

# CSI-1 CHARGE STATUS INDICATOR USER MANUAL

## MICRO-AIDE

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### RAIL SIGNAL PRODUCTS

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VOLTAGE MONITORS

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CLOCK SYNCHRONIZERS

WHISTLE DETECTORS

LOCAL CONTROL PANELS

CUSTOM ENGINEERING



# CSI-1

## CHARGE STATUS INDICATOR

### USER MANUAL

*Designed to indicate failures in battery charging systems by checking for inadequate charging current when the battery voltage is unacceptably low.*

## Description

This document is intended to provide a detailed description of the use and operation of the MICRO-AIDE CSI-1 Charge Status Indicator.

The CSI-1 can be used to monitor the operational integrity of a battery charger. Unlike most devices designed for this purpose, the CSI-1 actually monitors the charger's ability to provide a charging current. The CSI-1 uses sensitive Hall Effect technology to measure the DC current from the charger to the battery whenever the battery voltage falls below a user defined limit value. Should the charger fail to provide an adequate charging current under these conditions the CSI-1 will immediately indicate an alarm condition. A charger failure or prolonged commercial power interruption will eventually result in a significant drain on the battery. The CSI-1 can be used to provide several hours of advance warning that a potential problem will arise if left unchecked.

LEDs are used to indicate the status of the charging current, battery voltage and alarm condition. A green LED will illuminate if the current exceeds 1 Adc. A separate green LED will illuminate if the battery voltage exceeds a user defined limit value. If the **current and voltage** fail to exceed their respective limit values an alarm condition is reported. A red LED and set of form C relay contacts are used to indicate the failure. The dry contacts may be used to signal a fault condition to an alarm reporting device or data logger such as a MICRO-AIDE CWR-22xt Event Recorder.

The CSI-1 is powered by the battery it monitors. Its maximum current draw will not exceed 60 mA. It will operate in the range from 8 to 30 Vdc. The unit's operating temperature range extends from

-40°C to +70°C. The CSI-1 maintains a minimum isolation rating of 4,000 Vdc. Its use is completely non-intrusive. Its electronic circuitry is housed in a rugged, anodized aluminum chassis.

Figure 1 provides a three-sided view of the CSI-1. Figure 2 illustrates the inside of the unit. The last page of this document lists detailed specifications.

## Installation

The CSI-1 may be mounted on a shelf or backboard. It may be oriented in either a horizontal or vertical plane. Four mounting holes at the base of the unit are used to secure the CSI-1. It is advisable to mount the unit in such a way that the front panel LEDs are visible and that the cable from the charger to the battery is conveniently routed.

A detachable connector is used to simplify the installation procedure. Wire gauges in the range from 12 to 22 AWG may be used. Each conductor is secured by tightening the set screw associated with each connector terminal. Power should not be applied to the CSI-1 prior to completing the installation work. The unit's silkscreening provides a clear depiction of the connections to be made.

The CSI-1 draws its internal power from the battery leads that are connected to the "B" and "N" inputs located at the detachable screw-down connector. The remaining three terminals are used to make connections to the internal relay. Normally open, normally closed and common leads are available.

**Note:** - The terminal labeled "NC" will be closed to the "Com" terminal when the CSI-1 is not indicating a failure (i.e., the voltage and current levels exceed their respective limit values). The "NO" terminal

will be closed to the “Com” terminal when the CSI-1 is indicating a failure or power is removed.

The current carrying conductor from the charger to the battery is passed through the hole in the CSI-1. The diameter of the hole is such that a conductor terminated with a typical .5" ring lug will slip through the hole. The CSI-1 is sensitive to the polarity of the current it is measuring. Consequently, positive current must flow from the back of the unit to the front. An arrow on either side of the unit indicates the proper direction of the current.

## Setup and Operation

Operation of the CSI-1 is fully automatic once the voltage limit value has been adjusted.

To adjust the voltage limit value remove the cover plate. Apply power to the unit. Locate the green test point and the appropriate red test point. Connect a Digital Volt Meter (DVM) across the two test points. The positive lead of the DVM should be connected to the red test point. Adjust the potentiometer nearest the red test point until it reads 1/10th of the desired voltage limit value. As an example, if 11.00 V is desired a reading of 1.100 V is required.

**Note** - The CSI-1 is factory adjusted with a voltage limit value of 11.00 V.

Reinstall the cover plate after the voltage limit value has been set. The CSI-1 is ready for use.

**Reminder** - The adjustable DVM voltage reading should always be 1/10th of the desired voltage limit.

**Caution** - Never adjust the second potentiometer. It establishes the current limit value at 1 A and should not be changed.

## Maintenance and Troubleshooting

The CSI-1 is designed to be completely maintenance free. It contains no consumable materials or serviceable components. If the unit should ever fail to operate properly it should be returned to MICRO-AIDE for repair.

The CSI-1 can be easily tested as follows. A low voltage condition can be verified by applying an appropriate voltage to the “B” and “N” inputs. Applying a current that can be set to a value above and below 1 A will test the current sensing circuitry of the CSI-1. A combination of low voltage and low current will create an alarm condition that can be verified by observing the red LED.

All rail signal products manufactured by MICRO-AIDE are protected by a five-year limited warranty. Telephone numbers and a shipping address are listed below.

### MICRO-AIDE CORPORATION

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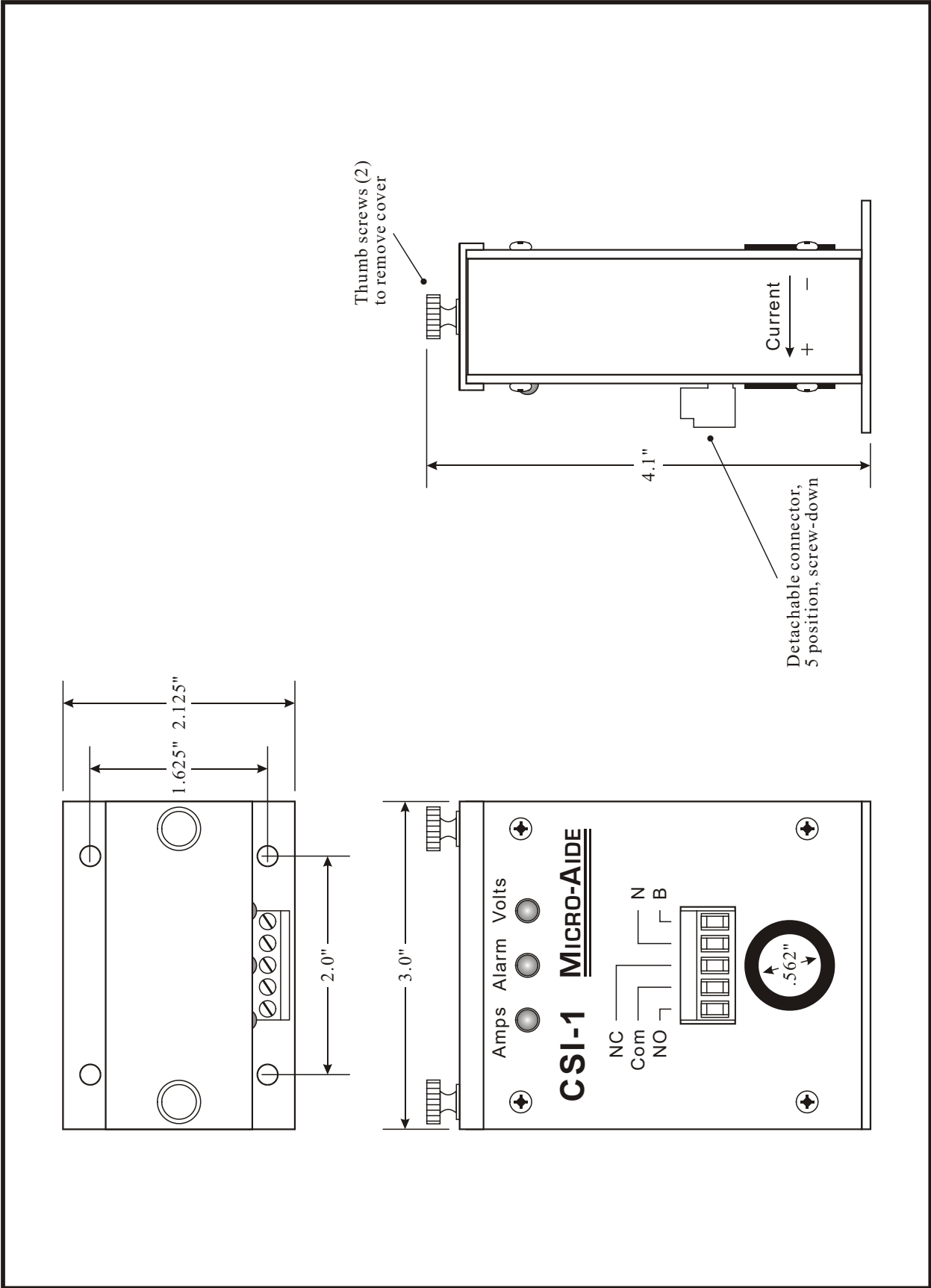


Figure 1 - Three-sided view

## Inside View with Cover Removed

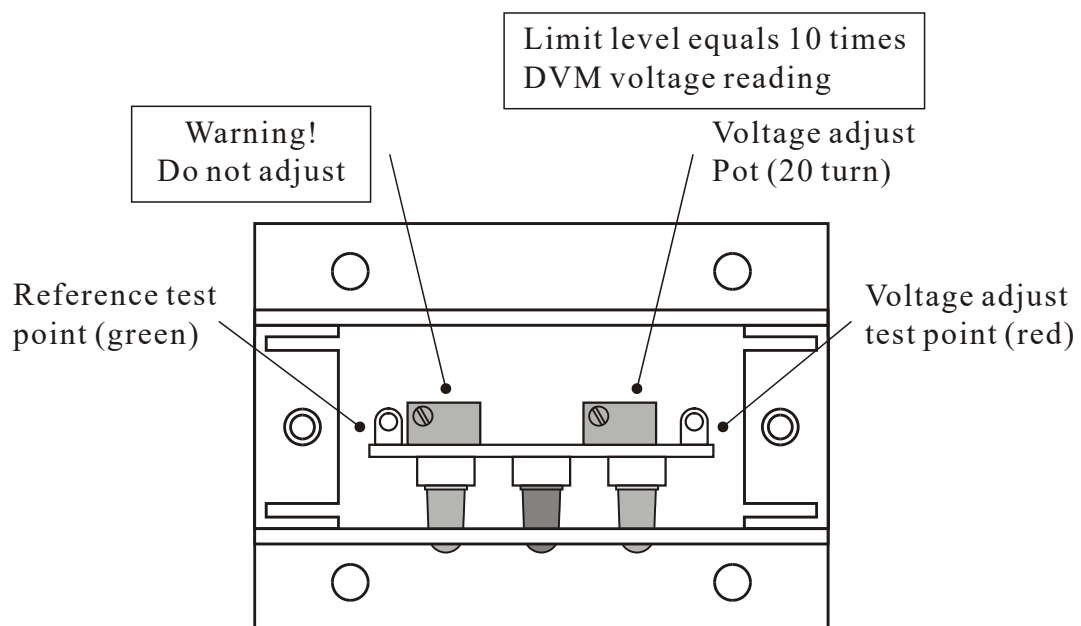


Figure 2 - Inside view

# CSI-1

## CHARGE STATUS INDICATOR

### SPECIFICATIONS

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#### Physical Spec

##### Size

**Length:** 3.0"  
**Width:** 2.125"  
**Height:** 4.1"

##### Weight

7 oz.

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#### Environmental

##### Storage

**Temperature:** -50°C to +85°C  
**Humidity:** 0% to 95%, non-condensing

##### Operating

**Temperature:** -40°C to +72°C  
**Humidity:** 0% to 95%, non-condensing

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#### Mounting

Shelf or desktop

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#### Construction

##### Chassis

Fully enclosed, anodized aluminum, removable screws allow access inside  
Externally accessible connectors and LEDs

##### Electrical

Single printed circuit board inside chassis

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#### Power

##### Voltage

8 to 30 Vdc

##### Consumption

.75 W maximum, at 12 Vdc

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#### Protection

##### Isolation

Minimum 4000 Vdc to ground, infinite duration, to any terminal input

##### Input Impedance

Infinite to current conductor (fully isolated)

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#### Internal Relay

##### Operation

Operates when current and voltage drop below respective limit values

##### Type

Non-latching mechanical, SPDT contacts

##### Contacts

**Rated Load:** 1 A at 24 Vdc, .5 A at 125 Vac

**Minimum Load:** 1 mA at 5 Vdc

**Maximum Operating Voltage:** 60 Vdc, 125 Vac

**Maximum Switching Capacity:** 62.5 VA, 30 W

**Service Life:** 5 million mechanical (minimum), 1 million electrical (typical)

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#### LED Indicators

##### Alarm

**Red:** voltage and current are below respective limit values

##### Voltage

**Green:** input is greater than limit value

##### Current

**Green:** current exceeds 1 A

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#### Controls

##### Internal

**Potentiometer:** 20-turn, used to adjust voltage limit value

**Test points:** 2, female, used to connect DVM when setting voltage limit value

##### External

None

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#### Connectors

Detachable, screw-down, with 5 terminals, 12 to 22 AWG

**Terminal 1:** normally open relay contact

**Terminal 2:** relay common

**Terminal 3:** normally closed relay contact

**Terminal 4:** N, battery negative

**Terminal 5:** B, battery positive

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#### Transient Filtering

Current sensor includes hysteresis and .6 second filter to ignore momentary current fluctuations

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#### Range

##### Voltage Limit

Adjustable from 10 to 30 Vdc

##### Current Limit

Factory set to 1 A

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#### Accuracy

**Voltage:** the greater of  $\pm 2\%$  or .2 Vdc as compared to 10 times limit value

**Current:**  $\pm .2$  A