1000A Precision Current Shunt Calibration Manual

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修 訂 管 制					
版次	修訂日期	修訂內容	修訂頁次	修訂者	核淮
A	2015/10/26	NEW RELEASE	ALL	**Han**	
B	2018/9/11	Remove fuse F2,F3、 range 1000A OPA	13	Han	
C	2018/10/19	Add fuse F2,F3 Remov range 1000A Offset adjust(VR4)	2,4,13	Han	
D	2018/12/18	Revise **Millie -> Milli** Add fuse F2,F3 Add **SAVECAL command**	1,4,5,6,8,9 13	Han	

1000A Precision Current Shunt Calibration Manual
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Chapter 1 Calibration

1-1. Introduction

The 1000A should be calibrated, at intervals best determined by the user, It will be necessary to remove the top cover of instrument to gain access to the calibration adjustments. Top cover is removed by removing seven screws. The adjust potentiometer and reference are shown on fig 1-1. There are two circuitry needs to be calibrated：shunt and DAM these calibrations may be performed independently.

1-2. Calibration equipment

Calibration equipment requires

1. A digital voltmeter with a DC accuracy of 0.005% and AC accuracy of 0.05% on 100mV range.
2. A current calibrator with current ranges of 500A, 100A, 10A, 1A, 0.1A.

An alternative way to calibration the 1000A is to return the instrument to PRODIGIT.

1-3. Shunt calibration

You can start to calibrate the 1000A after all equipment is stabilized. Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.

1. 0.2A Shunt calibration
   Press the key switch to the 0.2A position, connect the current calibrator cables to the 0.2A/2A/20A range terminals. Set the current calibrator output for 100mA and adjust VR6 (see fig 1-1) until the DVM reading is the same as the current calibrator output.

2. 2A Shunt calibration
   Press the key switch to the 2A position, connect the current calibrator cables to the 0.2A/2A/20A range terminals. Set the current calibrator output for 1A and adjust VR7 (see fig 1-1) until the DVM reading is the same as the current calibrator output.

3. 20A Shunt calibration
   Press the key switch to the 20A position, connect the current calibrator cables to the 0.2A/2A/20A range terminals. Set the current calibrator output for 10A and adjust VR2 (see fig 1-1) until the DVM reading is the same as the current calibrator output.

4. 200A Shunt calibration
   Press the key switch to the 200A position, connect the current calibrator cables to the 200A range terminals. Set the current calibrator output for 100A and adjust VR3 (see fig 1-1) until the DVM reading is the same as the current calibrator output.

5.1000A Shunt calibration

Press the key switch to the 1000A position. connect the current calibrator cables to the 1000A range terminals. Set the current calibrator output for 500A. Adjust VR1 (see fig 1-1) until the DVM reading is the same as the current calibrator output.

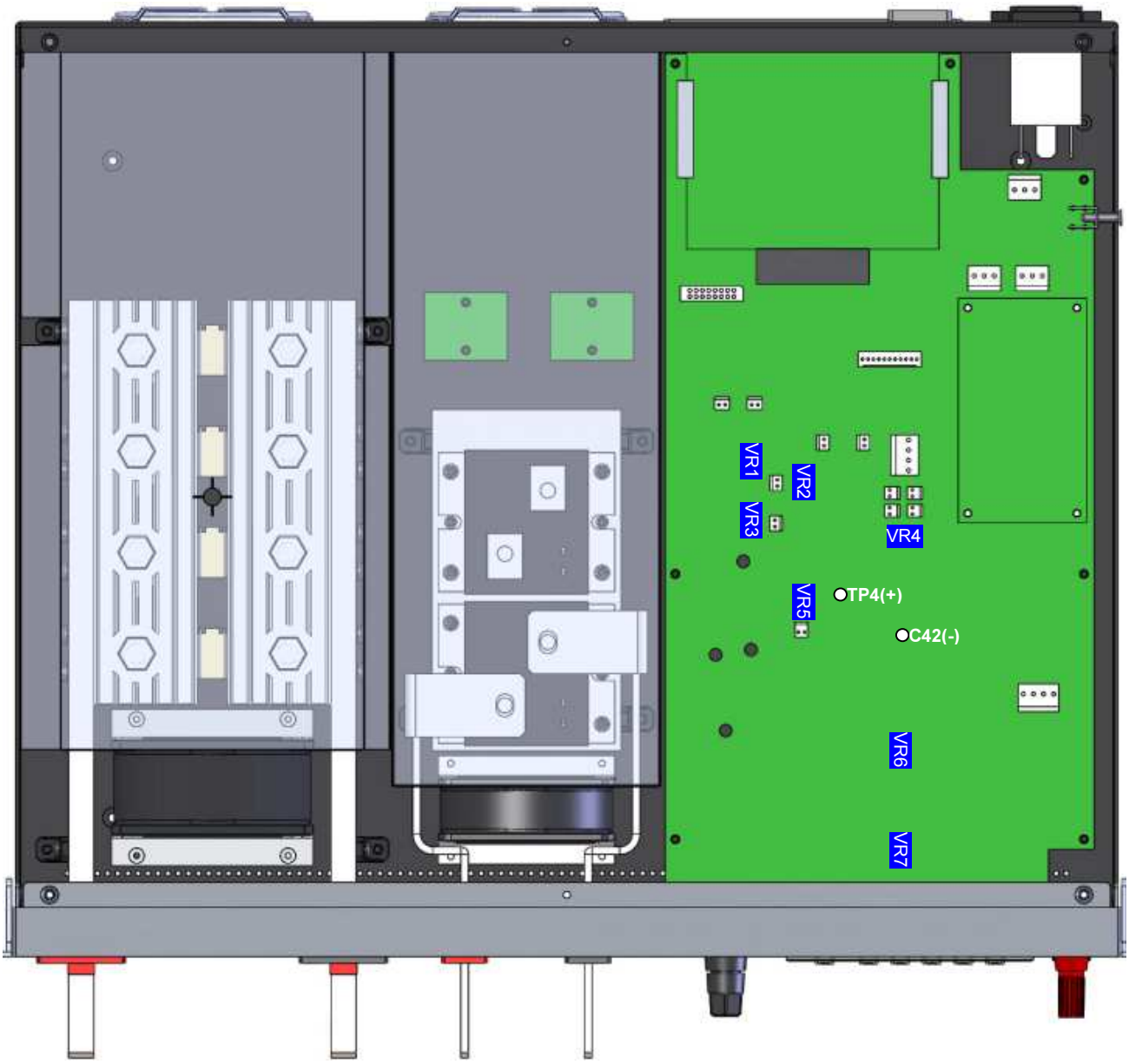

Fig 1-1 Potentiometer layout diagram

1-4. DC current meter calibration

1. The rear panel GPIB/RS-232 interface of 1000A mainframe is designed to connect PC or NOTEBOOK PC with GPIB/RS-232 interface, the NOTEBOOK PC acts as a remote controller of 1000A precision current shunt.

2. Connect the digital voltmeter to the TP4(+)、C42(-) (see fig 4-1) of the model 1000A. Adjust VR5 (see fig 1-1) until the DVM reading is 0.000mA.

3. Send the command “REMOTE” → “Calibrate 1000A“ → ”MEAS:curr?” ,Enter calibration mode

4. 0.2A DC offset
   Disconnect all of the CURRENT INPUT input terminals.
   a. Send the command “mode DC”, Delay 100ms.
   b. Send the command “rang 0.2A”, Delay 100ms.
   c. Send the command “rang 5”, Delay 100ms.
   d. Send the command “rang 7”, Delay 100ms.
   e. Send the command “DC_OFFSET_L_P”, Delay 1s.
   f. Send the command “rang 6”, Delay 100ms.
   g. Send the command “DC_OFFSET_H_P”, Delay 1s.
   h. Send the command “rang 5”, Delay 100ms.
   i. Send the command “rang 8”, Delay 100ms.
   j. Send the command “DC_OFFSET_L_N”, Delay 1s.
   k. Send the command “rang 6”, Delay 100ms.
   l. Send the command “DC_OFFSET_H_N”, Delay 1s.

5. 2A DC offset
   Disconnect all of the CURRENT INPUT input terminals.
   a. Send the command “mode DC”, Delay 100ms.
   b. Send the command “rang 2A”, Delay 100ms.
   c. Send the command “rang 5”, Delay 100ms.
   d. Send the command “rang 7”, Delay 100ms.
   e. Send the command “DC_OFFSET_L_P”, Delay 1s.
   f. Send the command “rang 6”, Delay 100ms.
   g. Send the command “DC_OFFSET_H_P”, Delay 1s.
   h. Send the command “rang 5”, Delay 100ms.
   i. Send the command “rang 8”, Delay 100ms.
   j. Send the command “DC_OFFSET_L_N”, Delay 1s.
   k. Send the command “rang 6”, Delay 100ms.
   l. Send the command “DC_OFFSET_H_N”, Delay 1s.

6. 20A DC offset
   Disconnect all of the CURRENT INPUT input terminals.
   a. Send the command “mode DC”, Delay 100ms.
   b. Send the command “rang 20A”, Delay 100ms.
   c. Send the command “rang 5”, Delay 100ms.
   d. Send the command “rang 7”, Delay 100ms.
   e. Send the command “DC_OFFSET_L_P”, Delay 1s.
   f. Send the command “rang 6”, Delay 100ms.
   g. Send the command “DC_OFFSET_H_P”, Delay 1s.
   h. Send the command “rang 5”, Delay 100ms.
   i. Send the command “rang 8”, Delay 100ms.
   j. Send the command “DC_OFFSET_L_N”, Delay 1s.

k. Send the command “rang 6”, Delay 100ms.
l. Send the command “DC_OFFSET_H_N”, Delay 1s.

7. 200A DC offset
Disconnect all of the CURRENT INPUT input terminals.
a. Send the command “mode DC”, Delay 100ms.
b. Send the command “rang 200A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Send the command “DC_OFFSET_L_P”, Delay 1s.
f. Send the command “rang 6”, Delay 100ms.
g. Send the command “DC_OFFSET_H_P”, Delay 1s.
h. Send the command “rang 5”, Delay 100ms.
i. Send the command “rang 8”, Delay 100ms.
j. Send the command “DC_OFFSET_L_N”, Delay 1s.
k. Send the command “rang 6”, Delay 100ms.
l. Send the command “DC_OFFSET_H_N”, Delay 1s.

8. 1000A DC offset
Disconnect all of the CURRENT INPUT input terminals.
a. Send the command “mode DC”, Delay 100ms.
b. Send the command “rang 1000A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Send the command “DC_OFFSET_L_P”, Delay 1s.
f. Send the command “rang 8”, Delay 100ms.
g. Send the command “DC_OFFSET_L_N”, Delay 1s.

9. 0.2A DC Gain
Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.
a. Send the command “mode DC”, Delay 100ms.
b. Send the command “rang 0.2A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Connect the current calibrator cables to the 0.2A/2A/20A range terminals. Set the current calibrator output for 100mA
f. Send the command “DC_GAIN_L_P”, Delay 1s.
g. Send the command “rang 7”, Delay 100ms.
h. Send the command “rang 6”, Delay 100ms.
i. Set the current calibrator output for 400mA
j. Send the command “DC_GAIN_H_P”, Delay 1s.
k. Send the command “rang 5”, Delay 100ms.
l. Send the command “rang 8”, Delay 100ms.
m. Set the current calibrator output for -100mA
n. Send the command “DC_GAIN_L_N”, Delay 1s.
o. Send the command “rang 8”, Delay 100ms.
p. Send the command “rang 6”, Delay 100ms.
q. Set the current calibrator output for -400mA
r. Send the command “DC_GAIN_H_N”, Delay 1s.

10. 2A DC Gain

Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.

a. Send the command “mode DC”, Delay 100ms.
b. Send the command “rang 2A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Connect the current calibrator cables to the 0.2A/2A/20A range terminals. Set the current calibrator output for 1A
f. Send the command “DC_GAIN_L_P”, Delay 1s.
g. Send the command “rang 7”, Delay 100ms.
h. Send the command “rang 6”, Delay 100ms.
i. Set the current calibrator output for 2A
j. Send the command “S_DC_GAIN_H_P XXXXXX”(ex:09FF00)”
k. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display 2000.0mA.
l. Send the command “rang 5”, Delay 100ms.
m. Send the command “rang 8”, Delay 100ms.
n. Set the current calibrator output for -1A
o. Send the command “DC_GAIN_L_N”, Delay 1s
p. Send the command “rang 8”, Delay 100ms.
q. Send the command “rang 6”, Delay 100ms.
r. Set the current calibrator output for -2A
s. Send the command “S_DC_GAIN_H_N XXXXXX”(ex: 0A3471)”
t. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display -2000.0mA.

11. 20A DC Gain

Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.

a. Send the command “mode DC”, Delay 100ms.
b. Send the command “rang 20A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Connect the current calibrator cables to the 0.2A/2A/20A range terminals. Set the current calibrator output for 10A
f. Send the command “DC_GAIN_L_P”, Delay 1s.
g. Send the command “rang 7”, Delay 100ms.
h. Send the command “rang 6”, Delay 100ms.
i. Set the current calibrator output for 20A
j. Send the command “S_DC_GAIN_H_P XXXXXX”(ex:09FF00)”
k. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display 20.000A.
l. Send the command “rang 5”, Delay 100ms.
m. Send the command “rang 8”, Delay 100ms.
n. Set the current calibrator output for -10A
o. Send the command “DC_GAIN_L_N”, Delay 1s
p. Send the command “rang 8”, Delay 100ms.
q. Send the command “rang 6”, Delay 100ms.
r. Set the current calibrator output for -20A
s. Send the command “S_DC_GAIN_H_N XXXXXX”(ex: 0A3471)”
t. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display -20.000A.

12. 200A DC Gain

Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.

a. Send the command “mode DC”, Delay 100ms.
b. Send the command “rang 200A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Connect the current calibrator cables to the 200A range terminals. Set the current calibrator output for 100A
f. Send the command “DC_GAIN_L_P”, Delay 1s.
g. Send the command “rang 7”, Delay 100ms.
h. Send the command “rang 6”, Delay 100ms.
i. Set the current calibrator output for 200A
j. Send the command “S_DC_GAIN_H_P XXXXXX”(ex:09FF00)”
k. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display 200.00A.
l. Send the command “rang 5”, Delay 100ms.
m. Send the command “rang 8”, Delay 100ms.
n. Set the current calibrator output for -100A
o. Send the command “DC_GAIN_L_N”, Delay 1s
p. Send the command “rang 8”, Delay 100ms.
q. Send the command “rang 6”, Delay 100ms.
r. Set the current calibrator output for -200A
s. Send the command “S_DC_GAIN_H_N XXXXXX”(ex: 0A3471)”
t. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display -200.00A.

13. 1000A DC Gain

Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.

a. Send the command “mode DC”, Delay 100ms.
b. Send the command “rang 1000A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Connect the current calibrator cables to the 1000A range terminals. Set the current calibrator output for 500A
f. Send the command “S_DC_GAIN_L_P XXXXXX”(ex:320300)”
g. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display 500.00A.
h. Send the command “rang 5”, Delay 100ms.
i. Send the command “rang 8”, Delay 100ms.
j. Set the current calibrator output for -500A
k. Send the command “S_DC_GAIN_L_N XXXXXX”(ex:320300)”
l. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display -500.00A.

14. Save Calibrate

Send the command “SAVECAL”, Save Calibrate Value and exit the Calibrate Mode

1-5. AC current meter calibration

1. The rear panel GPIB/RS-232 interface of 1000A mainframe is designed to connect PC or NOTEBOOK PC with GPIB/RS-232 interface, the NOTEBOOK PC acts as a remote controller of 1000A precision current shunt.

2. Send the command “REMOTE” → “Calibrate 1000A“ → ”MEAS:curr?” ,Enter calibration mode

3. 0.2A AC offset
   Disconnect all of the CURRENT INPUT input terminals.
   a. Send the command “mode AC”, Delay 100ms.
   b. Send the command “rang 0.2A”, Delay 100ms.
   c. Send the command “rang 5”, Delay 100ms.
   d. Send the command “rang 7”, Delay 100ms.
   e. Send the command “AC_OFFSET_L”, Delay 1s.
   f. Send the command “rang 6”, Delay 100ms.
   g. Send the command “AC_OFFSET_H”, Delay 1s.

4. 2A AC offset
   Disconnect all of the CURRENT INPUT input terminals.
   a. Send the command “mode AC”, Delay 100ms.
   b. Send the command “rang 2A”, Delay 100ms.
   c. Send the command “rang 5”, Delay 100ms.
   d. Send the command “rang 7”, Delay 100ms.
   e. Send the command “AC_OFFSET_L”, Delay 1s.
   f. Send the command “rang 6”, Delay 100ms.
   g. Send the command “AC_OFFSET_H”, Delay 1s.

5. 20A AC offset
   Disconnect all of the CURRENT INPUT input terminals.
   a. Send the command “mode AC”, Delay 100ms.
   b. Send the command “rang 20A”, Delay 100ms.
   c. Send the command “rang 5”, Delay 100ms.
   d. Send the command “rang 7”, Delay 100ms.
   e. Send the command “AC_OFFSET_L”, Delay 1s.
   f. Send the command “rang 6”, Delay 100ms.
   g. Send the command “AC_OFFSET_H”, Delay 1s.

5. 200A AC offset
   Disconnect all of the CURRENT INPUT input terminals.
   a. Send the command “mode AC”, Delay 100ms.
   b. Send the command “rang 200A”, Delay 100ms.
   c. Send the command “rang 5”, Delay 100ms.
   d. Send the command “rang 7”, Delay 100ms.
   e. Send the command “AC_OFFSET_L”, Delay 1s.
   f. Send the command “rang 6”, Delay 100ms.
   g. Send the command “AC_OFFSET_H”, Delay 1s.

6. 1000A AC offset
   Disconnect all of the CURRENT INPUT input terminals.
   a. Send the command “mode AC”, Delay 100ms.
   b. Send the command “rang 1000A”, Delay 100ms.
   c. Send the command “rang 5”, Delay 100ms.

d. Send the command “rang 7”, Delay 100ms.
e. Send the command “AC_OFFSET_L”, Delay 1s.

7. 0.2A AC Gain

Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.

a. Send the command “mode AC”, Delay 100ms.
b. Send the command “rang 0.2A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Connect the current calibrator cables to the 0.2A/2A/20A range terminals. Set the current calibrator output for AC 100mA/60Hz
f. Send the command “AC_GAIN_L”, Delay 1s.
g. Send the command “rang 7”, Delay 100ms.
h. Send the command “rang 6”, Delay 100ms.
i. Set the current calibrator output for AC 400mA/60Hz
j. Send the command “AC_GAIN_H”, Delay 1s.

7. 2A AC Gain

Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.

a. Send the command “mode AC”, Delay 100ms.
b. Send the command “rang 2A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Connect the current calibrator cables to the 0.2A/2A/20A range terminals. Set the current calibrator output for AC 1A/60Hz
f. Send the command “AC_GAIN_L”, Delay 1s.
g. Send the command “rang 7”, Delay 100ms.
h. Send the command “rang 6”, Delay 100ms.
i. Set the current calibrator output for AC 2A/60Hz
j. Send the command “S_AC_GAIN_H XXXXXX”(ex:09FFD0)”
k. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display 2000.0mA.

8. 20A AC Gain

Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.

a. Send the command “mode AC”, Delay 100ms.
b. Send the command “rang 20A”, Delay 100ms.
c. Send the command “rang 5”, Delay 100ms.
d. Send the command “rang 7”, Delay 100ms.
e. Connect the current calibrator cables to the 0.2A/2A/20A range terminals. Set the current calibrator output for AC 10A/60Hz
f. Send the command “AC_GAIN_L”, Delay 1s.
g. Send the command “rang 7”, Delay 100ms.
h. Send the command “rang 6”, Delay 100ms.
i. Set the current calibrator output for AC 20A/60Hz
j. Send the command “S_AC_GAIN_H XXXXXX”(ex:09FFD0)”
k. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display 20.000A.

9. 200A AC Gain
   Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.
   a. Send the command “mode AC”, Delay 100ms.
   b. Send the command “rang 200A”, Delay 100ms.
   c. Send the command “rang 5”, Delay 100ms.
   d. Send the command “rang 7”, Delay 100ms.
   e. Connect the current calibrator cables to the 200A range terminals. Set the current calibrator output for AC 100A/60Hz
   f. Send the command “AC_GAIN_L”, Delay 1s.
   g. Send the command “rang 7”, Delay 100ms.
   h. Send the command “rang 6”, Delay 100ms.
   i. Set the current calibrator output for AC 200A/60Hz
   j. Send the command “S_AC_GAIN_H XXXXXX”(ex:09FFD0)”
   k. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display 200.00A.

10. 1000A AC Gain
    Connect the digital voltmeter to the VOLTAGE OUTPUT terminals of the model 1000A. Select its 100 Milli-volt range.
    a. Send the command “mode AC”, Delay 100ms.
    b. Send the command “rang 1000A”, Delay 100ms.
    c. Send the command “rang 5”, Delay 100ms.
    d. Send the command “rang 7”, Delay 100ms.
    e. Connect the current calibrator cables to the 1000A range terminals. Set the current calibrator output for AC 500A/60Hz
    f. Send the command “S_AC_GAIN_L XXXXXX”(ex:320A00)”
    g. Adjust the value(XXXXXX), repeat step j, until the 5 1/2 digit current meter on the front panel is display 500.00A.

11. Save Calibrate
    Send the command “SAVECAL”, Save Calibrate Value and exit the Calibrate Mode

1-6. 1000A REMOTE CONTROL COMMAND LIST

State Commands	NOTE	RETURN
[STATe] RANGe{SP}{0.2A|2A|20A|200A|1000A} (;|NL)		
[STATe] RANGe{?} (;|NL)		0：0.2A 1：2A 2：20A 3：200A 4：1000A
[STATe：] MODE{SP}{DC|AC} (;|NL)		
[STATe：] MODE{?}(;|NL)		‘0’：DC ‘1’：AC

TABLE 1-1 STAGE COMMAND SUMMARY

System Commands	NOTE	RETURN
[SYStem：] REMOTE(; | NL)	Only RS232cmd	
[SYStem：] LOCAL(; | NL)	Only RS232cmd	
[SYStem：] NAME {?} (; | NL)		“PRODIGIT：1000A”

TABLE 1-2 SYSTEM COMMAND SUMMARY

Measure Commands	NOTE	RETURN
MEASure：CURRent{?}(; | NL)		{####.####}[m]{A}

TABLE 1-3 MEASURE COMMAND SUMMARY

Calibrate Commands	NOTE	RETURN
CALIbrate{SP}{1000A}(; | NL)	Enter calibration mode	
DC_OFFSET_L_P{SP}(; | NL)	Get DC Current Range Low pos. Offset value	0: OK 1: NG
DC_OFFSET_L_P{?}(; | NL)	Read DC Current Range Low pos. Offset value	“0000” ~ “FFFF”
DC_GAIN_L_P{SP}(; | NL)	Get DC Current Range Low pos. Gain value	0: OK 1: NG
DC_GAIN_L_P{?}(; | NL)	Read DC Current Range Low pos. Gain value	“000000” ~ “FFFFFF”
DC_OFFSET_L_N{SP}(; | NL)	Get DC Current Range Low neg. Offset value	0: OK 1: NG
DC_OFFSET_L_N{?}(; | NL)	Read DC Current Range Low neg. Offset value	“0000” ~ “FFFF”
DC_GAIN_L_N{SP}(; | NL)	Get DC Current Range Low neg. Gain value	0: OK 1: NG
DC_GAIN_L_N{?}(; | NL)	Read DC Current Range Low neg. Gain value	“000000” ~ “FFFFFF”
DC_OFFSET_H_P{SP}(; | NL)	Get DC Current Range High pos. Offset value	0: OK 1: NG
DC_OFFSET_H_P{?}(; | NL)	Read DC Current Range High pos. Offset value	“0000” ~ “FFFF”
DC_GAIN_H_P{SP}(; | NL)	Get DC Current Range High pos. Gain value	0: OK 1: NG
DC_GAIN_H_P{?}(; | NL)	Read DC Current Range High pos. Gain value	“000000” ~ “FFFFFF”
DC_OFFSET_H_N{SP}(; | NL)	Get DC Current Range High neg. Offset value	0: OK 1: NG
DC_OFFSET_H_N{?}(; | NL)	Read DC Current Range High neg. Offset value	“0000” ~ “FFFF”
DC_GAIN_H_N{SP}(; | NL)	Get DC Current Range High neg. Gain value	0: OK 1: NG
DC_GAIN_H_N{?}(; | NL)	Read DC Current Range High neg. Gain value	“000000” ~ “FFFFFF”
AC_OFFSET_L{SP}(; | NL)	Get AC Current Range Low Offset value	0: OK 1: NG
AC_OFFSET_L{?}(; | NL)	Read AC Current Range Low Offset value	“0000” ~ “FFFF”

AC_GAIN_L{SP}(; |NL)	Get AC Current Range Low Gain value	0: OK 1: NG
AC_GAIN_L{?}(; |NL)	Read AC Current Range Low Gain value	“000000” ~ “FFFFFF”
AC_OFFSET_H{SP}(; |NL)	Get AC Current Range High Offset value	0: OK 1: NG
AC_OFFSET_H{?}(; |NL)	Read AC Current Range High Offset value	“0000” ~ “FFFF”
AC_GAIN_H{SP}(; |NL)	Get AC Current Range High Gain value	0: OK 1: NG
AC_GAIN_H{?}(; |NL)	Read AC Current Range High Gain value	“000000” ~ “FFFFFF”
SAVECAL{?}(; |NL)	Save Calibrate Value and exit the Calibrate Mode.	0: OK 1: NG
S_DC_OFFSET_L_P{SP} {n} (; |NL)	Get DC Current Range Low pos. Offset value. n=“000000” ~ “FFFFFF”	
S_DC_GAIN_L_P{SP} {n} (; |NL)	Get DC Current Range Low pos. Gain value. n=“000000” ~ “FFFFFF”	
S_DC_OFFSET_L_N{SP} {n} (; |NL)	Get DC Current Range Low neg. Offset value. n=“000000” ~ “FFFFFF”	
S_DC_GAIN_L_N{SP} {n} (; |NL)	Get DC Current Range Low neg. Gain value. n=“000000” ~ “FFFFFF”	
S_DC_OFFSET_H_P{SP} {n} (; |NL)	Get DC Current Range High pos. Offset value. n=“000000” ~ “FFFFFF”	
S_DC_GAIN_H_P{SP} {n} (; |NL)	Get DC Current Range High pos. Gain value. n=“000000” ~ “FFFFFF”	
DC_OFFSET_H_N{SP} {n} (; |NL)	Get DC Current Range High neg. Offset value. n=“000000” ~ “FFFFFF”	
DC_GAIN_H_N{SP} {n} (; |NL)	Get DC Current Range High neg. Gain value. n=“000000” ~ “FFFFFF”	
AC_OFFSET_L{SP} {n} (; |NL)	Get AC Current Range Low Offset value n=“000000” ~ “FFFFFF”	
AC_GAIN_L{SP} {n} (; |NL)	Get AC Current Range Low Gain value n=“000000” ~ “FFFFFF”	
AC_OFFSET_H{SP} {n} (; |NL)	Get AC Current Range High Offset value n=“000000” ~ “FFFFFF”	
AC_GAIN_H{SP} {n} (; |NL)	Get AC Current Range High Gain value n=“000000” ~ “FFFFFF”	
RANGe {SP}{5|6|7|8} (; |NL)	5:LowRange,6:High Range,7:POS,8:NEG	

TABLE 1-4 Calibrate COMMAND SUMMARY

1-7. The description of abbreviation

SP：Space, the ASCII code is 20 Hexadecimal.
; ：Semicolon, Program line terminator, the ASCII code is OA Hexadecimal.
NL：New line, Program line terminator, the ASCII code is OA Hexadecimal.
NR2：Digits with decimal point. It can be accepted in the range and format of###.#####.

For Example：

30.12345, 5.0

1-8. Remote Control Command Language description

{ } : The contents of the { } symbol must be used as a part or data of the GPIB command, it can not be omitted.

[ ] : The contents of the [ ] symbol indicts the command can be used or not. It depends on the testing application.

| : This symbol means option. For example 〝LOW|HIGH〞 means it can only use LOW or HIGH as the command, it can choose only one as the setting command.

Terminator : You have to send the program line terminator character after send the GPIB command, the available command terminator characters which can be accepted in 1000A mainframe is listed in Table 4-4.

LF
LF WITH EOI
CR，LF
CR，LF WITH EOI

TABLE 1-5 COMMAND TERMINATOR

Chapter 2 Block diagram

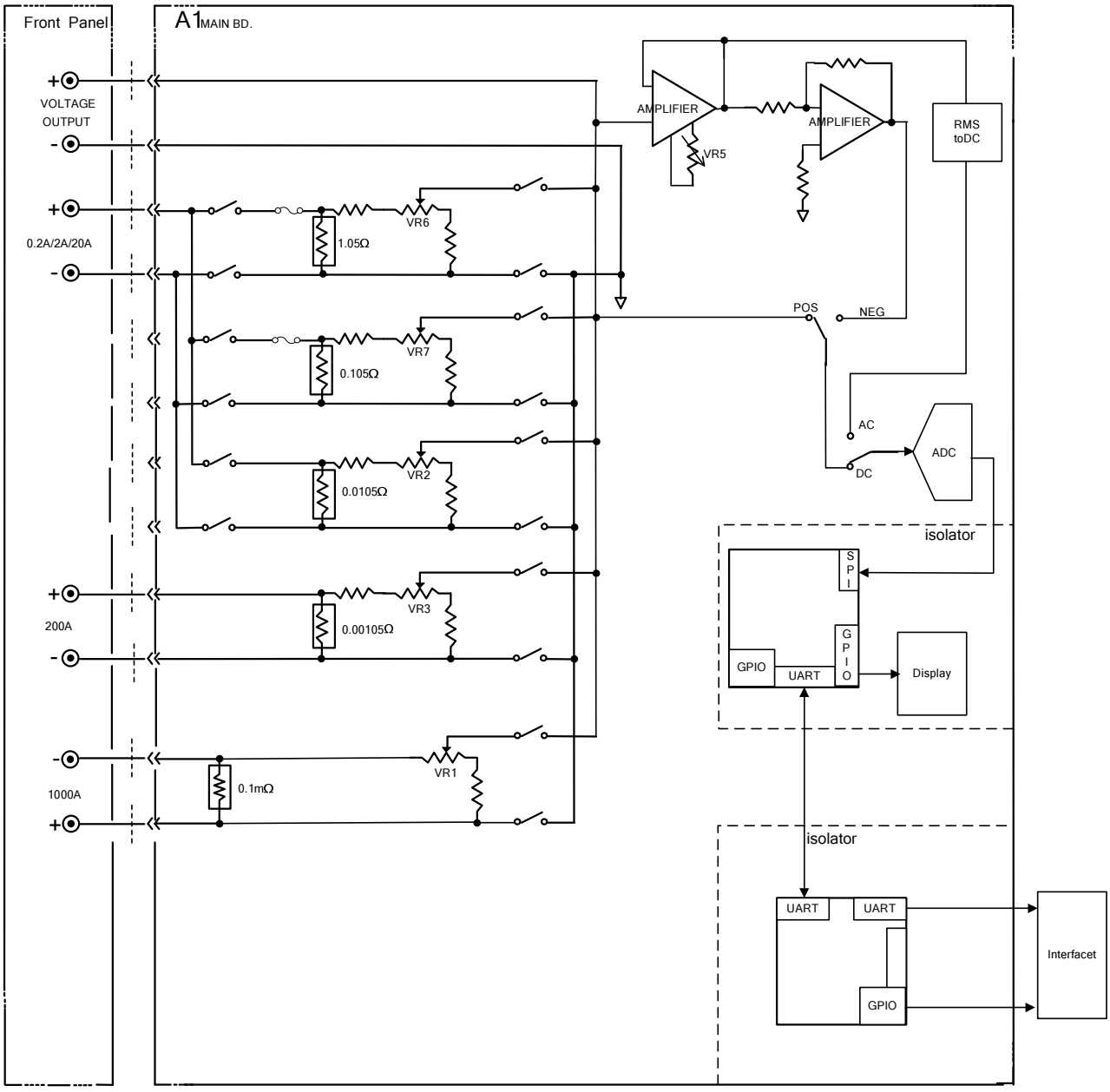

Fig 2-1 1000A Pecision current shunt block diagram