

DIMENSION[®] 600/2000 PBX
POWER METER INTERFACE TEST
(PROC 538)

1. GENERAL

- 1.1 This section is issued in order to make available the information contained in the Administration and Maintenance Manual, 500-497, PROC 538.
- 1.2 The attachment provides test procedures that can be used to verify pulse activity from a power meter being detected by PBX software.

ATTACHMENT

PROC 538 (8 pages)

Reason for Issue:
New Section

Manager, Denver PBX PECC

PRIVATE

THE INFORMATION CONTAINED HEREIN SHOULD NOT BE DISCLOSED TO UNAUTHORIZED PERSONS. IT IS MEANT SOLELY FOR USE BY AUTHORIZED BELL SYSTEM EMPLOYEES.

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PROCEDURE 538 - POWER METER INTERFACE TEST

PROC 538

A. DESCRIPTION

Procedure 538 should be used when the following conditions exist:

- The NETWORK OTHER-515 and MINOR alarm indicators on the Alarm Panel are turned on.
- Procedure 515 indicates Procedure 538 should be used to find the source of the alarm.

Procedure 538 is used to:

- Display the failure history for the power meters.
- Verify pulse activity from all administered power meters and display power demand for the entire system.

TEST 1: DISPLAY FAILURE HISTORY. USE 'NEXT UNIT' TO DISPLAY NEXT FAILED UNIT. USE 'CLEAR DATA'. 'EXECUTE' TO 'CLEAR FAILURE HISTORY.	TEST 2: TESTS ALL INTERFACE UNITS (SEE NOTE 1). USE 'NEXT UNIT' KEY TO DISPLAY NEXT FAILED UNIT.	TEST 3: TESTS A PARTICULAR INTERFACE UNIT CONTINUOUSLY. USE 'NEXT UNIT' TO ADVANCE TO NEXT UNIT IN SYSTEM.	FAILURE CODES (FIELD 9): 0=PASS (PULSES DETECTED) 1= SIGNAL ALWAYS INACTIVE 2= SIGNAL ALWAYS ACTIVE 8= TEST NOT COMPLETED (TEST 2) 9= NETWORK ORDER INCOMPLETE	OTHER CODES: FIELD 8: 0=ECS ALARM DISABLED, PBX ALARM NOT SET 1=DISABLED, SET 2=ENABLED, NOT SET 3=ENABLED, SET	NOTES: 1. TEST 2 RUNS FOR 5-6 MINUTES. IT RETIRES BUT DOES NOT GENERATE THE ALARM. 2. MULTIPLY NUMBER IN FIELD 10 BY TEN RAISED TO POWER DISPLAYED IN FIELD 11. TEST 2=SYSTEM DEMAND IN KILOWATTS TEST 3=NUMBER OF PULSES DETECTED
FLIPCHART ISSUE 5		PROC 538			

FLIPCHART ISSUE 5		POWER METER INTERFACE TEST												PROC 538	
TEST NO	TEST 3 UNIT NUMBER	EQUIPMENT LOCATION					FAILURE ALARMS	FAILURE CODE	KILOWATTS OR PULSE COUNT (SEE NOTE 2)		TOTAL UNITS IN SYSTEM	NUMBER OF FAILED UNITS	FAILED UNIT INDEX	FAILURE HISTORY	
		MODULE	CAB	CAR	SLOT	CKT			MOST SIGNIFICANT DIGITS	10 ^x				FAILURES PER HOUR	FAILURES BEGAN (HOURS AGO)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1.	3.	0.	0.	1.	2.	0.	-	-	-	-	-	-	-	-	-	-	-	538
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FIELD

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

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538-1

A. DESCRIPTION (Contd)

- Detect pulse activity from a selected power meter and display the number of pulses detected.
- Retire the alarm when signal pulses are detected in Test 2 from all meters for which the alarm is turned on and the energy communication system (ECS) alarm function is enabled.

Three tests are available:

- Test 1 - Failure history
- Test 2 - Tests all power meter interface units
- Test 3 - Tests a selected power meter interface unit continuously

B. FIELD DEFINITIONS AND CODES

Field	Code	Definition
1	1-3	Test number
2	1-16	Unit number of the power meter
3	0-24	Module number
4	0-4	Cabinet number
5	0-4	Carrier number
6	2-25	Slot number
7	0-7	Circuit number

Field	Code	Definition
8		Alarm status of displayed power meter:
	0	ECS alarm is disabled, PBX alarm is not set
	1	ECS alarm is disabled, PBX alarm is set
	2	ECS alarm is enabled, PBX alarm is not set
9	3	ECS alarm is enabled, PBX alarm is set
		Failure code
	0	Pass (pulses detected)
	1	Signal always inactive
	2	Signal always active
10*	8	Test (2) not completed
	9	Network order incomplete
10*	0-99	Most significant digits
11*	1-9	Exponent of 10's multiplier

* Multiply number in field 10 by ten raised to power displayed in field 11. For Test 2, the value is the system demand in kilowatts. For Test 3, the value is the number of pulses detected.

B. FIELD DEFINITIONS AND CODES (Contd)

Field	Code	Definition
12	1-16	Number of administered power meter units in system.
13		Number of failed units:
	0-6	Test 1.
	0-16	Test 2.
14		Failed unit index:
		Test 1:
	0	Failure summary.
	1-6	Index into failure history.
		Test 2:
	1-16	Index into failure history.
15	0-99	Failure summary: sum of approximate number of failures per hour for all failing units.
		Failure history: approximate number of failures per hour for circuit being displayed.
16	0-17	Failure summary: number of hours since the oldest individual failure started (to the nearest hour).

Field	Code	Definition
16 (contd)	0-17	Failure history: number of hours since failures started in the displayed circuit (to the nearest hour).
ECS - Energy communications system		

C. TEST PROCEDURES

A list of power meter interface tests, what each one does, and how each is run follows:

Call in Procedure 538:

PROC NO.; 538; ENTER

Test 1 is automatically selected.

Depressing the NEXT TEST key repeatedly advances the procedure to the desired test. Upon entry to the procedure, the total number of administered power meters is displayed in field 12.

In Test 3 only, the test selection may result in the display of a "default" circuit. A default circuit is the last failing circuit displayed. Dashes appear if there is no default circuit.

The identity of the default circuit is redefined when a failing circuit is displayed from the failure tables used in Test 1 or 2.

C. TEST PROCEDURES (Contd)

Test 1:

Test 1 provides a failure history of the power meter interface unit failures.

To start the test, select Test 1 and depress the EXECUTE key. EXECUTE takes a "snapshot" of the failure summary and displays it on the MAAP. If one or more failures have occurred, the following are displayed:

Field	Contents
12	Total number of units in the system
13	Total number of failed units
14	0, Failure summary
15	Total failure rate
16	Time in hours since the most recent failure

The failure summary displays all the power meter interface unit failures that have occurred.

Depressing the NEXT UNIT key displays the first failing circuit in the failure history. The display includes the following:

Field	Contents
2	Unit number of failing power meter interface unit
3-7	Equipment location of failing circuit
8	Alarm status
9	Failure code
12	Number of administered power meter units in the system

13	Number of failed units
14	1, Index into the failure history table
15	Failure rate
16	Number of hours since failure began

After the first failing circuit is displayed, depressing the NEXT UNIT key repeatedly displays the failure histories of the remaining failing units. Depressing NEXT UNIT after all failure histories have been displayed dashes fields 2 through 11 and 13 through 16. Depressing NEXT UNIT again causes Test 1 to be executed, starting the sequence over with an updated failure summary.

If there are no failures, dashes appear in fields 2 through 11 and 13 through 16. Depressing the NEXT UNIT key again restarts the test as if EXECUTE were operated.

Refer to paragraph 2C in Section 4 for information on clearing the failure history.

Test 2:

NOTE

Test 2 retires the alarms but does not generate any.

Test 2 verifies that each power meter interface unit detects pulses from its associated power meter. Operating for 5 to 6 minutes, the test displays the system power demand in kilowatts as computed by on-line ECS software.

C. TEST PROCEDURES (Contd)

To start the test, select Test 2 and depress the EXECUTE key. The WAIT indicator on the MAAP turns on. Fields 2 through 7 are dashed while the test is executing. The power demand for the system is displayed in fields 10 and 11 and updated at 1-minute intervals. After the system has been tested for five complete, 1-minute intervals, the WAIT indicator turns off and the total number of failures is displayed in field 13.

If one or more failures are detected, information about the first failing unit is displayed when the test is concluded. The display is as follows:

Field	Contents
2	Unit number of first failing unit
3-7	Equipment location of failing circuit
8	Alarm status
9	Failure code
10-11	Total power demand (kilowatts) during the last 1-minute interval of the test
12	Number of administered power meter units in the system
13	Number of failed units
14	Index into the failure history table

Depressing the NEXT UNIT key displays the next failing unit in fields 2 through 7. The failure index in field 14 is advanced by 1. The NEXT UNIT key can be depressed repeatedly to display the remainder of the failing circuits. Depressing NEXT UNIT after all the circuits have been displayed dashes fields 2 through 9 and 15 and 16. Depressing NEXT UNIT again causes the first failure to be displayed once more.

The STOP key can be used to stop testing. The latest system power demand is displayed in fields 10 and 11. A failure code of 8 is displayed in field 9 to indicate that the test was not completed.

NOTE

Five minutes is the minimum time that this test can run and still give valid results. If the test is stopped early, no failure information is available and the alarms cannot be retired.

Test 3:

This test monitors pulses detected from a selected power meter and displays the pulse count in fields 10 and 11.

C. TEST PROCEDURES (Contd)

A unit number must be present in field 2 before the test can be executed. The last displayed failure from Test 1 or 2 is displayed as a default unit when the test is first entered. If there is no default, a unit number must be entered in field 2 or the NEXT UNIT key may be used to select the next power meter unit.

To start the test, depress EXECUTE. The pulses counted flash in fields 10 and 11 while the test is running. The display includes the following:

Field	Contents
2	Unit number to be tested
3-7	Equipment location
8	Alarm status
9	Failure code (displayed when test is stopped)
10-11	Pulse count
12	Total number of administered power meter units in the system

Depressing the NEXT UNIT key advances the display to the next power meter unit and the equipment location of the associated LC16B.

When it is desired to test another circuit, stop the test, select the new circuit, and restart the test, eg:

STOP; (Select new circuit); EXECUTE

D. REPAIR GUIDE

When a power meter unit fault is indicated, the following steps should be performed in the order shown to isolate and repair the faulty unit.

- | Step | Isolation Procedure |
|------|---|
| 1. | Using Test 1, step through the failure history and record the results. |
| 2. | Execute Test 2 to determine if a power meter unit is failing. This test runs from 5 to 6 minutes. Note the system power demand displayed in fields 10 and 11. It is updated once each minute and should correspond to the value displayed on the ECS console. |
| 3. | At the end of the test, step through the failures and record the unit numbers, circuit locations, and failure codes. |
| 4. | Based on test results, take the corrective action indicated, in the order listed, in Table 538-1. |
| 5. | If intermittent power meter unit failures or wiring problems are suspected, use Test 3 to continuously test suspect circuits. |
| 6. | After all failures have been corrected, repeat Test 1 to clear the failure history and Test 2 to retire the alarms. |

D. REPAIR GUIDE (Contd)

Table 538-1. Power Meter Unit Test Repair Guide

Failure Code	Corrective Action
1 or 2	<p>No power meter readings are detected since the power meter signal is not changing. The on-line software generates a failure code when a power meter does not produce readings during the demand interval administered from the ECS console.</p> <div data-bbox="331 716 926 1179" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">NOTE</p> <p>The alarm status field (8) indicates if the ECS alarm software for a specific power meter has been activated, Code 1 occurs only when the following three conditions apply:</p> <ul style="list-style-type: none"> • The ECS alarm is enabled. • The PBX alarm is turned on. • Then the ECS alarm function is disabled from the ECS console. </div> <p>Execute Test 3. If the pulse count shown in fields 10 and 11 remains zero, the power meter signals are not being detected. Stop the test and look at the failure code to determine the status of the signal. Perform the following:</p>

Failure Code	Corrective Action
1 or 2 (Contd)	<ol style="list-style-type: none"> 1. Consult with the building engineer. If no pulses are expected from the power meter, the alarm function should be disabled from the ECS console. If this is the only recorded failure, run Test 2 to retire the alarm. <div data-bbox="1394 711 1988 938" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">CAUTION</p> <p>If pulses are expected from the power meter, the peak demand load shedding function will receive invalid data and should, therefore, be deactivated from the ECS console.</p> </div> <ol style="list-style-type: none"> 2. Inspect the power meter to verify that it is functioning. 3. At the cross-connect field, measure the voltage at the M and MR leads that correspond to the slot and circuit in question. An open power meter contact registers about -48 volts, a closed contact 0 volt.

D. REPAIR GUIDE (Contd)

Table 538-1. Power Meter Unit Test Repair Guide (Contd)

Failure Code	Corrective Action
1 or 2 (Contd)	<p>If pulses are being detected, the reading fluctuates between 0 and -48 volts. The degree of fluctuation depends on the frequency of the pulses. For example, high pulse activity would produce a nearly constant reading of -24 volts.</p> <p>4. Check the wiring at the cross-connect field, between the cross-connect field and the power meter, and between the cross-connect field and LC16B.</p> <p>Pulse signals may be generated manually by shorting together the wires connected to the power meter.</p> <p>Test 3 should be executed when this is done. If the wiring is correct, the pseudo pulses are detected and displayed in fields 10 and 11. Before manually generating the pulses, make sure that the peak demand load shedding has been deactivated as indicated in the caution above.</p>

Failure Code	Corrective Action
1 or 2 (Contd)	<div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">NOTE</p> <p>Manually shorting wires will probably cause the pulse count to be higher than if a black box device had been used.</p> </div> <p>5. If the test shows that pulses are being generated and are being received by the LC16B, replace the LC16B and rerun the test.</p>
8	<p>The STOP key was operated before the WAIT indicator turned off. Test 2 must run to completion before potential failures can be detected.</p>
9	<p>Use Procedures 505 and 506 to determine if a scanner/distributor failure has occurred.</p>