



1000 Technology Drive, Pittsburgh, PA 15219  
645 Russell Street, Batesburg, SC 29006

**SM 5A1.0002**

---

# **Model 95 Electronic Gate Controller Retrofit Kit**

## **▪ Installation**



## Proprietary Notice

This document and its contents are the property of Ansaldo STS USA, Inc. (formerly known as Union Switch & Signal Inc., and hereinafter referred to as "ASTS USA"). This document is furnished to you on the following conditions: 1.) That no proprietary or intellectual property right or interest of ASTS USA is given or waived in supplying this document and its contents to you; and, 2.) That this document and its contents are not to be used or treated in any manner inconsistent with the rights of ASTS USA, or to its detriment, and are not to be copied, reproduced, disclosed or transferred to others, or improperly disposed of without the prior written consent of ASTS USA.

## Important Notice

ASTS USA constantly strives to improve our products and keep our customers apprised of changes in technology. Following the recommendations contained in the attached service manual will provide our customers with optimum operational reliability. The data contained herein purports solely to describe the product, and does not create any warranties.

Within the scope of the attached manual, it is impossible to take into account every eventuality that may arise with technical equipment in service. Please consult an ASTS USA local sales representative in the event of any irregularities with our product.

ASTS USA expressly disclaims liability resulting from any improper handling or use of our equipment, even if these instructions contain no specific indication in this respect. We strongly recommend that only approved ASTS USA spare parts are used as replacements.

## Revision History

REV.	DATE	NATURE OF REVISION
1	March 2010	Initial Release

Copyright© 2010, Ansaldo STS USA, Inc.  
1000 Technology Drive, Pittsburgh, PA USA 15219-3120  
645 Russell Street, Batesburg, SC 29006  
[www.ansaldo-sts.com](http://www.ansaldo-sts.com)

All rights reserved.

## Table of Contents

<b>1. GENERAL INFORMATION .....</b>	<b>1-1</b>
1.1. Parts List .....	1-1
1.2. Safety .....	1-1
<b>2. REMOVAL OF EXISTING CONTROLLER .....</b>	<b>2-3</b>
2.1. Existing Control Circuitry Removal .....	2-3
2.2. Removal of Power Down Module .....	2-6
2.2.1. Removal Procedure for Gate Mechanisms Built Prior to September 1, 2003 .....	2-6
2.2.2. Removal Procedure for Gate Mechanisms Built After September 1, 2003 .....	2-7
2.3. Removal of the Maintenance Switch assembly .....	2-8
2.4. Gate Light Fuse Block Assembly .....	2-10
<b>3. INSTALLATION OF ELECTRONIC CONTROLLER .....</b>	<b>3-1</b>
3.1. Wiring the Gate Mechanism for the Electronic Controller .....	3-1
3.2. Wiring the 4-Wire Power Harness Connections .....	3-1
3.3. Wiring the 9-Wire Control Harness Connections .....	3-3
3.4. Installing the Electronic Controller unit .....	3-3
3.4.1. Fuse Bracket Installation .....	3-5
3.5. Tests .....	3-6
3.5.1. Gate Mechanism Test .....	3-7
3.5.2. Maintenance Switch Test .....	3-7
3.5.3. Gate Arm Fuse Wiring Test .....	3-8
<b>4. RAIL TEAM AND TECHNICAL SUPPORT .....</b>	<b>4-1</b>

## **List of Figures**

Figure 2-1.	Circuit Wiring Diagram .....	2-4
Figure 2-2.	Electrical Bracket Assembly .....	2-5
Figure 2-3.	Motor Control Relay (MCR) Mounting.....	2-6
Figure 2-4.	Prior to September 1, 2003 Power Down Module Location .....	2-7
Figure 2-5.	After September 1, 2003 Power Down Module Location .....	2-8
Figure 2-6.	Maintenance Switch Assembly .....	2-9
Figure 2-7.	Gate Arm Fuse Block Assembly .....	2-10
Figure 3-1.	Terminal block numbering .....	3-1
Figure 3-2.	Electronic Gate Controller Wiring Diagram .....	3-2
Figure 3-3.	Controller Mounting Locations .....	3-4
Figure 3-4.	Controller Installation .....	3-5
Figure 3-5.	Gate Arm Light Fuse Bracket.....	3-6
Figure 3-6.	Installed Assembly .....	3-6

## **List of Tables**

Table 1-1.	Electronic Controller Applications .....	1-1
------------	--	-----

## 1. GENERAL INFORMATION

This document describes the removal of the Motor Control Relay (MCR) control circuitry and the installation of the Electronic Gate Controller for the Model 95 Gate Mechanism.

The Electronic Gate Controller Upgrade Kit improves the reliability of the Model 95 gate mechanism by removing the standard non-vital motor control relay (MCR) and replacing it and other discrete components with a completely electronic circuit. The new circuit contains all the functions of the existing design and adds a test feature to aid in troubleshooting.

### NOTE

The Electronic Gate Controller is designed only to be installed on the non-vital gate mechanism.

### 1.1. Parts List

There are four versions of the electronic controller unit. Ensure that you have the correct version for your application. The part number and description are printed on the label that is located on the bottom of the controller. See Table 1-1 for the application of the controllers.

**Table 1-1. Electronic Controller Applications**

Electronic Gate Controller Part Number	Used On
N46722801	12 Volt Entrance Gate
N46722802	24 Volt Entrance Gate
N46722803	12 Volt Exit Gate
N44672804	24 Volt Exit Gate

The following parts are included in the upgrade kit:

- J507218: Screw ¼"-20 x 5/8 (2)
- J4751210111: Lock washer (4)
- J5000970106 Cap Screw ¼"-20 x 3/8 (2)
- N46790401: Power Harness-4 wire (1)
- N46790402: Controller Harness-9 wire (1)

### 1.2. Safety

Read and thoroughly understand this manual before attempting to install the electronic controller into the gate mechanism. Always observe standard electrical safety precautions when working with electrical equipment.

Adhere to all safety regulations set forth by the railroad.





## 2. REMOVAL OF EXISTING CONTROLLER

Refer to Figure 2-1 or to SM 6495 for the existing wiring diagram.

### 2.1. Existing Control Circuitry Removal

Proceed as follows to remove the existing control circuitry from the gate mechanism:

1. Remove the gate mechanism from service and render it in a safe condition for maintenance.
2. Disconnect power from the gate by loosening the gold nut on Terminal 5B.
3. Remove the B12 supply wire from Terminal 2C and insulate the end of the wire.
4. Remove the spiral wrap and the wire ties from the old wiring harness.
5. Remove the wire that connects the SNUB resistor at Terminal R2 to Terminal T5 (Figure 2-2).
6. Remove the SNUB diode from Terminals R1 and T4. The SNUB diode will not be reused.
7. Remove the wires that connect the LIM resistor at Terminal R4 and Terminal R3 to 3A. The LIM resistor will not be reused and can be removed if desired (Figure 2-2).
8. Disconnect the wires from the circuit breaker and remove the breaker from the gate mechanism. It will not be reused. The circuit breaker is incorporated into the electronic controller.
9. Disconnect the MCR wires at the following locations:
  - a. Terminal 1A
  - b. Terminal 4B (two wires)
  - c. Terminal 1B
  - d. Terminal 1C
  - e. Terminal T4
  - f. Terminal T5
  - g. LIM resistor R4

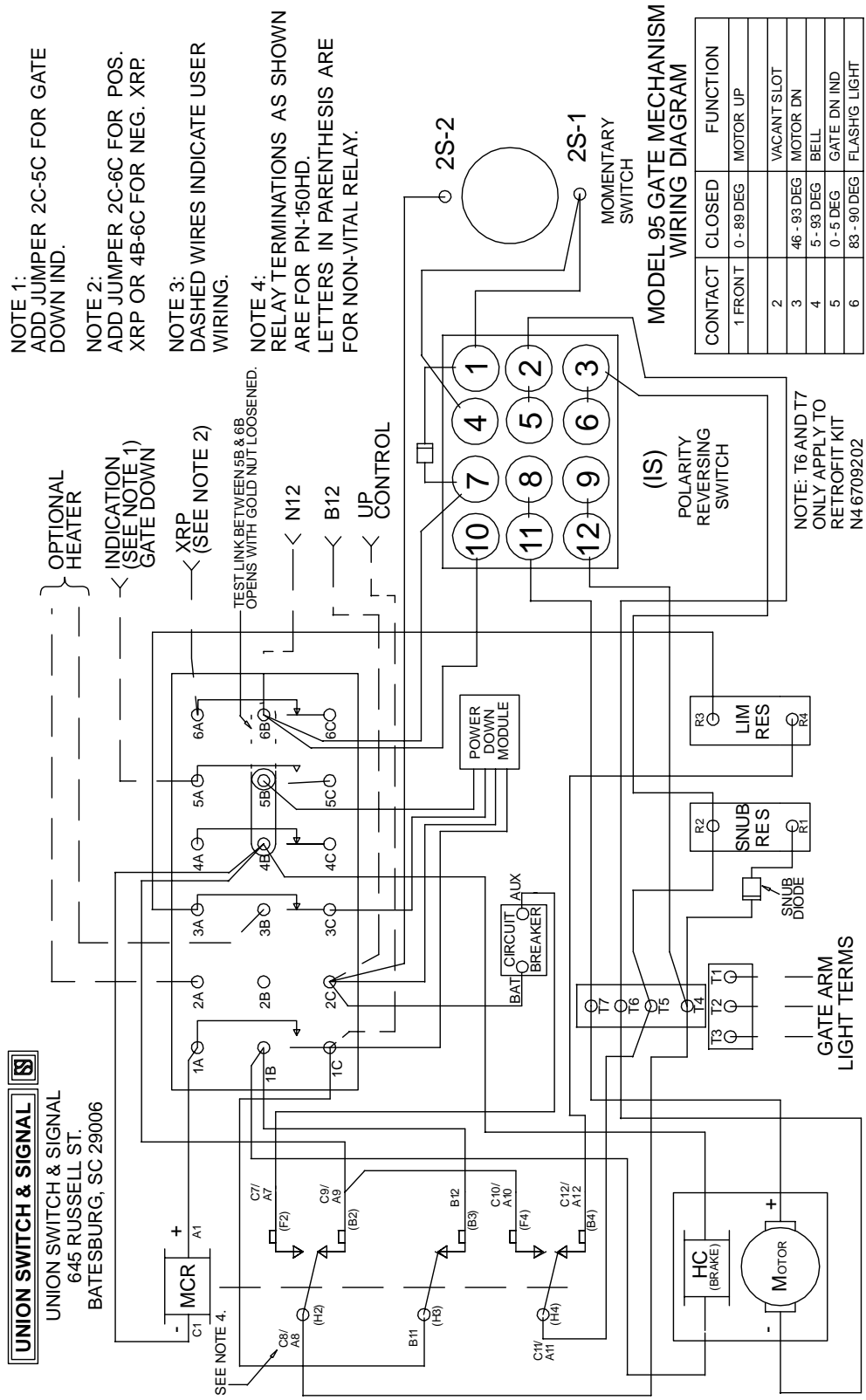
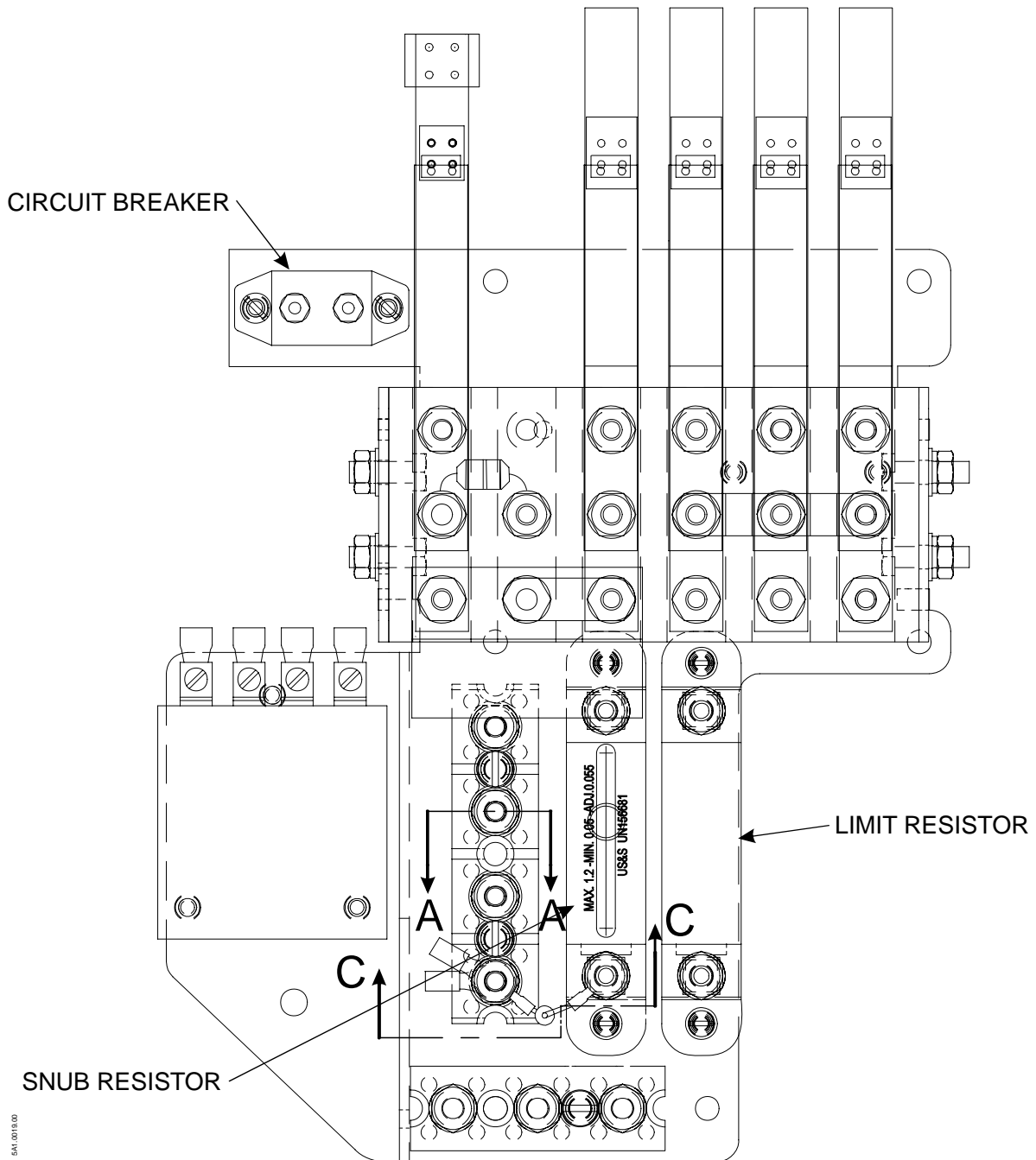
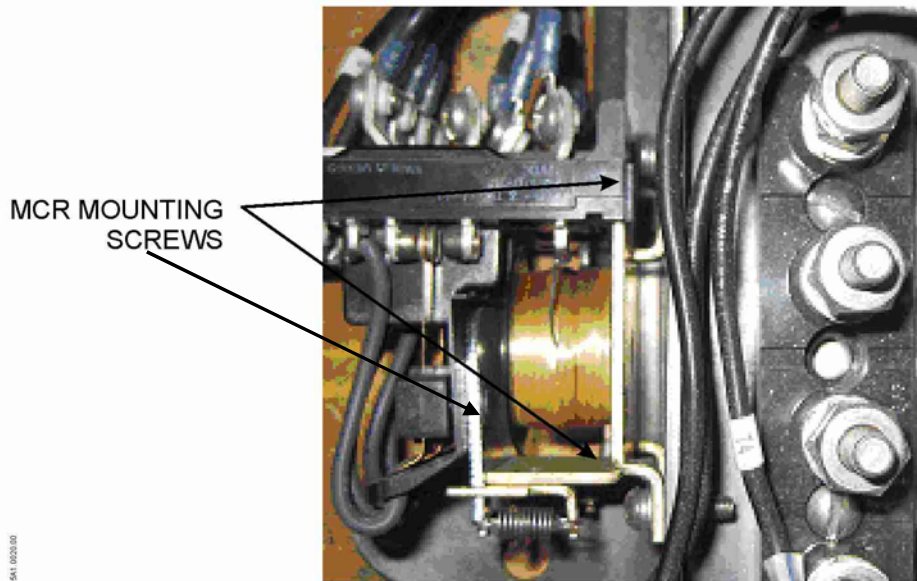


Figure 2-1. Circuit Wiring Diagram

10. Remove the two ¼" - 20 screws that secure the MCR (Figure 2-3).
11. Remove the MCR. The MCR will not be reused.



**Figure 2-2. Electrical Bracket Assembly**



**Figure 2-3. Motor Control Relay (MCR) Mounting**

### 2.2. Removal of Power Down Module

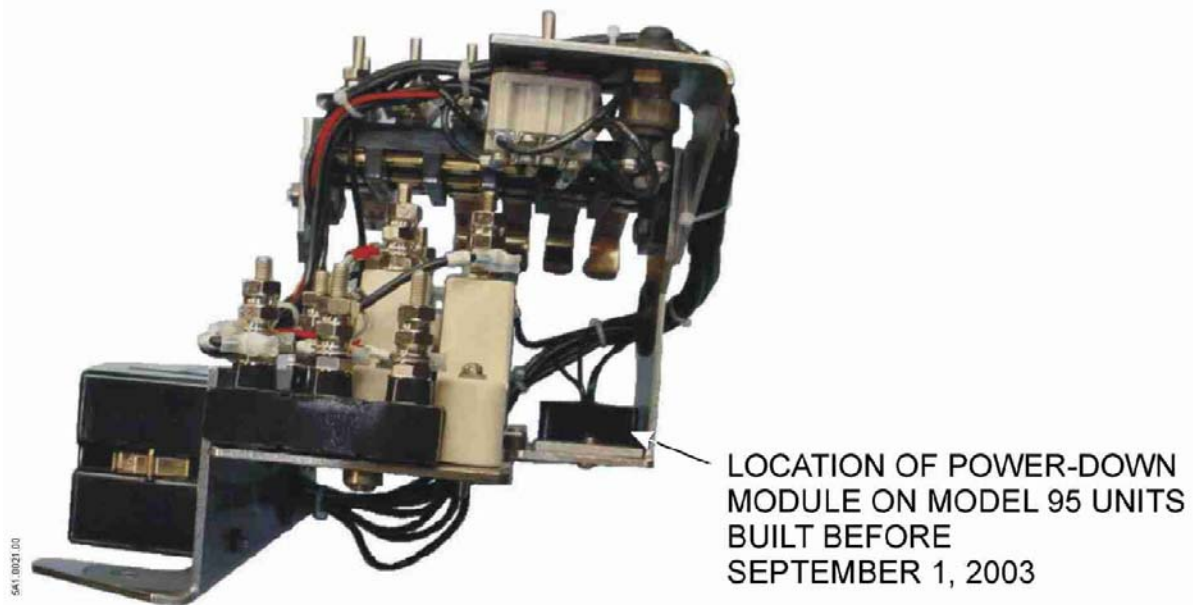
Model 95 Gate mechanisms built prior to September 1, 2003 have the power down module located underneath the cam contact assembly (Figure 2-4).

Gate mechanisms built after September 1, 2003 have the power down module circuit board connected directly to the cam contact terminals (Figure 2-5).

#### 2.2.1. Removal Procedure for Gate Mechanisms Built Prior to September 1, 2003

Proceed as follows to remove the power down module:

1. Remove the wire from Terminal 1C.
2. Remove the wire from Terminal 2C.
3. Remove the wire from Terminal 3C.
4. Remove the wire from Terminal 5B.
5. Remove the power down module. It will not be reused. The power down module is incorporated into the electronic controller.

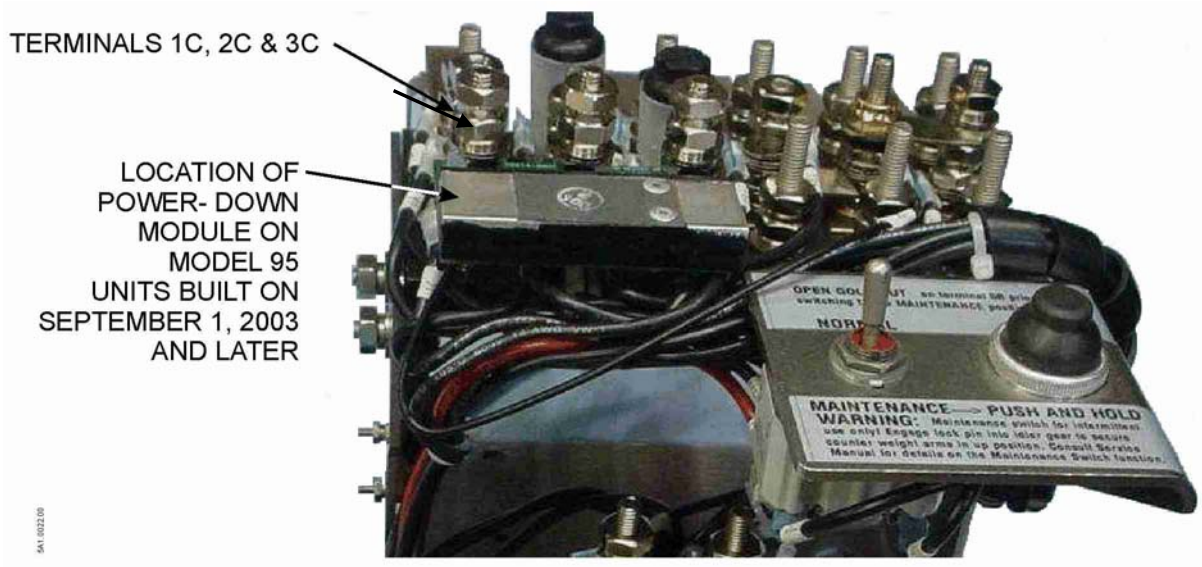


**Figure 2-4. Prior to September 1, 2003 Power Down Module Location**

### **2.2.2. Removal Procedure for Gate Mechanisms Built After September 1, 2003**

Proceeds as follows to remove the power down module:

1. Disconnect the wire at Terminal 5B.
2. Remove the three hex nuts that hold the potted module board to the cam contact on the electrical assembly at Terminals 1C, 2C, and 3C.
3. Remove the power down module. It will not be reused. The power down module is incorporated into the electronic controller.



**Figure 2-5. After September 1, 2003 Power Down Module Location**

### 2.3. Removal of the Maintenance Switch assembly

1. Disconnect the following wires for the maintenance switch assembly:
  - a. Terminal 6B (two leads)
  - b. Terminal 2C
  - c. R2 from the SNUB resistor
  - d. Terminal T4
  - e. Terminal T6
  - f. Terminal T7
2. Remove the two 1/4"-20 nuts and bolts from the side of the electrical assembly bracket (Figure 2-6).
3. The maintenance switch assembly it is not reused.

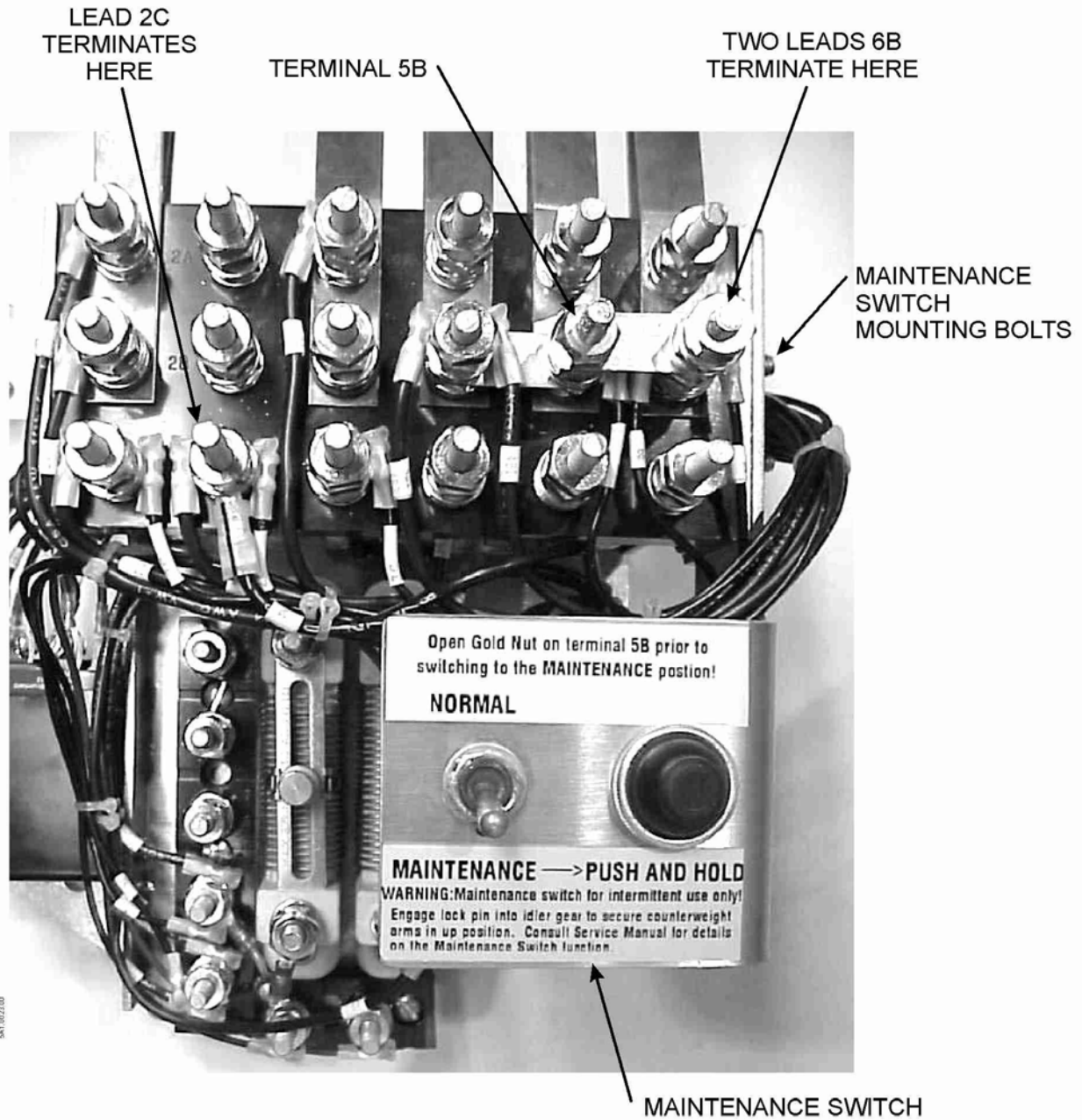
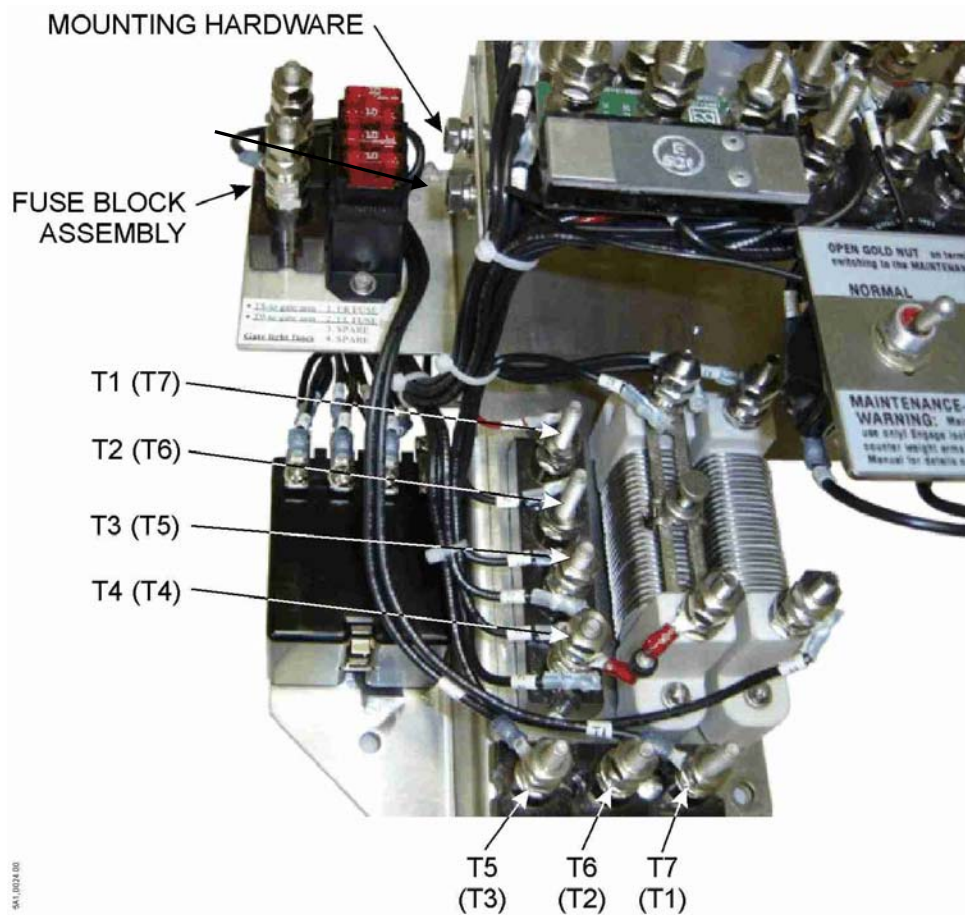


Figure 2-6. Maintenance Switch Assembly

## Removal of Existing Controller

### 2.4. Gate Light Fuse Block Assembly

1. If the gate mechanism is equipped with a gate fuse block assembly (part number X46700039) (Figure 2-7), remove the wires from Terminals T1 and T3 for the older version terminal block or Terminals (T7) and (T5) for the newer version terminal block. Newer versions of the gate mechanisms have the terminals labeled as indicated by the parenthesis in Figure 2-7.
2. Remove the two 7/16" hex nuts and lock washers. Remove the fuse bracket. Install the nuts and lock washers after removing the fuse bracket. The nuts and lock washers are required to hold the AAR terminals. Retain the fuse block. It will be used with the electronic controller.



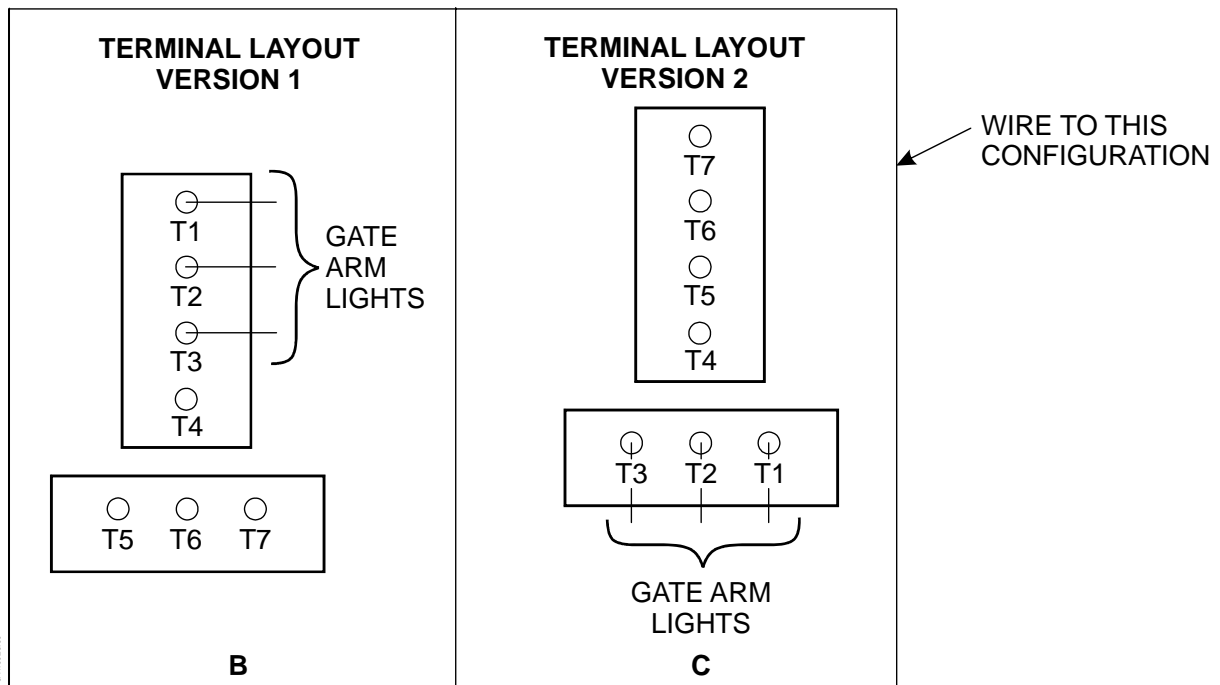
**Figure 2-7. Gate Arm Fuse Block Assembly**



### 3. INSTALLATION OF ELECTRONIC CONTROLLER

There are two nomenclatures for the terminal blocks. The older version uses the top three terminals for the gate arm lights. The newer version uses the three-post terminal block horizontally mounted under the Snub resistor for the gate arm lights. Wire the new controller per the configuration labeled Terminal Layout Version 2 as shown in Figure 3-1.

1. If needed, move the older version gate arm light wires to the horizontal terminal block as in Figure 3-1.



**Figure 3-1. Terminal block numbering**

#### 3.1. Wiring the Gate Mechanism for the Electronic Controller

Refer to Figure 3-2 for the new wiring configuration with the electronic controller.

#### 3.2. Wiring the 4-Wire Power Harness Connections

Proceed as follows to wire the gate mechanism using the 4-wire power harness (part number N46790401):

1. Move the Black motor wire from Terminal T6 to Terminal T5.

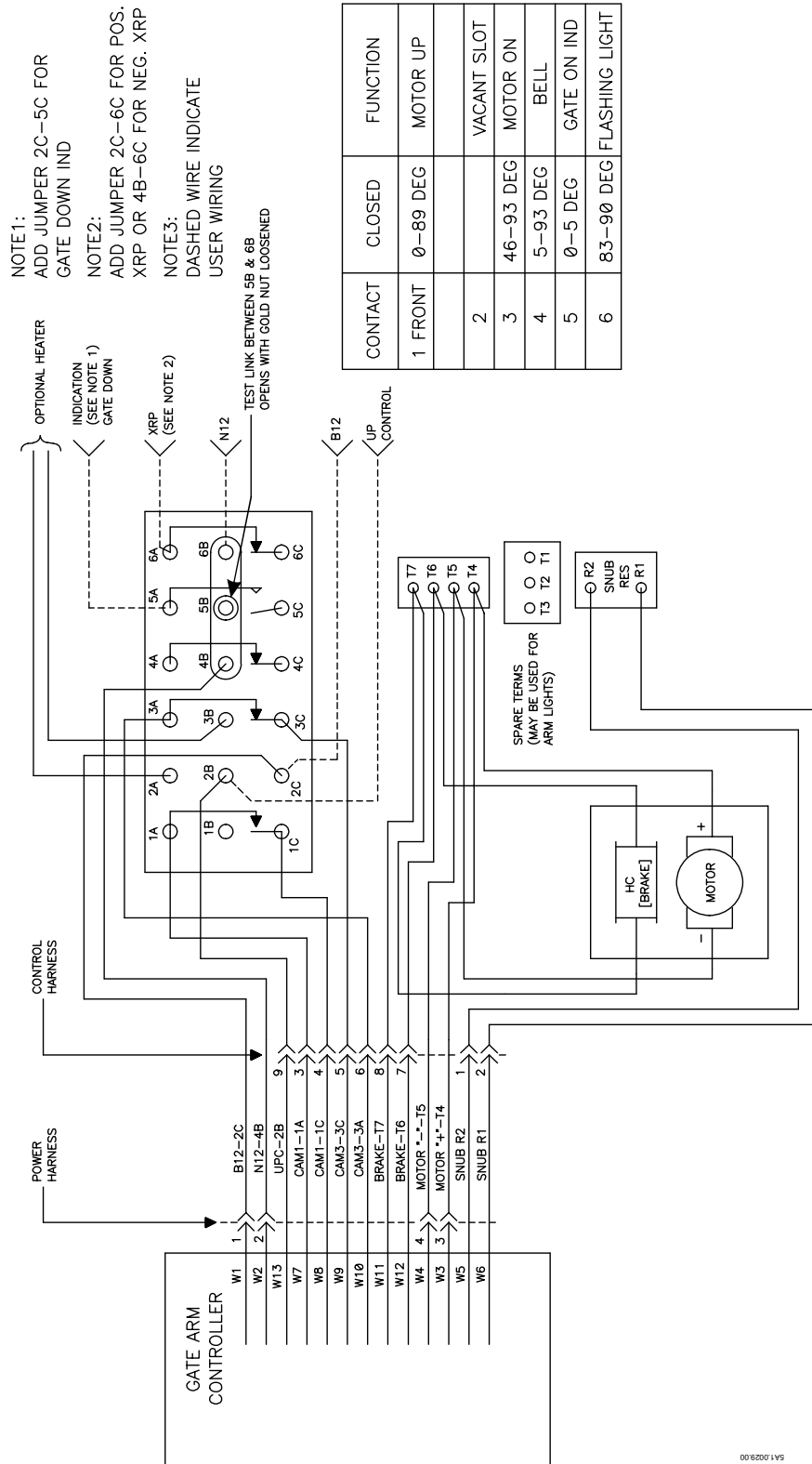


Figure 3-2. Electronic Gate Controller Wiring Diagram

2. Move the Red motor wire from Terminal T7 to Terminal T4.
3. Move the wires from Terminals 4B and 1B to Terminals T6 and T7.
4. Connect the 4-wire harness as follows.
  - a. Connect the wire tagged W3 (Motor +) to Terminal T4.
  - b. Connect the wire tagged W4 (Motor -) to Terminal T5.
  - c. The wire tagged W1 (B12) to Terminal 2C.
  - d. The wire tagged W2 (N12) to Terminal 4B.

### **3.3. Wiring the 9-Wire Control Harness Connections**

Proceed as follows to wire the gate mechanism using the 9-wire control harness (part number N46790402):

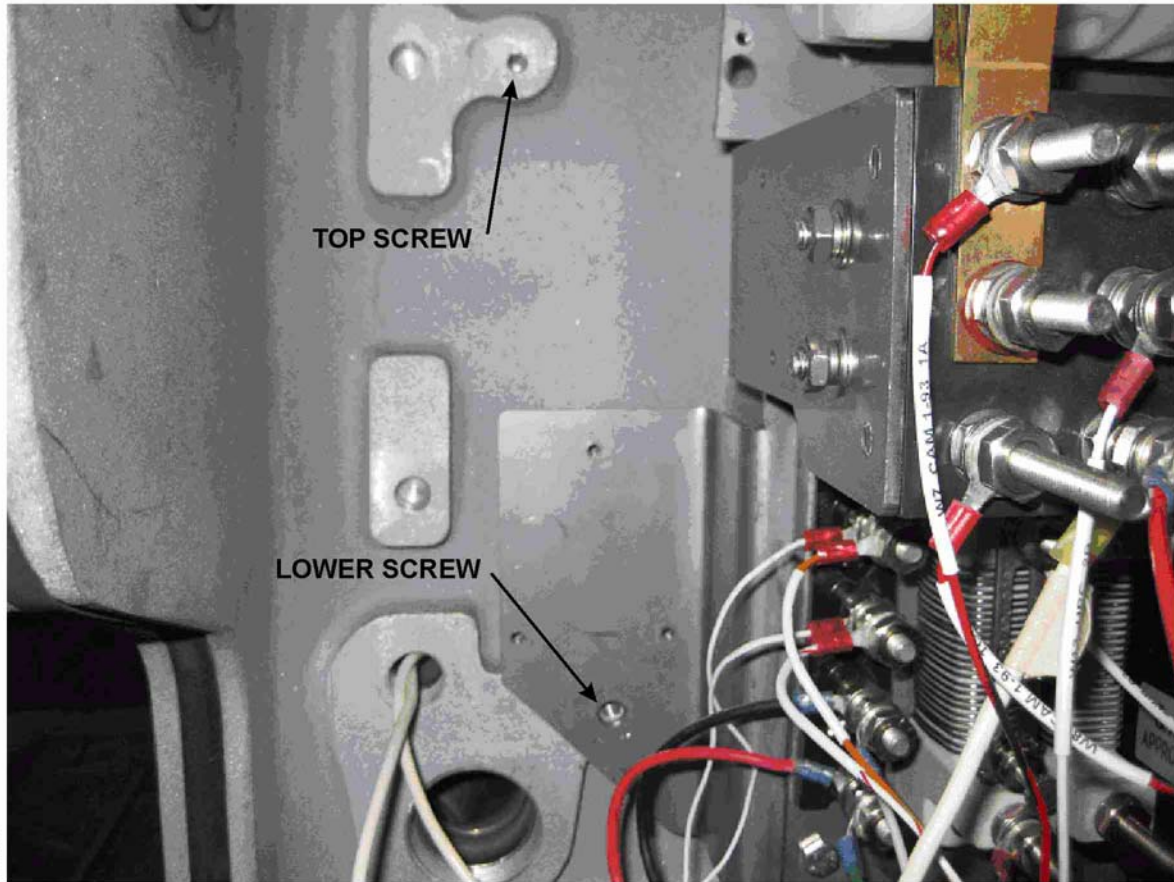
1. Connect the wire tagged W5 (SNUB) to Terminal R2.
2. Connect the wire tagged W6 (SNUB) to Terminal R1.
3. Connect the wire tagged W7 (CAM 0-89) to Terminal 1A.
4. Connect the wire tagged W8 (CAM 0-89) to Terminal 1C.
5. Connect the wire tagged W9 (CAM 46-93) to Terminal 3C.
6. Connect the wire tagged W10 (CAM 46-93) to Terminal 3A.
7. Connect the wire tagged W11 (Brake +) to Terminal T7.
8. Connect the wire tagged W12 (Brake -) to Terminal T6.
9. Connect the wire tagged W13 (Control) to Terminal 2B (this is the UP control line from the relay house).

### **3.4. Installing the Electronic Controller unit**

Proceed as follows to attach the Electronic Controller unit to the gate mechanism:

1. Attach the controller unit using the two ¼"- 20 x 5/8" screws provided with the kit. One mounting hole is located on the upper right of the electrical bracket. The other mounting hole is located just above the motor (Figure 3-3 and Figure 3-4).
2. Plug the 4-terminal plug from the controller into the 4 wire harness plug.

3. Plug the 9 terminal plug from the controller into the 9 wire harness plug.



**Figure 3-3. Controller Mounting Locations**



**Figure 3-4. Controller Installation**

### **3.4.1. Fuse Bracket Installation**

If the gate mechanism is equipped with a gate arm fuse bracket (Figure 3-5 and Figure 3-6), install the fuse bracket in the bottom front of the controller using the two ¼" - 20 x 3/8" screws and the two lock washers that are supplied with the kit.

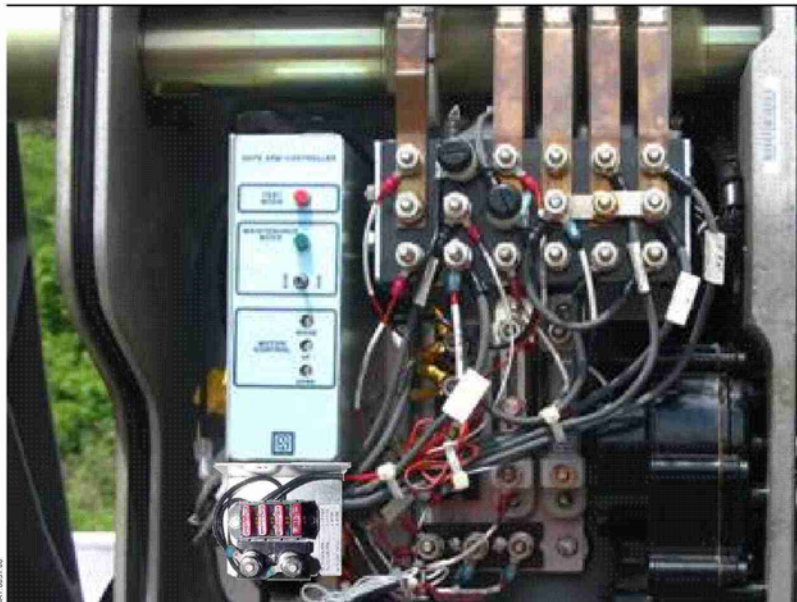
Refer to Figure 3-2 and proceed as follows to wire the fuse bracket:

1. Remove the gate arm light wire from Terminal T1 and move it to Terminal T8 of the fuse bracket.
2. Remove the gate arm light wire from Terminal T3 and move it to Terminal T9 of the fuse bracket.
3. Select the wire on the fuse holder tagged "T1" and connect it from the fuse holder assembly to Terminal T1.
4. Select the wire on the fuse holder tagged "T3" and connect it from the fuse holder assembly to Terminal T3.

5. The wire on Terminal T2 remains unchanged.



**Figure 3-5. Gate Arm Light Fuse Bracket**



**Figure 3-6. Installed Assembly**

### 3.5. Tests

After the electronic gate controller is installed, the gate must be tested for proper operation.

After the tests are complete and the gate mechanism is functioning properly, return the gate mechanism to service following all the railroad's requirements for servicing crossing gate mechanisms.

Refer to ASTS USA Service Manual 5A1.0001 for maintenance instructions for the electronic gate mechanism.

### 3.5.1. Gate Mechanism Test

Proceed as follows to test the gate mechanism:

1. Restore power to the gate mechanism. The gate should return to the vertical position.
2. Put the maintenance switch in the NORMAL position.
3. Push and hold the red TEST MODE pushbutton and observe the LED display.
4. The BRAKE LED should extinguish and the DOWN LED should illuminate.
5. The gate arm should begin to descend normally at the proper rate.
6. Release the pushbutton.
7. The DOWN LED should extinguish and the UP LED should illuminate.
8. Once the gate reaches the full vertical position, the UP LED should go out and the BRAKE LED should illuminate indicating that the hold clear is activated.

### 3.5.2. Maintenance Switch Test

Proceed as follows to test the maintenance switch:

1. Remove the Motor (+) wire from Terminal T4.
2. With the gate arm up, operate the toggle switch on the maintenance switch to the MAINTENANCE position and momentarily push the MAINTENANCE pushbutton.
3. The MOTOR DOWN LED should illuminate indicating that the controller is providing proper output to the motor.

#### **WARNING**

The maintenance switch function is designed to drive the gate to the down position without the gate arm being attached. More current is supplied to the motor because the weight of the gate arm is not present to assist in bringing the gate to the down position. If the gate arm is still attached and the motor is not disconnected, the gate arm will be driven down at a high rate of speed and may cause bodily injury.

## Installation of Electronic Controller

---

4. Release the MAINTENANCE pushbutton and return the toggle switch to the normal position.
5. Connect the Motor (+) wire to Terminal 4.

### 3.5.3. Gate Arm Fuse Wiring Test

If the fuse is installed, test the gate arm fuse wiring as follows:

1. Power the gate mechanism so that the gate arm lights are lit.
2. Remove Fuse 1 from the fuse holder. The tip light and the light nearest the mast should go out.
3. Remove Fuse 2 from the fuse holder. The tip light and the middle light should go out.
4. Replace the fuses. All the lights should be operational.



#### **4. RAIL TEAM AND TECHNICAL SUPPORT**

The Rapid Action Information Link Team (RAIL Team) is a group of experienced product and application engineers ready to assist you to resolve any technical issues concerning this product. Contact the RAIL Team in the United States at 1-800-652-7276 or by e-mail at [railteam@ansaldo-sts.us](mailto:railteam@ansaldo-sts.us).





**End of Manual**