

# Motor and Pump Protection Relays

## 235P Series

### Single-Phase Pump Monitor



### Description

The Littelfuse 235P is designed to protect 5-15 hp, 230 V, single-phase pumps from dry-well, dead-head, jammed impellers, rapid-cycle, and overvoltage and undervoltage conditions. A calibration adjustment allows the 235P to be calibrated to your specific pumping applications, reducing the possibility of false or nuisance tripping. A unique microcontroller-based voltage and current-sensing circuit constantly monitors the incoming power for fluctuations causing overcurrent and undercurrent. When an abnormality such as loss of suction is detected, the 235P deactivates its output relay and directly disconnects the pump motor. The 235P communicates with a hand-held diagnostics tool called the Informer (sold separately). The Informer displays parameters including calibration points, trip points, run time, and last faults. An external current transformer is required for operation (sold separately).

Special considerations for pump cables larger than #10 AWG: In some cases where larger motors are installed with deep-set pumps, pump cables are used that exceed the relay's terminal size. In these conditions, a short splice of #10 AWG or #12 AWG may be a solution at the control box. Note: All local, state, and national electric codes should be followed when applying this solution.

NOTE: The 235P model has a sensitivity adjustment for the dry-well trip point. After calibration is done, you can adjust the sensitivity for the dry-well/dead-head trip point from 70-90 % of the full load. This makes the unit even more adaptable to varying pumping applications. If you have a very low producing well, increase the sensitivity closer to the 90 % mark, or if you have a very heavy producing well, decrease the sensitivity around the 70 % mark.

### Features & Benefits

| FEATURES                                           | BENEFITS                                                                                                              |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Proprietary microcontroller-based circuitry</b> | Constant monitoring of voltage and current for reliable pump protection                                               |
| <b>Onboard sensitivity adjustment</b>              | User-adjustable sensitivity knob makes the unit more adaptable to varying pumping applications                        |
| <b>Adjustable restart delay</b>                    | Allows user to select well recovery time delay after a dry-well condition occurs, or to select manual reset           |
| <b>Built-in IR communications link</b>             | When used with the Informer, allows user to see stored faults, run time, and troubleshoot the pump while it's running |
| <b>LED indication</b>                              | Provides status and diagnostics for troubleshooting                                                                   |
| <b>Flexible reset</b>                              | Reset can be done through a push button on the relay or remotely with optional 777-MRSW or OL-Reset remote reset kit  |

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### Applications

- Used for single-phase pump protection needs

### Specifications

#### Functional Specifications

##### Adjustments/Settings:

|                      |                                                 |
|----------------------|-------------------------------------------------|
| Overcurrent          | 125 % of calibration point                      |
| Underload (dry-well) | Adjustable (70 to 90 % of calibrated run power) |
| Overvoltage          | 265 V ac                                        |
| Undervoltage         | 190 V ac                                        |

|                                                                |   |
|----------------------------------------------------------------|---|
| Number of restarts allowed in a 60-sec. period (rapid-cycling) | 4 |
|----------------------------------------------------------------|---|

##### Trip Delay Times:

|             |           |
|-------------|-----------|
| Overcurrent | 5 seconds |
| Dry-well    | 4 seconds |

##### Restart Delay Times:

|                   |                       |
|-------------------|-----------------------|
| Over/undervoltage | 2 seconds             |
| All other faults  | Manual, 2–225 Minutes |

#### Input Characteristics

|                |                                                                        |
|----------------|------------------------------------------------------------------------|
| Supply Voltage | 230 V ac                                                               |
| Load Range     | 5–15 hp (external current transformer required)                        |
| Frequency      | 50/60 Hz ( <i>Note: 50 Hz will increase all delay timers by 20 %</i> ) |

#### Output Characteristics

|                            |                                      |
|----------------------------|--------------------------------------|
| Output Contact Rating-SPST | A300, 720VA @240 V ac (10 Amps max.) |
|----------------------------|--------------------------------------|

#### General Characteristics

|                       |                                                                                  |
|-----------------------|----------------------------------------------------------------------------------|
| Operating Temperature | -40 °C to 55 °C (-40 °F to 131 °F)                                               |
| Maximum Input Power   | 5 W                                                                              |
| Wire Gauge            | Solid or Stranded 10–22 AWG                                                      |
| Terminal Torque       | 13 in.-lbs.                                                                      |
| Dimensions            | <b>H</b> 73.66 mm (2.9"); <b>W</b> 133.35 mm (5.25"); <b>D</b> 73.99 mm (2.913") |
| Weight                | 14 oz.                                                                           |
| Mounting Methods      | #8 screws                                                                        |

### Certification & Compliance

cULus Listed

UL 508, C22.2 No. 14

### Accessories

#### Informer

A hand-held diagnostic tool that uses an infrared receiver to access information which can be helpful for troubleshooting the system. Includes the Informer IR Kit-12

#### Informer IR Kit-12

12" infrared adapter cable attaches to the face of the unit to provide remote diagnostics without opening the panel. Included with the Informer

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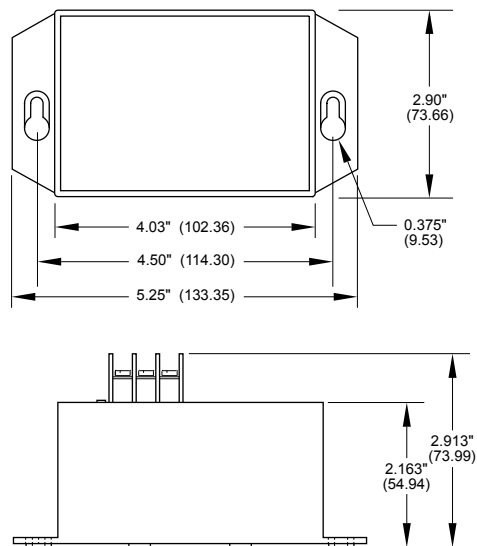
### Ordering Information

| MODEL     | LINE VOLTAGE | DESCRIPTION                |
|-----------|--------------|----------------------------|
| 235P      | 230 V ac     | 5–15 hp                    |
| 235P-ENCL | 230 V ac     | 233P with NEMA3R enclosure |

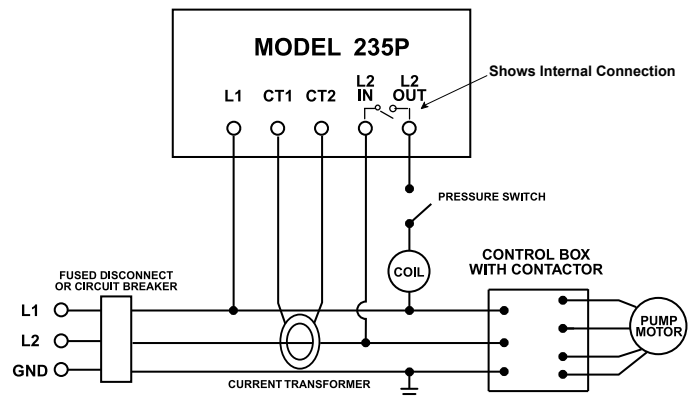
| PART*       | SIZE      | CURRENT (A) | CT CURRENT RATIO |
|-------------|-----------|-------------|------------------|
| CT-0050-D10 | 5 - 7½ hp | 27.5–42.1   | 50:5             |
| CT-0075-D10 | 10 hp     | 51          | 75:5             |
| CT-0100-D10 | 15 hp     | 75          | 100:5            |

\* Current transformer sold separately

### Dimensions Inches (mm)



### Simplified Wiring Diagram



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