

# MAGHEX 2 FAN CONTROLLER

ON BOARD ELECTRONIC OIL COOLING

Compact Programmable  
Fan Controller and Sensor



Mag Wand



# MAGHEX 2

## FAN CONTROLLER

**This combined sensor and controller is designed to mount directly to the heat exchanger.** It provides accurate temperature control by cycling the electric cooling fan to maintain desired oil temperature. A single housing reduces wiring and mechanical installation. The MAGHEX 2 magnetic wand is used to set up and program the sensor. Not needed for operation. LEDs indicate the oil temperature setting.

### Features

- Easy installation and integration into MA Series (any SAE#8 port or cavity)
- Creates a simple drive circuit with minimal programming
- Low cost alternative to complex control systems
- Utilize built-in temperature sensor to activate the fan based upon current set point
- Oil temperature status shown with LED indicator
- 12 or 24 volt DC operation controlling up to 40 amps
- Temperature sensor and operation controller in single aluminum housing
- Select from 10 temperature settings from 100° to 200°F (38° to 93°C)
- Solid-state design, fully sealed microprocessor
- Manual override feature built-in
- Shuts off 7 degrees below set point
- Improved circuitry to accommodate higher amperage applications
- Housing is used as a heat sink for internal components
- Automatic low voltage shut down

### Specifications

Operating Voltage	12 or 24 VDC Systems
Min/Max Voltage	9 VDC / 32 VDC
Current Rating	40 AMPS
Switch Type	Normally open
Ambient Operating Temperature	-40° to +185°F (-40° to +85°C)
Measurement Temperature Range	100°F to 200°F (38 to 93°C)
Current Draw MAGHEX	20 mA
Set point Selections	10 set points in 10 degree increments from 100°F to 200°F (38 to 93°C)
Selection Method	Magnetic programming wand
Enclosure Rating	IP69K
Sealed Housing	High-grade automotive potting compound
Housing Material	Anodized aluminum
Weight	Approx 8 oz. (.23 kg) incl. wire
Mounting	#8 SAE Thread
Fan Connector	3 Conductor receptacle

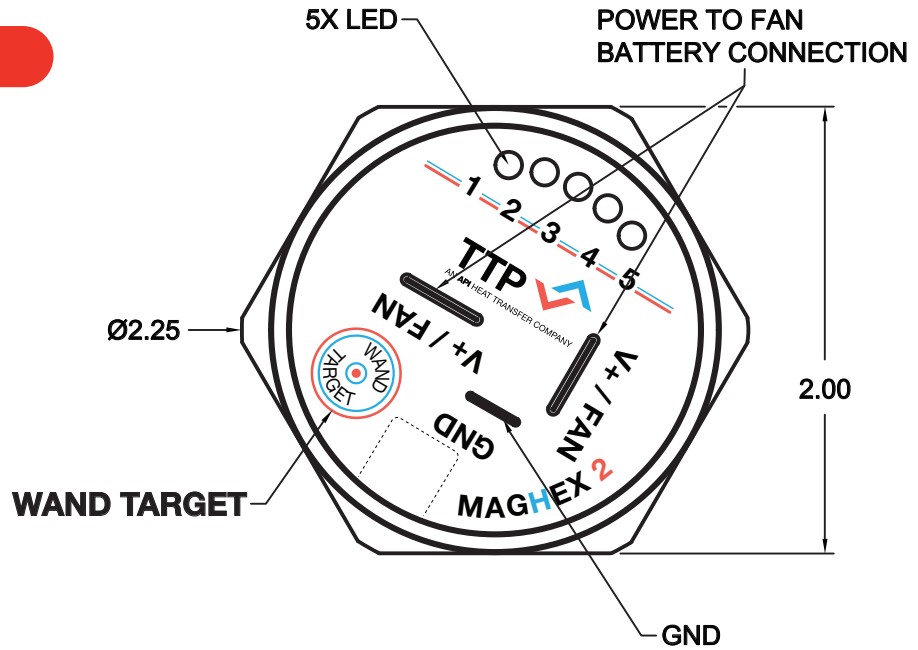
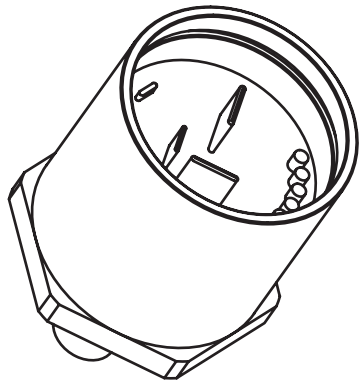


MAGHEX 2 Programming Wand

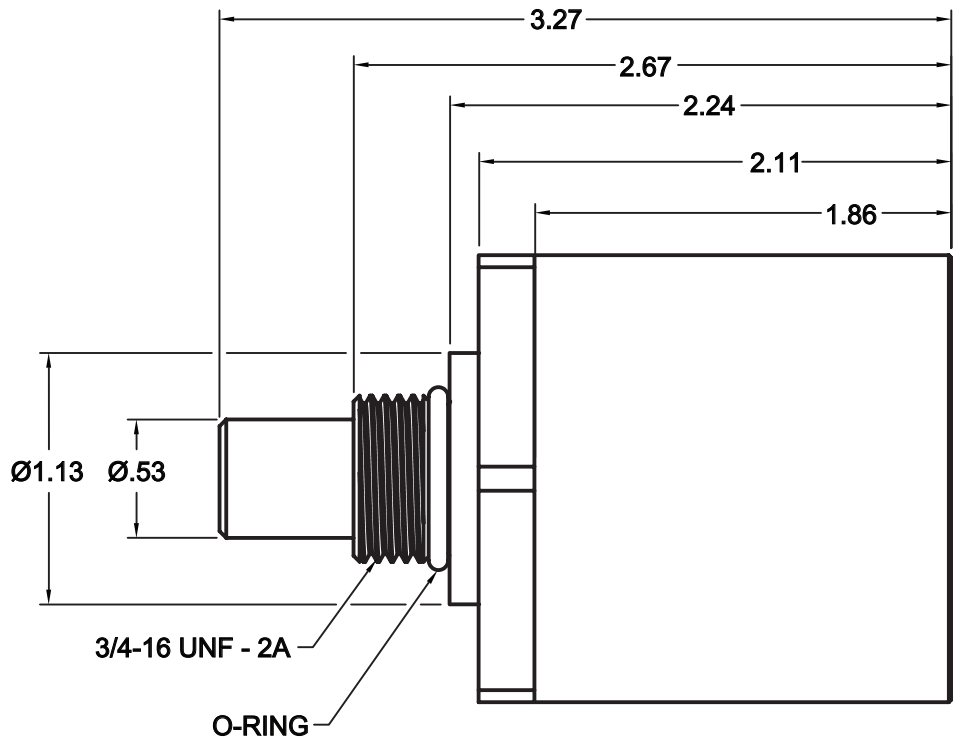
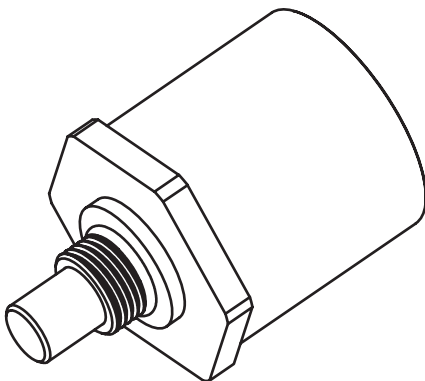
# MAGHEX 2

## FAN CONTROLLER

Top View



Side View



# MAGHEX 2 FAN CONTROLLER

## Wiring and Installation

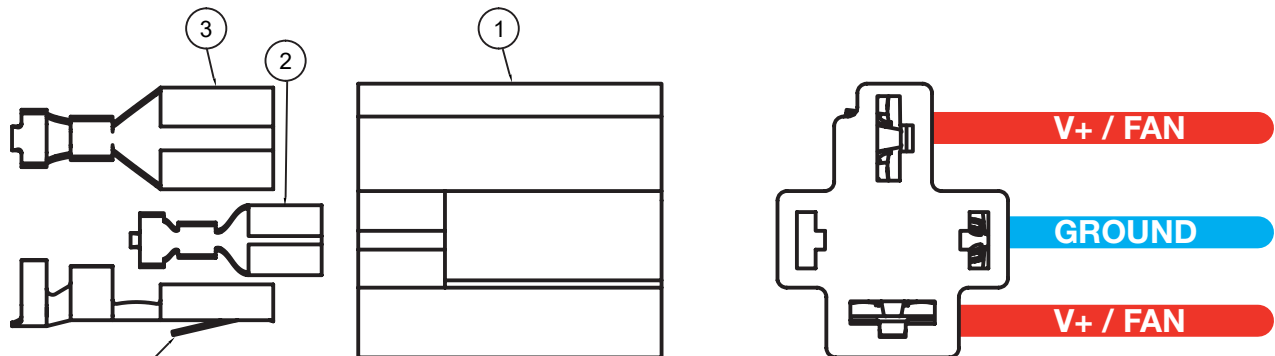
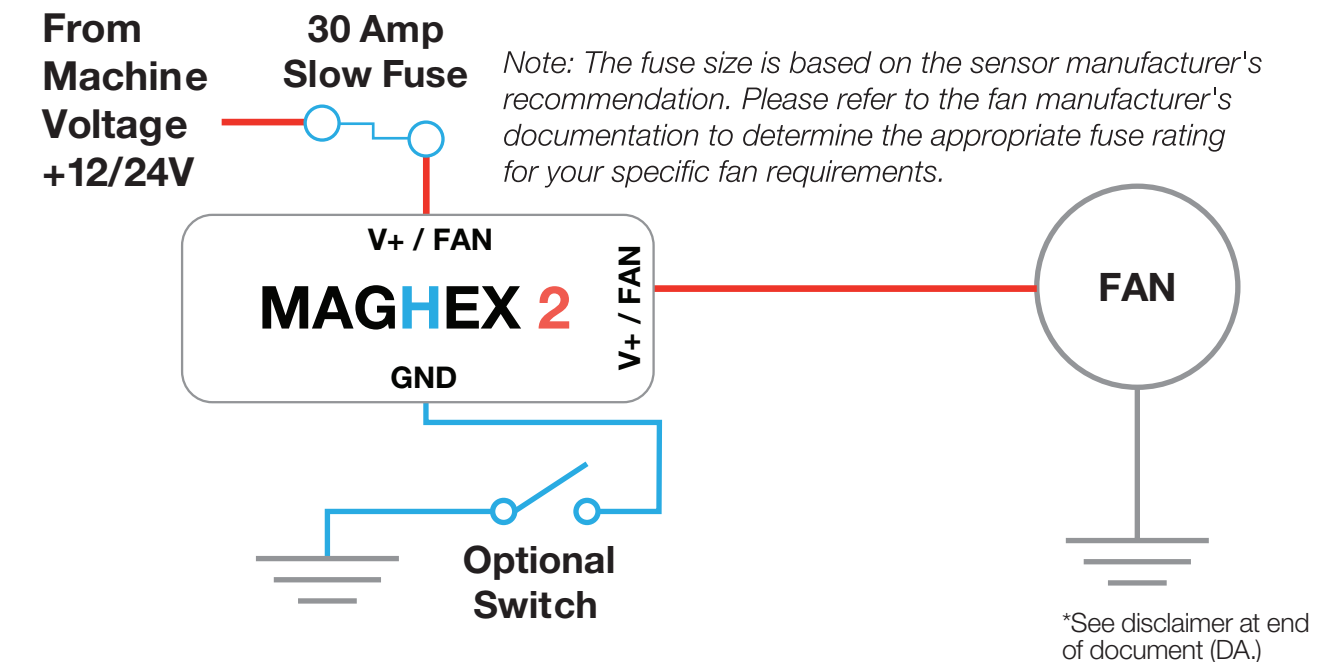
This sensor will drive one single fan based on 20 adjustable set points in 5 degree increments from 100° to 200°F (38° to 93°C).

### Installation:

1. Insert controller sensor into #8 SAE sensor port on cooler.
2. Connect controller to DC fan (see wire diagram).
3. Provide 30 amp slow fused power to the fan.
4. Use MAGHEX Programming Wand to set controller to desired temperature.

### Attention!

1. Use wire suitable for the application.
2. Install fuse as close to battery as possible.
3. Optional ON/OFF switch can be added to ground wire.



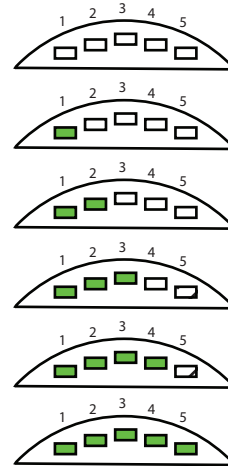
PARTS LIST		
ITEM	QTY	PART NUMBER
1	1	PR04-WH
2	2	C-42100-2-DS-3D
3	4	C-151667-2-AD-3D

# MAGHEX 2

## FAN CONTROLLER

### LED Activation Indicator

- The indication timer is a series of five (5) green LEDs that light to indicate the sensor mode changing.
  - When engaged, the LED indicators will light green, in series one at a time, until all are lit
  - The LED 'Activation Indicator' provides feedback to help enter program and test mode
- The indication timer is used to enter the Test Mode and Program Mode.
  - Test Mode is engaged by holding the MAGHEX programming button down during power up
  - Program mode is engaged by holding the MAGHEX programming button during regular operation
  - LED 'Activation Indicator' provides feedback to help enter program and test mode

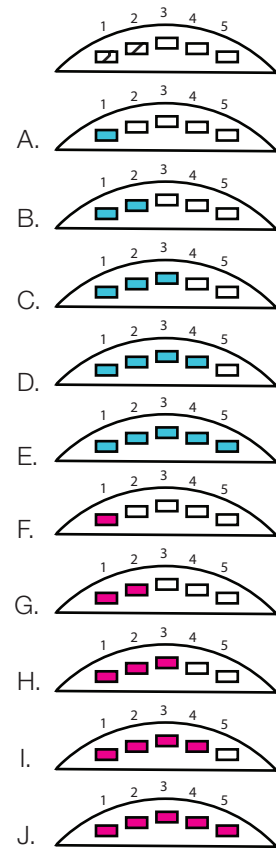


### Program Mode

- During run mode press the button or engage magnet wand for at least (5) seconds.
- While holding the button/magnet wand, the unit's LED 'Activation Indicator' will start.
- Wait for the 'Activation Indicator' LED pattern to complete (five seconds) and release the button/magnet wand to enter program mode.
- In program mode the sensor's five (5) LEDs will display the current programmed setting.
- To cycle temperature set point press the button/engage magnet wand. The LEDs light in a color code that corresponds to the available temperature ranges.

#### Available Ranges:

- (A) 1st setting (100°F): 1 LED blue
- (B) 2nd setting (110°F): 2 LEDs blue
- (C) 3rd setting (120°F): 3 LEDs blue
- (D) 4th setting (130°F): 4 LEDs blue
- (E) 5th setting (140°F): 5 LEDs blue
- (F) 6th setting (150°F): 1 LED purple
- (G) 7th setting (160°F): 2 LEDs purple
- (H) 8th setting (170°F): 3 LEDs purple
- (I) 9th setting (180°F): 4 LEDs purple
- (J) 10th setting (190°F): 5 LEDs purple



#### To Exit Programming Mode:

The sensor will time out after 30 seconds with no input or it can be power cycled to immediately exit program.

# MAGHEX 2

## FAN CONTROLLER

### RUN Mode

#### To Enter RUN Mode (Normal Operation):

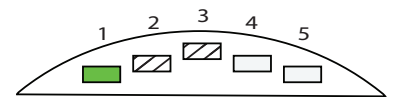
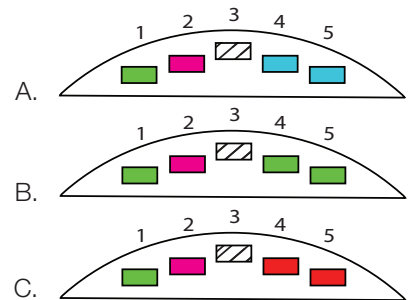
1. To enter RUN mode, power up the sensor without holding down the button/magnet wand switch (normal power up sequence).
2. The 5 LEDs have the following functions in this mode:
  - First LED, GREEN or RED: Power condition
  - Second LED, PURPLE: Button/magnet wand switch status
  - Third LED, GREEN or RED: Sensor condition
  - Fourth and Fifth LED, BLUE - GREEN - RED: Temperature reading
3. **Power Condition:** Status GREEN LED if supply power is OK, status LED RED on bad/low supply voltage. **(IF LED IS RED SEE ERROR MODE)**
4. **Button/Magnet Wand:** Activates PURPLE LED when the button or magnet wand switch is pressed or engaged.
5. **Sensor Condition:** Indicates control unit status, GREEN LED is FAN ON, flashing RED LED indicates PROBE ERROR.
6. **Temperature Reading:** The fourth and fifth LEDs will change color based on the current temperature reading:
  - A) Below set point: BLUE (Default set point 100°F)
  - B) 0° to 20°F above set point; GREEN
  - C) More than 20°F above set point: RED

**OPTION:** Button/magnet wand switch may be held down to manually force unit on. Review "FORCE ON from RUN" for instructions.

### FORCE ON from RUN

1. To FORCE ON, during run mode press the button or engage magnet wand between 1-4 seconds.
2. When the 'Activation Indicator' begins, release the button/wand.
  - To complete the timer, release before the 5th green LED activates
3. When in FORCE ON mode the 'sensor condition' LED indicator will light GREEN and the two 'oil temperature' LED indicators will light WHITE.
4. To exit FORCE ON mode, power cycle the sensor or repeat the activation steps by engaging the magnet wand between 1-4 seconds - release before the LED 'Activation Indicator' finishes cycle.
5. During FORCE ON mode, if the button/wand is engaged long enough to complete the 'Activation Indicator' LED pattern, the sensor will enter programming mode.

*Note: In run mode, the fan relay will switch on when the temperature reaches the set point and switch off when the temperature falls to 5 degrees less than the set point*



# MAGHEX 2

## FAN CONTROLLER

### TEST Mode

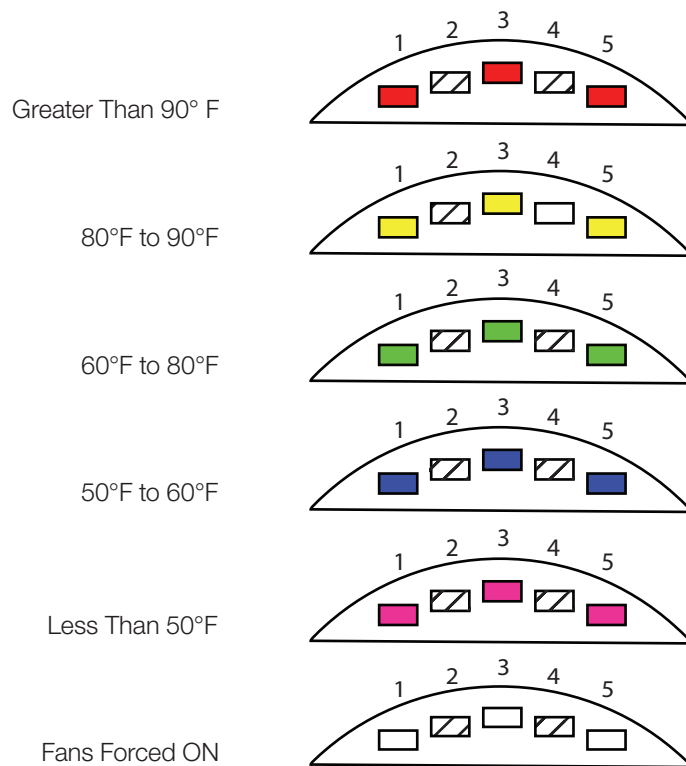
1. Test mode allows the user to see the current temperature detected by the probe as well as force the unit on to test operation.
2. Press the button or engage magnet wand during sensor power up. Hold the button or magnet wand during sensor power up for at least 10 seconds to activate test mode.
  - The LED Activation Timer will engage during power up, all LEDs will light green
  - Continue to hold the magnet wand or sensor button after ALL LEDs are green
  - If successful, the sensor will enter TEST MODE (see figures on left for guide)
  - Entering test mode will require holding the button or magnet wand in place for approximately 10 seconds during sensor power up
3. In test mode the sensor LEDs light according to the probe temperature.

### While in Test Mode, to Activate Fan Force on Mode:

1. While in test mode engage the button or magnet wand to activate fan force on.
2. When fan force on is activated LEDs will turn WHITE.
3. Releasing the switch will turn the relay off, and the LEDs will resume test mode.

### To Exit Test Mode:

The sensor must be powered down.



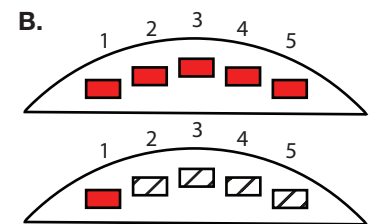
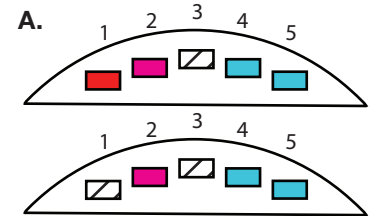
# MAGHEX 2

## FAN CONTROLLER

### Error Modes

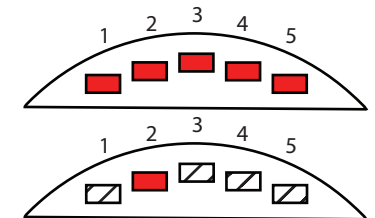
#### Power Condition Error: LED #1 Flashes RED

- Upon power up the sensor automatically detects system voltage (12v or 24v) and sets internal parameters for safe operating voltage ranges.
- A voltage error occurs when operating voltage drops below operating threshold.
  - 12v systems require 10v minimum
  - 24v systems require 22v minimum
- If voltage is under safe operating voltage the first (1) LED will flash RED.
  - If there is only a voltage error, the first LED will flash RED indicating voltage error. LEDs 2-5 will operate normal, indicating button/probe/temperature status.
  - If there is a button or temperature sensor error in combination with a voltage error, the sensor will enter ERROR MODE and all LEDs will flash RED then the LEDs that correspond to detected errors. LED 1 indicates voltage error.
- While input voltage LED flashes in RED ERROR MODE, the fan relay will NOT turn on regardless of temperature or if the button/magnet wand is used to FORCE ON.



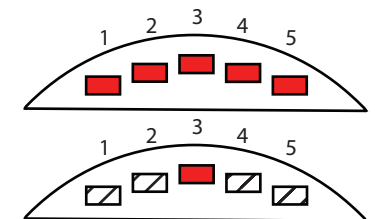
#### Button/Magnet Wand Error: LED #2 Flashes RED

- The button/magnet wand switch has been held down on startup for approximately 20 seconds indicating a button short or error.
- LED number two (2) will flash red indicating button/magnet wand switch error.



#### Temperature Sensor Error: LED #3 Flashes RED

- If there is no voltage error, the relay will be forced on during temperature error.
- During run mode, the temperature sensor has been detected as removed or malfunctioning.
- While in temperature sensor error mode, the board will periodically check if the temperature sensor has been reattached or stopped malfunctioning. If the probe is detected, the sensor re-enters run mode.



**NOTE: Multiple errors can occur simultaneously, causing multiple error LEDs to activate indicating more than one error which correspond to the activated LEDs.**

### DA. Disclaimer

It is the responsibility of the end user and installer to ensure that the correct wire gauges and fuse sizes are selected and installed to meet the electrical requirements of the motor and fan system. Using improper fusing or wire sizes can result in excessive resistance, overheating, and potential damage to the installation.

Failure to adhere to these guidelines may compromise the safety and efficiency of the system and can lead to property damage or personal injury. The manufacturer is not liable for any issues arising from improper installation practices.