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# CURRENT MONITOR

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## PLEASE SAVE THESE IMPORTANT SAFETY AND OPERATING INSTRUCTIONS

For correct operation of the equipment, it is important to read and be familiar with this entire manual before installing and operating the charger.  
**DO NOT DISCARD THIS MANUAL AFTER READING.**



**LOOK FOR THIS SYMBOL TO POINT OUT SAFETY PRECAUTIONS. IT MEANS: *BECOME ALERT—YOUR SAFETY IS INVOLVED.* IF YOU DO NOT FOLLOW THESE SAFETY INSTRUCTIONS, INJURY OR PROPERTY DAMAGE CAN OCCUR.**

### 1. IMPORTANT SAFETY INSTRUCTIONS

- a. Before using the current monitor, read all the instructions and caution markings on the battery current monitor, the battery, and all of the products using the battery.
- b. Do not touch the uninsulated parts of the AC input or the DC wires or the battery terminals as there is a possibility of electric shock.
- c. Batteries produce hydrogen gas while operating, which can explode if ignited. Never smoke, use an open flame, or create sparks in the vicinity of the battery. Ventilate the area well when the battery is charging in an enclosed area.
- d. Batteries contain caustic material which may cause burns. Do not get in eyes, on skin, or clothing. If the gelled or liquid content of the batteries contacts the skin or clothing, wash the area thoroughly with water. In the case of contact with the eyes, flush immediately with clean water for 15 minutes and obtain medical attention.
- e. Only qualified personnel should service this equipment.
- f. De-energize all AC and DC power connections before servicing this unit. If injury does occur, apply standard treatment for electric shock and, if necessary, consult with a physician.
- g. The current monitor is not for outdoor use. Do not expose the current monitor to rain or snow.
- h. Do not operate the current monitor if it has received a sharp blow, been dropped, or otherwise damaged. Take it to a qualified service center.
- i. Do not disassemble the current monitor. Have the current monitor examined by a NATIONAL RAILWAY SUPPLY, INC. service agent or a qualified service facility. If the current monitor is assembled incorrectly, damage to the current monitor or an electric shock may result.

### 2. DESCRIPTION

The NATIONAL RAILWAY SUPPLY CURRENT MONITOR is a specialized electronic device used to sense the current between a battery charger and the battery. The current monitor may be used in several voltage applications and has the capability to sense a charging current as low as 15 milliamps.

The information obtained about the current is used to control an internal relay in the monitor. The relay contacts are connected to a terminal strip located on the case of the current monitor. The terminal strip

connects are to be connected to the signaling circuit. The signaling circuit will therefore be able to monitor the on/off status of the charging current.

### 3. RECEIVING AND INSTALLING THE CURRENT MONITOR

Proper installation of the current monitor is important in order to achieve good performance and to prevent internal damage. When the current monitor is received, a check for possible in-transit damage should be made. If any damage is found, it should be reported as a claim to the carrier.

**! WARNING: DO NOT TOUCH THE CHARGER'S TERMINALS OR AN ELECTRIC SHOCK COULD OCCUR. A VOLTAGE IS**

**PRESENT ON THE DC TERMINALS EVEN AFTER THE AC IS DISCONNECTED BECAUSE OF THE ENERGY STORED IN A LARGE CAPACITOR INSIDE THE CURRENT MONITOR.**

The current monitor should be bolted or screwed onto a solid surface near the batteries. Four mounting holes are included on the monitor's case for this purpose. **The monitor's case must be grounded to ensure proper operation.** Connect the negative post of the battery pack to the monitor's shunt terminal labeled "-BATTERY" and the negative DC output of the charger to the shunt terminal labeled "CHARGER" as shown in Figure 1. **DO NOT LOOSEN THE BACK NUT ON THE SHUNT LUGS.** Quarter-inch (1/4") ring terminals are required on both cables connected to the current monitor shunt to ensure proper connection.

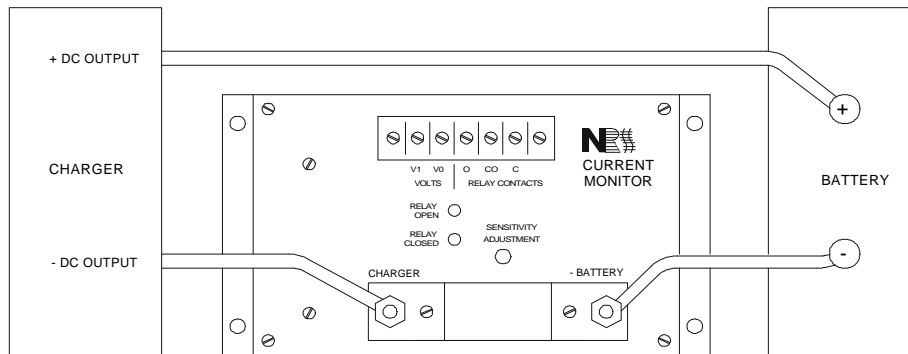


Figure 1

The current monitor will function in a battery voltage range from 8 to 60 volts. **DO NOT USE MORE THAN A 48-VOLT BATTERY PACK WITH THE CURRENT MONITOR.** The wire from the positive post of the battery to the current monitor should be 18 AWG wire with a #6 ring terminal, which is used to ensure proper connection to the current monitor terminal block.

If the battery pack voltage to be used is less than 15 volts, connect the positive terminal on the battery to the terminal labeled V0 as shown in Figure 2a. For a battery pack voltage greater than 15 volts, connect the positive terminal of the battery to the terminal labeled V1 shown in Figure 2b. In the latter case, a dropping resistor R1 is required. Table 1 indicates the proper value of R1 needed for the appropriate battery pack voltage used.

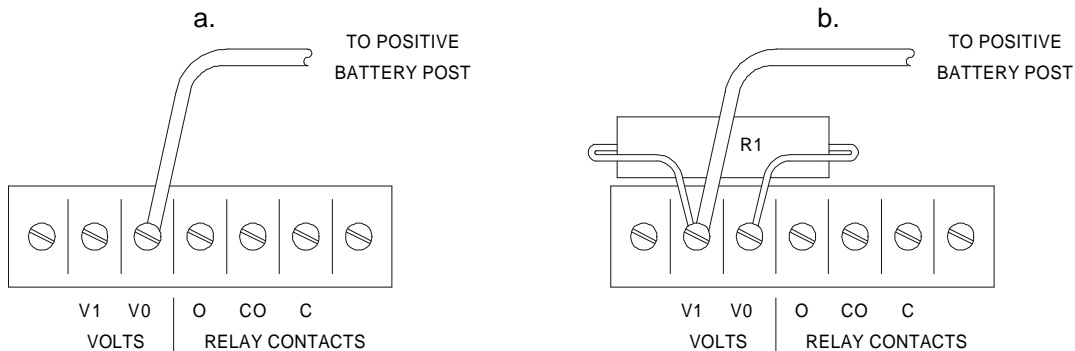


Figure 2

**TABLE 1**

Model	DC Battery Voltage	Resistor R1
16775-00	$9 \leq \text{VDC} < 16$	---
16775-18	$16 \leq \text{VDC} < 24$	56Ω 5W
16775-24	$24 \leq \text{VDC} < 33$	120Ω 5W
16775-36	$33 \leq \text{VDC} < 46$	200Ω 10W
16775-48	$46 \leq \text{VDC} < 60$	330Ω 15W

#### 4. OPERATION

Once the current monitor is installed and all of the connections have been completed, the monitor is ready to be used. The sensitivity is preset to its minimum setting (approximately 400 milliamps) which should work for most applications. If you need a more sensitive setting, using the following instructions to set the current monitor. *A small screwdriver (blade width < 3/32 inch) and an ERB-C charger are required to set the sensitivity adjustment.*

With the power connected, the charger off, and with no load connected to a set of fully charged batteries, the red LED should be on and the relay open. Start the charger and turn the sensitivity adjustment fully clockwise. The relay should close and the yellow LED will light. Wait for the current to stop decreasing (monitor the current from the ERB-C display) and turn the sensitivity adjustment slowly counterclockwise until the relay opens. Turn the sensitivity adjustment 1/8 of a turn clockwise from this switching point. If the relay will not open when turned fully counterclockwise, then just turn back 1/8 of a turn from that position.

The maximum setting for the sensitivity adjustment is approximately 15 milliamps. Turn off the charger to verify that the current monitor is working. The relay should open after a short time delay (30 seconds or less). **The float current may change over a long period of time, so if an adjustment is made to the sensitivity, periodic recalibration may be required.**

#### 4.1 Relay Closed (yellow LED)

When the yellow LED is lighted, the relay is closed, indicating the current is greater than the amount set with the sensitivity adjustment. The relay contact labeled C (closed) is closed with respect to the terminal contact labeled CO (common).

#### 4.2 Relay Open (red LED)

When the red LED is lighted, the relay is open, indicating the current is less than the amount set with the sensitivity adjustment. The relay contact labeled O (open) is closed with respect to the terminal contact labeled CO (common).

#### 5. MAINTENANCE

The current monitor requires minimal maintenance. It should be kept clean and all connections are to be tightly secured. In the event of an intermittent operation, examine and tighten, if necessary, all connections. **BE SURE THE CHASSIS IS SECURELY GROUNDED.** If any problem cannot be resolved, consult NATIONAL RAILWAY SUPPLY, INC.

#### 6. CURRENT MONITOR SPECIFICATIONS

DC INPUT VOLTAGE:

9 – 60 volts

MAXIMUM POWER (w/o R1):

3.5 watts (relay on)

RELAY:

12 volt, 10 amp

MINIMUM SWITCHING CURRENT:

15 milliamps

SIZE:

8" x 4.5" x 2.5"

WEIGHT, NET

2.17 lbs.

## 7. PARTS LIST

The following is a list of the parts found in the NRS CURRENT MONITOR. When replacing a part, **use only original factory replacement parts** of the correct size and rating.

<b>PART NO.</b>	<b>DESCRIPTION</b>
21393S	CASE ASSEMBLY
17263S	SHUNT ASSEMBLY
12845S	CONTROL MODULE
17251S	RELAY
17264S	TERMINAL STRIP
17405S	R1 ASSEMBLY, 18-VOLT OPTION
17402S	R1 ASSEMBLY, 24-VOLT OPTION
17403S	R1 ASSEMBLY, 36-VOLT OPTION
17404S	R1 ASSEMBLY, 48-VOLT OPTION