

## 40 Loss of Field (#1 or #2, VC #1 or #2)

<b>VOLTAGE INPUTS:</b>	Configuration V1			
<b>CURRENT INPUTS:</b>	Configuration C1			
<b>TEST SETTINGS:</b>	Circle Diameter	P	Ohms	(0.1 to 100)
	1 Amp CT Rating			(0.5 to 500)
	Offset	O	Ohms	(-50 to 50)
	1 Amp CT Rating			(-250 to 250)
	Time Delay	D	Cycles	(1 to 8160)
	Voltage Control	V	Volts	(5 to 180)
	Delay with VC		Cycles	(1 to 8160)
	Directional Element	E	Degrees	(0 to 20)
	Programmed Outputs	Z	OUT	(1 to 8)
			Expanded I/O	(9 to 23)
VT Configuration	Line-Ground			

■ **NOTE:** It would be efficient to disable the function with the higher “reach” (diameter minus offset) setting first (lower current) and test the lower “reach” setting operation. Since the higher setting operation can be tested without disabling the lower setting, the 40 functions will be enabled when the tests are complete.

### Test Setup:

1. Determine the Function 40 Loss of Field settings to be tested.
2. Enter the Function 40 Loss of Field settings to be tested utilizing either the HMI or IPScorn® Communications Software.
3. Disable all other functions prior to testing. Refer to Section 3.2, Initial Setup Procedure/Settings, Configure Relay Data subsection, for details that describe disabling/enabling functions.
4. Connect test voltage inputs as shown in Figure 6-1, Voltage Inputs: Configuration V1.
5. Connect test current inputs as shown in Figure 6-3, Current Inputs: Configuration C1.

■ **NOTE:** For proper testing, use  $I \leq 3 \times \text{CT rating}$ .

6. The level of current at which operation is to be expected for an individual setting is as follows:
  - a. Define “reach” as  $R \text{ ohms} = (P - O \text{ ohms})$  where  $O$  is usually negative.
  - b. Define “trip current” as  $I = (\text{Selected Voltage} \div R \text{ ohms})$ . The voltage level may be selected based on the desired test current level.
  - c. Define “offset current” as  $IO = (\text{Selected Voltage} \div O \text{ ohms})$ .
7. Set the three-phase voltages  $V_A$ ,  $V_B$ , and  $V_C$  to the **Selected Voltage** value from Step 6, and set the phase angle between the voltage and current inputs to  $90^\circ$  (current leading voltage).

**Pickup Test:**

1. Press and hold the **TARGET RESET** pushbutton, then slowly increase the three-phase currents until the **40 LOSS OF FIELD** LED illuminates, or the pickup indicator illuminates on the IPScm Function Status screen. The level will be equal to "I" calculated in Step 6 with the resulting impedance within  $\pm 0.1$  ohms or  $\pm 5\%$ .
2. If the offset setting is negative, continue to increase the three-phase currents until the **40 LOSS OF FIELD** LED light extinguishes, or the pickup indicator extinguishes on the IPScm<sup>®</sup> Function Status screen. The level will be equal to "IO" calculated in Step 6 with the resulting offset impedance within  $\pm 0.1$  ohms or  $\pm 5\%$ .
3. Release the **TARGET RESET** pushbutton.
4. Decrease the three-phase currents. The **OUTPUT LED(s)** will extinguish.
5. Press the **TARGET RESET** pushbutton to reset targets.

**Time Test:**

1. Connect a timer to output contacts (**Z**) so that the timer stops timing when the contacts (**Z**) close.
2. Set the three-phase voltages  $V_A$ ,  $V_B$ , and  $V_C$  to the **Selected Voltage** value from Step 6, and set the phase angle between the voltage and current inputs to  $90^\circ$  (current leading voltage).
3. Apply  $I + 10\%$  Amps and start timing. Contacts will close after **D** cycles  $\pm 1$  cycle or  $\pm 1\%$ .

**Time Test With Voltage Control:**

1. Connect a timer to output contacts (**Z**) so that the timer stops timing when the contacts (**Z**) close.
2. Enable the Voltage Control setting utilizing either the HMI or IPScm Communications Software.
3. Set the three-phase voltages  $V_A$ ,  $V_B$ , and  $V_C$  to a voltage where the positive sequence voltage is less than the Voltage Control setting.
4. Set phase currents and phase angles to establish the impedance value within the mho pickup and start timing. Contacts will close after **D** cycles  $\pm 1$  cycle or  $\pm 1\%$ .