

## SECTION 6: MAINTENANCE AND STORAGE

### 6-1 GENERAL

The Digitrip MV Trip Unit is designed to be a self contained and maintenance free unit. The printed circuit boards are calibrated and conformally coated at the factory. They are intended for service by factory trained personnel only. The Troubleshooting Guide (Table 6-1) is intended for service personnel to identify whether a problem being observed is external or internal to the unit. If a problem is identified to be internal, the unit should be returned to the factory for repair or replacement as described in Paragraph 6-3.

#### 6-1.1 STORAGE

The Digitrip MV trip Unit should be stored in an environment that does not exceed the specified storage temperature range of  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ . The environment should also be free of excess humidity. There are no aluminum electrolytic capacitors used in the trip unit, therefore it is not a requirement to power the unit occasionally. If possible, the trip unit should be stored in its original packing material and container.

### 6-2 TROUBLESHOOTING GUIDE (TABLE 6-1)



#### WARNING

**ALL MAINTENANCE PROCEDURES MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE DIGITRIP MV TRIP UNIT, THE ASSOCIATED BREAKER AND CURRENT LINES BEING MONITORED. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN SERIOUS INJURY, DEATH AND/OR EQUIPMENT DAMAGE.**

**TROUBLESHOOTING PROCEDURES MAY INVOLVE WORKING IN EQUIPMENT AREAS WITH EXPOSED LIVE PARTS WHERE THE HAZARD OF A FATAL ELECTRIC SHOCK IS PRESENT. PERSONNEL MUST EXERCISE EXTREME CAUTION TO AVOID INJURY OR EVEN DEATH.**

**ALWAYS DISCONNECT AND LOCK OUT THE CURRENT SOURCE AND CONTROL POWER SUPPLY BEFORE TOUCHING THE COMPONENTS ON THE REAR OF THE DIGITRIP MV TRIP UNIT.**

### 6-3 REPLACEMENT

Follow these procedural steps to replace the Digitrip MV Trip Unit.

- Step 1: Turn off control power at the main disconnect or isolation switch of the control power supply. If the switch is not located in view from the trip unit, lock it out to guard against other personnel accidentally turning it on.
- Step 2: Verify that all "foreign" power sources wired to the trip unit are deenergized. These may also be present on the alarm terminal block. Current transformer inputs must be temporarily shorted at a point prior to the trip unit's terminals before attempting to open these terminals on the Digitrip MV trip unit.
- Step 3: Before disconnecting any wires from the unit, make sure they are individually identified to assure that reconnection can be correctly performed. Make a sketch to help with the task of terminal and wire identification.
- Step 4: If an optional cable connects with the Communications Port, carefully disconnect it.
- Step 5: Remove wires by loosening or removing the screw terminal where there is a wire connection.
- Step 6: Remove the 6 mounting screws holding the unit against the door or panel. These are accessed from the rear of the trip unit.



#### CAUTION

**SUPPORT THE TRIP UNIT FROM THE FRONT SIDE WHEN THE SCREWS ARE LOOSENED OR REMOVED. WITHOUT SUCH SUPPORT, THE TRIP UNIT COULD FALL OR THE PANEL COULD BE DAMAGED.**

- Step 7: Carefully lay the screws aside for later use.
- Step 8: Mount the replacement unit. Read paragraph 5-2.2 before attempting this.
- Step 9: Reverse the procedure outlined in Steps 4 through 6.
- Step 10: Using the sketch mentioned in Step 3, replace each wire at the correct terminal. Be sure that

each is firmly tightened. Remove temporary shorts on incoming current transformers.

Step 11: Restore control power. Refer to paragraphs 5-4.2 entitled "Initial Power Application."

Table 6.1 Troubleshooting Guide

Symptom	Probable Cause	Possible Solution(s)	Reference
Operational LED is Off	Trip Unit's Control Power is Deficient or Absent	Verify that Control Power is Connected Between TB1-5 and TB1-6 and that it is within Specifications	Figure 3-1 and Paragraph 2-3
	Trip Unit is Malfunctioning	Replace the Trip Unit	Paragraph 6-3
Operational LED is On but Does not Blink	Trip Unit's Control Power is Deficient or Absent	Verify that Control Power is Connected Between TBI-5 and TBI-6 and it is within Specifications	Figure 3-1 and Paragraph 2-3
	Trip Unit is Malfunctioning	Replace the Trip Unit	Paragraph 6-3
Operational LED Blinks Red or is any Color other than a Definite Red or Green	Internal Problem Detected	Press Reset Pushbutton	Paragraphs 2-2.1 and 3-2
		Reprogram Setpoints	Paragraph 6-3
		Replace Trip Unit if Symptom Persists	
"PGRM" Appears in Settings Display Window	Setpoints are Invalid	Reprogram Setpoints	Paragraph 3-3.2
	Check sum did not Match	Replace Trip Unit if "PGRM" Reappears After Saving Settings	Paragraph 6-3
"ERR" Appears in Setting	There was an Error During Setpoint Programming	Make Sure the Circuit Breaker Stays Open During Programming Operation	Paragraph 3-3.3
	There was an Error While in the Test Mode	More than 0.1 Per Unit of Current Cannot Flow While in Test Mode	
"RAM" Appears in Settings Display Window	An Internal RAM Check Failed	Remove Power from the Trip Unit and then Reapply Power – If the Symptom Persists, Replace the Trip Unit	Paragraph 6-3
Current Readings Appear Incorrect	Incorrect CT Ratio used in Equipment	Verify CT Ratio in Equipment	Tables 5.1 and 5.2 Figures 3-1 and 5-3
	CT Ratio DIP Switch Set Incorrectly	Check for Proper DIP Switch Setting	
	Incorrect Current Wiring	Verify Connections on CT Wiring	
Current Readings Appear Incorrect	Incorrect System Frequency Programmed	Set to Correct Frequency	Paragraph 3-3.2
	Breaker "b" Contact to trip unit not functioning	Insure "b" Contact Type is Connected to Trip Unit and Functioning	Figure 3-1

Table 6.1 Troubleshooting Guide (continued)

Symptom	Probable Cause	Possible Solution(s)	Reference
Circuit Breaker Trips Much Faster than Expected on Long Delay	Incorrect Settings	Check Settings	Paragraph 3-3.2 and Tables 5.1 and 5.2
	Phase Zone Interlocking not used and Jumper Missing	Check for Phase Zone Interlocking Jumper Between TB1-13 and TB1-14	Figure 3-1
	Ground Zone Interlocking not Used and Jumper Missing	Check for Ground Zone Interlocking Jumper Between TB1-11 and TB1-12	Figure 3-1
	Zone Interlocking Used	Check for Absence of Blocking Signal from "Down-Stream" Breaker <b>NOTE:</b> During an Internal Test, there is No Blocking Signal from a "Down-Stream" Breaker, therefore, add jumper for test.	Figure 5-3
Circuit Breaker Trips Much Slower than Expected on Long Delay	The Short Delay Time Setting Determines the Minimum Long Delay Time	Check Coordination Curves for Short Delay and Long Delay Settings	Section 7, Paragraph 3-3.1 and Figure 3-12
Trip Unit Indicates a Trip, but Circuit Breaker Doesn't Open	Improper Wiring from Trip Unit	Check Trip Relay Wiring <b>NOTE:</b> Instantaneous and Override Trip Functions Close the Contact Between TB2-12 and TB2-13, while Long Delay and External Trip Functions Close the Contact Between TB2-14 and TB2-15	Figures 3-1 and 5-3
		Check that Trip Contact on Trip Unit makes	Figure 3-1
	Unit in Test Mode with "No Trip Test Selected"	Select Trip Test while in the Test Mode	Paragraph 3-3.3
		Check Wiring from Trip Unit to Circuit Breaker Trip Coil	Wiring Plan Drawing
	Check that Circuit Breaker has Source of Tripping Power	Wiring Plan Drawing	
Auto-Reset Function not Operational	Breaker "b" Contact to Trip Unit not Functioning	Check wiring from Breaker "b" Dry Contact to TB1-9 and TB1-10 of Trip Unit Terminal Block	Figure 3-1 and 5-3
	DIP Switch S9 not set correctly	Check DIP Switch S9 Setting	Table 5.3
		Check that "b" Contact is Operational	Figure 5-3
<i>Caution: When the Digitrip MV Trip Unit is Powered, it Supplies Voltage to the "b" Contacts</i>			
Manual Reset Function not Operational	Dip Switch S9 not set correctly	Check the Switch Setting	Table 5.3
	Damaged Reset Pushbutton	Replace Trip Unit	Paragraph 6-3