit-controlled fan	Fan on with call for Heat

TROUBLESHOOTING

The primary diagnostic tools are the system and damper status LEDs. See Table 9 for troubleshooting guide.

Table 9. Troubleshooting Guide.

Symptom	Problem	Solution
No LEDs light	No power to the panel.	<ul style="list-style-type: none"> Check for 24 Vac across TR2. Check circuit breaker; if hot, a short exists in thermostat or damper wiring.
Erratic operation	Insufficient voltage. Incorrect configuration Panel in Emergency Heat mode Panel needs resetting.	Check for 24 Vac \pm 10% across TR1 and TR2. Verify jumpers and DIP switch setting for correct configuration. Check position of Em Heat switch. Press Boot button and recheck system operation.
Heat or Cool LED flashes continuously	Heat LED flashing. Cool LED flashing.	ZoneMAX Sensor tripped on high limit. ZoneMAX Sensor tripped on high limit.
Heat pump works in Heat but not in Cool or in Cool but not in Heat	Incorrect thermostat. Incorrectly wired.	Install the correct thermostat. If equipment is heat pump, be sure there is a Y1 or W1 jumper installed.
Emergency heat not coming on	Incorrectly wired. Incorrect thermostat.	Verify thermostat and equipment wiring. Verify correct thermostat is used.

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