The Model CR-150 monitors the current going to a motor. It has one adjustable trip point which can be either:

- **High** - Relay switches when load is above the trip point.
- **Low** - Relay switches when load is below the trip point.

**MOUNTING**

Wiring is done to un-pluggable terminal strips on the rear of the unit. Three ways to mount:

- On door or raceway - use cutout template
- Panel Mount - use template + optional Bezel Kit (No Charge)
- On wall - on standard outdoor junction box + optional Outlet Box Adapter (No Charge)

**FULL SCALE**

The Range Finder Toroid has six current choices. Select one that is equal to or larger than your load.

<table>
<thead>
<tr>
<th>RANGE FINDER SWITCH</th>
<th>FULL SCALE</th>
<th>For Loads less than 5 AMPS take extra turns.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 AMPS</td>
<td><strong>EXAMPLE:</strong></td>
</tr>
<tr>
<td>2</td>
<td>10 AMPS</td>
<td>5 AMP Full Scale = 1 AMP Full Scale</td>
</tr>
<tr>
<td>3</td>
<td>25 AMPS</td>
<td>5 Turns</td>
</tr>
<tr>
<td>4</td>
<td>50 AMPS</td>
<td>For Loads greater than 150 AMPS set Toroid for 5 AMPS and use External Current Transformer + Toroid</td>
</tr>
<tr>
<td>5</td>
<td>100 AMPS</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>150 AMPS</td>
<td></td>
</tr>
</tbody>
</table>

**REMOTE RESET**

**RELAY OUTPUT — POWER ON, NOT TRIPPED**

**4-20 MA OUTPUT**

**RANGE FINDER TOROID**

**120 VOLTS**
FOR MOTORS LESS THAN 5 AMPS
Take more “turns” of the leg through the Toroid. Each time the wire passes through the Toroid is a “turn”.

FOR MOTORS GREATER THAN 150 AMPS
A Current Transformer is used to reduce the primary current. The 5-amp secondary passes through the Toroid. Turn Dip Switch 1 on.

CAUTION
When current is flowing through the primary of the external current transformer, always have a wire between the two brass Terminals on the CT.

If they are left open, dangerous and destructive voltages can develop.

HOO KING UP THE RESET
Control can be reset three ways:
• Manually with the Reset button on the control.
• Remotely with a remotely located reset button or relay.
• Automatic with a jumper.

Remote Reset-
Momentarily connect Terminal 5 to Terminal 6.

Automatic Reset-
Jumper Terminal 5 to Terminal 6.

The terminals for Reset generate a small amount of current (8-12 milliamps). To reset, you just need to connect the terminal to the circuit common (Terminal 6).

The switches or relays that you use must be suitable for low current (Gold flashed contacts, Reed Relays, Mercury Switches).

4-20 MILLIAMP ANALOG OUTPUT
The Analog Output is directly proportional to Full Scale capacity. It is always active. 500 ohm maximum connected impedance.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Current (mA)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4-20</td>
<td>Positive</td>
</tr>
<tr>
<td>3</td>
<td>4-20</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Use twisted pair or in noisy environments, use shielded cable. Ground betwign shield at other end.

The Full Scale capacity to scale external meter, chart recorders or computers is the Dip Switch setting of the Toroid (or CT if one is used).

THE CR-150 POWERS THE 4-20 MA SIGNAL
DON’T USE AN EXTERNAL DC POWER SUPPLY!

SPECIFICATIONS CR-150

<table>
<thead>
<tr>
<th>ENCLOSURE</th>
<th>ANALOG OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass-filled Polycarbonate</td>
<td>4-20mA; powered by the CR-150 500 OHM maximum connected impedance</td>
</tr>
<tr>
<td>NEMA 4, 4X-STYLE</td>
<td></td>
</tr>
<tr>
<td>(3 1/4” x 6 1/4” x 2”)</td>
<td></td>
</tr>
<tr>
<td>(83 mm x 160 mm x 54 mm)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAPACITY</th>
<th>RESPONSE TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 AMPS directly through Toroid</td>
<td>50 Milliseconds</td>
</tr>
<tr>
<td>Large motors with external Current Transformer &amp; Toroid</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIGITAL LOAD DISPLAY</th>
<th>TEMPERATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>.4” LED 3 Digit</td>
<td>0ºC - 55ºC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RELAY OUTPUT</th>
<th>Timers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form C 3 AMP @ 300 VAC or 1/8 HP @ 240 VAC</td>
<td>Start-up and Trip Delay</td>
</tr>
<tr>
<td>Latch when tripped</td>
<td>0-90 second</td>
</tr>
<tr>
<td></td>
<td>0-2 second in .1 second increments</td>
</tr>
<tr>
<td></td>
<td>2-90 second in 1 second increments</td>
</tr>
</tbody>
</table>
TO SET FULL SCALE
• Use Toroid Dip Switches (or Toroid and CT if one is used) to determine your Full Scale
• Decide if you want to display AMPS or %
• The cycles through the choices shown below and blinks slowly for each choice. Each press of moves you to the next choice.

TO DISPLAY % OF YOUR MOTOR FULL LOAD
To display % of your motor load requires 1 calculation.

“RATIO” = \[
\text{Full Scale Capacity} \times 100
\]

Y our Motor Size
Enter this “Ratio” as Full Scale.

The Ratio must be greater than 100. If it isn’t, change your hook-up to a higher capacity.

The display will now read 100% when your motor reaches its Full Load.

TO VIEW AND CHANGE SET POINTS AND DELAY TIMES
cycles through the choices. The LED for each choice will turn ON.

To change a setting, use

Press ENTER until quick blinking stops to store your new choice.

After 5 seconds if you haven’t pressed any buttons, control will return to normal operation.

For High Trip - Relay will switch when load is ABOVE the Set Point.

Press until display shows HHH

Hold ENTER until high LED stops blinking

For Low Trip - Relay will switch when load is BELOW the Set Point.

Press until display shows LLL

Hold ENTER until low LED stops blinking

The High or Low LED will remain on during normal operation.

FRONT PANEL SET-UP TIPS
1) None of the settings will be changed until you hold down ENTER and the fast blinking stops.

2) Five seconds after you have pressed a button, the Control will return to normal operation.

3) If you hold down the digits will continue to change.

4) You only need to do when you install the Control (or if you change the hook-up).

Start-up Timer
The Start-up Timer bypasses the Control during motor start-up to avoid false trips because of current inrush. For convenience, the TIMING BEGINS WHEN THE MOTOR STARTS. The Start-up LED stays lit until the start-up period is over.

The start-up time should be:
• Long enough so that the load has stabilized.

To bypass Start-up Timer set time to zero seconds.

Delay Timers
To avoid nuisance trips from short overloads, Delay Timers bypass the Control for the selected time. The relays won’t trip until the time is exceeded. If the trip condition goes away before the time is up, the timer resets to zero.

• Start with minimum Delay. If you are getting trips where you don’t want them, increase the Delay Time.