

GPS

4303/ 4251/ 3303/ 2303

Verification/ Adjustment Manual

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How to Use this Manual

This manual describes how to verify and adjust the performance of GPS-4303/ 4251/ 3303/ 2303 Multiple Output D.C. Power Supplies.

Specification, page5, shows GPS electronic and mechanical specifications. It also shows the locations of relevant verification and adjustment procedures in this manual.

Front Panel, page7, describes the front panel switches, terminals, and indicators. The **Default Settings** column shows the basic panel settings applicable to all verification and adjustment items.

Performance Verification, page9, shows how to verify GPS performance, step by step. Check the necessary equipment and the overall procedure before start working on each item.

Adjustment, page31, shows how to adjust GPS specification. Same as Performance Verification, check the equipment and the overall procedure before start working on each item.

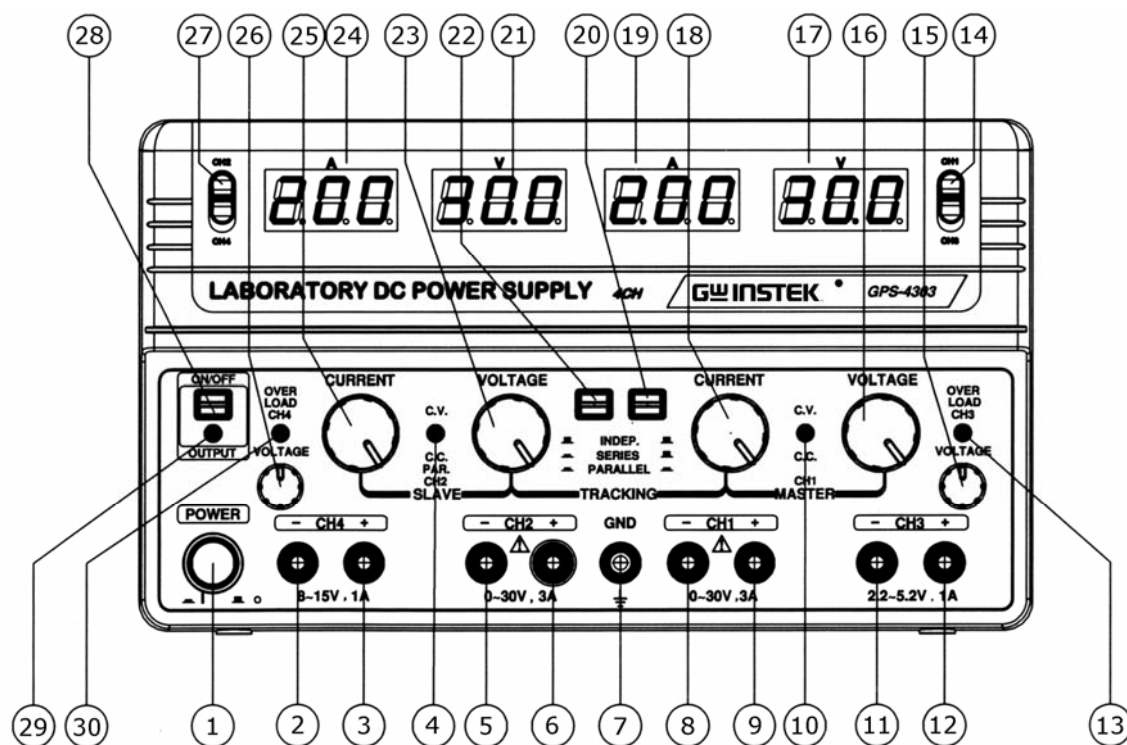
Specification

GPS-4303					
Output Mode	CH1, 2	CH3	CH4	Verification	Adjustment
Voltage	0 ~ 30V	2.2 ~ 5.2V	8 ~ 15V	Page10	Page37
Current	0 ~ 3A	1A Max.	1A Max.	Page14	Page42
Tracking Series Voltage	0 ~ 60V	---	---	Page12	Page40
Tracking Parallel Current	0 ~ 6A	---	---	Page16	Page44
GPS-4251					
Output Mode	CH1, 2	CH3	CH4	Verification	Adjustment
Voltage	0 ~ 25V	3 ~ 6V	8 ~ 15V	Page10	Page37
Current	0 ~ 0.5A	2.5A Max.	1A Max	Page14	Page42
Tracking Series Voltage	0 ~ 50V	---	---	Page12	Page40
Tracking Parallel Current	0 ~ 1A	---	---	Page16	Page44
GPS-3303					
Output Mode	CH1, 2	CH3	CH4	Verification	Adjustment
Voltage	0 ~ 30V	5V Fixed	---	Page10	Page37
Current	0 ~ 3A	3A Max.	---	Page14	Page42
Tracking Series Voltage	0 ~ 60V	---	---	Page12	Page40
Tracking Parallel Current	0 ~ 6A	---	---	Page16	Page44
GPS-2303					
Output Mode	CH1, 2	CH3	CH4	Verification	Adjustment
Voltage	0 ~ 30V	---	---	Page10	Page37
Current	0 ~ 3A	---	---	Page14	Page42
Tracking Series Voltage	0 ~ 60V	---	---	Page12	Page40
Tracking Parallel Current	0 ~ 6A	---	---	Page16	Page44

(Continued on next page)

Constant Voltage Operation (CH1, CH2)		Verification	Adjustment
Line Regulation	$\leq 0.01\% + 3\text{mV}$	---	---
Load Regulation	$\leq 0.01\% + 3\text{mV}$ (rating current $\leq 3\text{A}$) $\leq 0.02\% + 5\text{mV}$ (rating current $> 3\text{A}$)	Page22	---
Ripple & Noise	$\leq 1\text{mVrms}$, 5Hz ~ 1MHz	Page26	---
Recovery Time	$\leq 100\mu\text{S}$ (50% Load Change, Minimum Load 0.5A)	---	---
Constant Current Operation (CH1, CH2)		Verification	Adjustment
Line Regulation	$\leq 0.2\% + 3\text{mA}$	---	---
Load Regulation	$\leq 0.2\% + 3\text{mA}$	Page18	---
Ripple Current	$\leq 3\text{mA}_{\text{rms}}$	Page20	---
Tracking Operation (CH1, CH2)		Verification	Adjustment
Tracking Error	$\leq 0.5\%(\text{CH1}) + 10\text{mV}$	Page12	Page41
Series Regulation	$\leq 300\text{mV}$	---	---
Load Regulation	$\leq 0.01\% + 3\text{mV}$	Page24	---
Ripple & Noise	$\leq 2\text{mVrms}$, 5Hz ~ 1MHz	Page24	---
CH3 Output		Verification	Adjustment
Line Regulation	$\leq 5\text{mV}$	---	---
Load Regulation	$\leq 15\text{mV}$	Page22	---
Ripple & Noise	$\leq 2\text{mVrms}$, 5Hz ~ 1MHz	Page26	---
CH4 Output		Verification	Adjustment
Line Regulation	$\leq 5\text{mV}$	---	---
Load Regulation	$\leq 10\text{mV}$	Page22	---
Ripple & Noise	$\leq 2\text{mVrms}$, 5Hz ~ 1MHz	Page26	---
Meter		Verification	Adjustment
Model	3 Digits, 0.5" LED display	---	---
Out ON Accuracy	$\pm (0.5\% \text{ rdg} + 2 \text{ digits})$	Page10, 14	Page38, 43
Out OFF Accuracy	$\pm (0.5\% \text{ rdg} + 8 \text{ digits})$ * GPS-2303: $\pm (0.5\% \text{ rdg} + 2 \text{ digits})$	Page10, 12, 14, 16	Page39, 41, 43, 45
Insulation		Verification	Adjustment
Chassis and Terminal	$\geq \text{DC } 500\text{V}/ 20\text{M}\Omega$	---	---
Chassis and AC Cord	$\geq \text{DC } 500\text{V}/ 30\text{M}\Omega$	---	---
Power Source		Verification	Adjustment
AC 100V/ 120V/ 220V ($\pm 10\%$)/ 230V ($+10\% \sim -6\%$), 50/ 60Hz		---	---
Dimensions & Weight		Verification	Adjustment
255(W) x 145(H) x 265(D) mm, 7kg *GPS-4251: 6.3kg		---	---

Front Panel



Description and Default Settings

No	Description	Default Settings	GPS-4303	GPS-4251	GPS-3303	GPS-2303
1	Power Switch	ON	*	*	*	*
2	CH4 – Output Terminal		*	*		
3	CH4 + Output Terminal		*	*		
4	CH2 C.V./ C.C. Indicator Green : Constant Voltage (C.V.) Red : Constant Current (C.C.)		*	*	*	*
5	CH2 – Output Terminal		*	*	*	*
6	CH2 + Output Terminal		*	*	*	*
7	GND Terminal	Connect to Ground	*	*	*	*
8	CH1 – Output Terminal	Connected	*	*	*	*
9	CH1 + Output Terminal	Connected	*	*	*	*

No	Description	Default Settings	GPS-4303	GPS-4251	GPS-3303	GPS-2303
10	CH1 C.V./ C.C. Indicator Green : Constant Voltage (C.V.) Red : Constant Current (C.C.)		*	*	*	*
11	CH3 – Output Terminal		*	*	*	
12	CH3 + Output Terminal		*	*	*	
13	CH3 Overload Indicator		*	*	*	
14	CH1/ CH3 Selector	CH1	*	*		
15	CH3 Voltage Control	Minimum	*	*		
16	CH1 Voltage Control	Minimum	*	*	*	*
17	CH1/ CH3 Voltage Meter		*	*	CH1 Only	CH1 Only
18	CH1 Current Control	Minimum	*	*	*	*
19	CH1/ CH3 Current Meter		*	*	CH1 Only	CH1 Only
20	Mode Switch ■ ■ Independent	Independent ■ ■	*	*	*	*
22	■ ■ Series ■ ■ Parallel					
21	CH2/ CH4 Voltage Meter		*	*	CH2 Only	CH2 Only
23	CH2 Voltage Control	Minimum	*	*	*	*
24	CH2/ CH4 Current Meter		*	*	CH2 Only	CH2 Only
25	CH2 Current Control	Minimum	*	*	*	*
26	CH4 Voltage Control	Minimum	*	*		
27	CH2/ CH4 Selector	CH2	*	*		
28	Output Switch	OFF	*	*	*	*
29	Output Indicator		*	*	*	*
30	CH4 Overload Indicator		*	*		

Performance Verification

Overall Procedure

1. Prepare the Equipment according to the following table.
2. Set the front panel according to the *Default Settings* (page7).
3. Verify a specification item and record the result (page10 to 26).
The recording tables are at the end of this chapter (page28).
4. Repeat step 3 for all items.
5. In case of over- or under-specification, continue with the relevant item in the Adjustment chapter (page31).

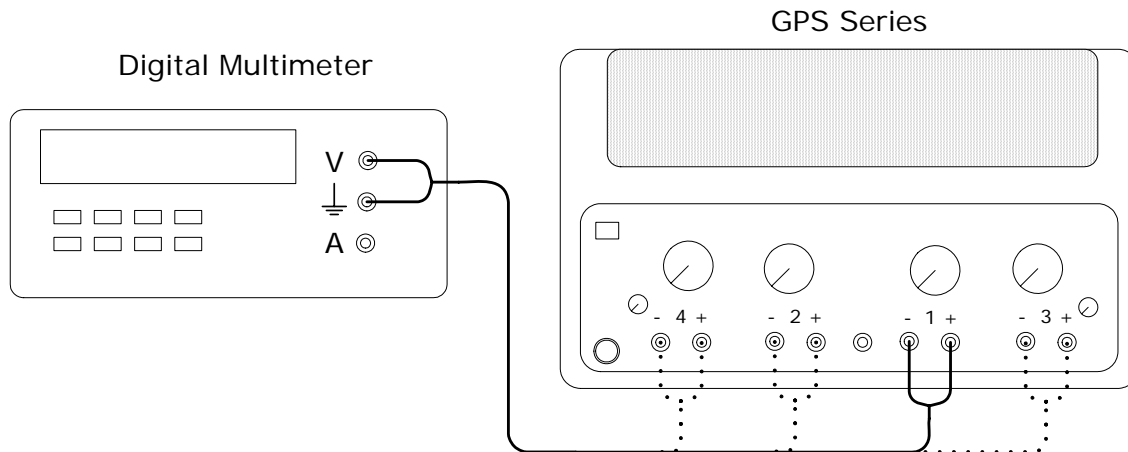
Verification Equipment

Equipment	Required Specification	Used in	Recommended Model
Digital Multimeter	<ul style="list-style-type: none"> AC & DC Voltage Accuracy: $< \pm 0.1\%$ DC Current Range: $\geq 6A$ DC Current Accuracy: $< \pm 0.1\%$ 	All items	<ul style="list-style-type: none"> GDM-8245 GDM-8246
2 nd Digital Multimeter	<ul style="list-style-type: none"> AC & DC Voltage Accuracy: $< \pm 0.1\%$ 	<ul style="list-style-type: none"> Ripple Current 	<ul style="list-style-type: none"> GDM-8245 GDM-8246
Electronic Load	<ul style="list-style-type: none"> DC Voltage Range: $\geq 60V$ DC Current Range: $\geq 6A$ CV, CC, CR Mode Short Mode 	<ul style="list-style-type: none"> Load Regulation Ripple Voltage Ripple Current 	<ul style="list-style-type: none"> Agilent N3305A
AC Power Supply	<ul style="list-style-type: none"> Capacity: $\geq 1k VA$ Frequency: 50 – 60Hz Line Voltage: $\pm 10\%$ *230V: $-6\% \sim +10\%$ 	<ul style="list-style-type: none"> Ripple Voltage 	<ul style="list-style-type: none"> APS-9102 Agilent 6813B
GPS – Multimeter cable	<ul style="list-style-type: none"> Voltage rating: $> 60V$ Current rating: $> 6A$ 	All items	---
GPS – 2 nd Multimeter cable	<ul style="list-style-type: none"> Voltage rating: $> 30V$ 	<ul style="list-style-type: none"> Ripple Current 	---
GPS – Electronic Load cable	<ul style="list-style-type: none"> Voltage rating: $> 60V$ Current rating: $> 6A$ 	<ul style="list-style-type: none"> Load Regulation Ripple Voltage Ripple Current 	---
Calculator	<ul style="list-style-type: none"> For calculating the acceptance ranges 	All items	---

Output Voltage Verification

Here we verify Minimum Output Voltage, Maximum Output Voltage, and Voltage Meter Accuracy.

Connection



Verification steps

1. Set the front panel according to *Default Settings*, page 7.
2. Connect the Multimeter to CH1 and turn ON the Output Switch.

Minimum Output Voltage

3. (CH1, CH2 only) Turn up the Current Control to full.
4. (CH1, CH2 only) Make sure the indicator shows C.V. (green).
5. Record the Multimeter readout as Minimum Output Voltage.

Maximum Output Voltage

6. Turn up the Voltage Control to full.
7. (CH1, CH2 only) Make sure the indicator shows C.V. (green).
8. Record the Multimeter readout as Maximum Output Voltage.

Out ON Meter Accuracy

9. Record the GPS readout. Calculate the difference between the previous Multimeter readout and record it as Out ON Meter Accuracy.

Out OFF Meter Accuracy

10. Turn OFF the Output Switch.

11. Record the GPS readout. Calculate the difference between the previous GPS readout (Output ON) and record it as Out OFF Meter Accuracy.
12. Switch the GPS connection to the next channel and turn ON the Output Switch.
13. Repeat step 3 to 12 for CH2, CH3, and CH4.

Acceptance range: Output Voltage

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	Min: < -30mV Max: 30V +3% ~ +8% (30.9 ~ 32.4)	Min: < -30mV Max: 25V +3% ~ +8% (25.75 ~ 27)	Min: < -30mV Max: 30V +3% ~ +8% (30.9 ~ 32.4)	
CH2	Min: < -30mV Max: > CH1 +0.2V		Min: < -30mV Max: > CH1 +0.2V	
CH3	Min: 2.2V ±8% (2.024 ~ 2.376) Max: 5.2V ±8% (4.784 ~ 5.616)	Min: 3.0V ±8% (2.76 ~ 3.24) Max: 6.0V ±8% (5.52 ~ 6.48)	Min: 5.0V ±8% (4.6 ~ 5.4) Max: N/A	
CH4	Min: 8.0V ±8% (7.36 ~ 8.64) Max: 15.0V ±8% (13.8 ~ 16.2)			

Acceptance range: Voltage Meter Accuracy

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	Out ON: ±(0.5% rdg + 2digits) Out OFF: ±(0.5% rdg + 8digits)		Out ON: ±(0.5% rdg + 2digits) Out OFF: ±(0.5% rdg + 8digits)	Out ON: ±(0.5% rdg + 2digits) Out OFF: N/A
CH2				
CH3			N/A	
CH4				

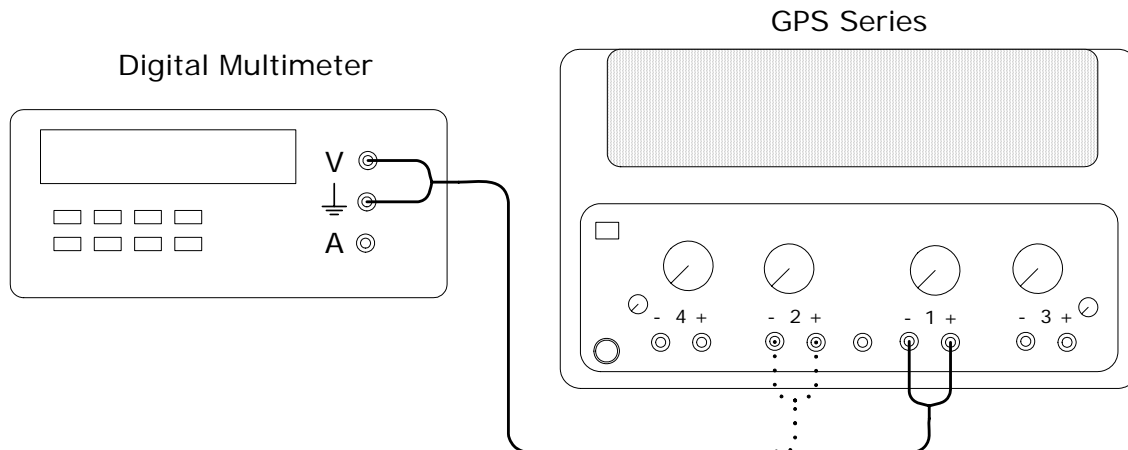
When out of range...

Refer to *Output Voltage* adjustment, page37.

Tracking Series Voltage Verification

Here we verify Tracking Series Minimum Voltage, Tracking Error, and Tracking Series Meter Accuracy.

Connection



Verification steps

1. Set the front panel according to *Default Settings*, page 7.
2. Connect the Multimeter to CH1 and turn ON the Output Switch.

Tracking Series Minimum Voltage

3. Turn up the Current Control to full and set the Tracking Switch to Series ■ ■.
4. Make sure the indicator shows C.V. (green) for both CH1 and CH2.
5. Turn up the Voltage control to 1.0V and record the Multimeter readout.
6. Switch the GPS connection to CH2, turn up the Current Control to full, and record the Multimeter readout.
7. Calculate the difference between the CH1 readout and record it as Tracking Series Minimum Voltage.

Tracking Error

8. Switch the GPS connection to CH1, turn up the Voltage Control to full, and record the Multimeter readout.

9. Make sure the indicator shows C.V. (green) for both CH1 and CH2.
10. Switch the GPS connection to CH2, turn up the Voltage Control to full, and record the Multimeter readout.
11. Calculate the difference between CH1 and record it as Tracking Error.

Tracking Series Meter Accuracy

12. Switch the GPS connection to CH1 and record the GPS readout. Turn OFF the Output Switch and record the GPS readout.
13. Calculate the difference between Output ON and OFF GPS readout and record it as CH1 Tracking Series Meter Accuracy.
14. Switch the GPS connection to CH2 and record the GPS readout. Turn ON the Output Switch and record the GPS readout.
15. Calculate the difference between Output ON and OFF GPS readout and record it as CH2 Tracking Series Meter Accuracy.

Acceptance range

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
	Minimum Voltage: $\pm 10\text{mV}$ Error: $\leq 0.5\%$ of CH1 + 10mV		Minimum Voltage: $\pm 10\text{mV}$ Error: $\leq 0.5\%$ of CH1 + 10mV	
CH1	Meter Accuracy: $\pm(0.5\% \text{ rdg} + 8\text{digits})$		Meter Accuracy: $\pm(0.5\% \text{ rdg} + 8\text{digits})$	N/A
CH2				

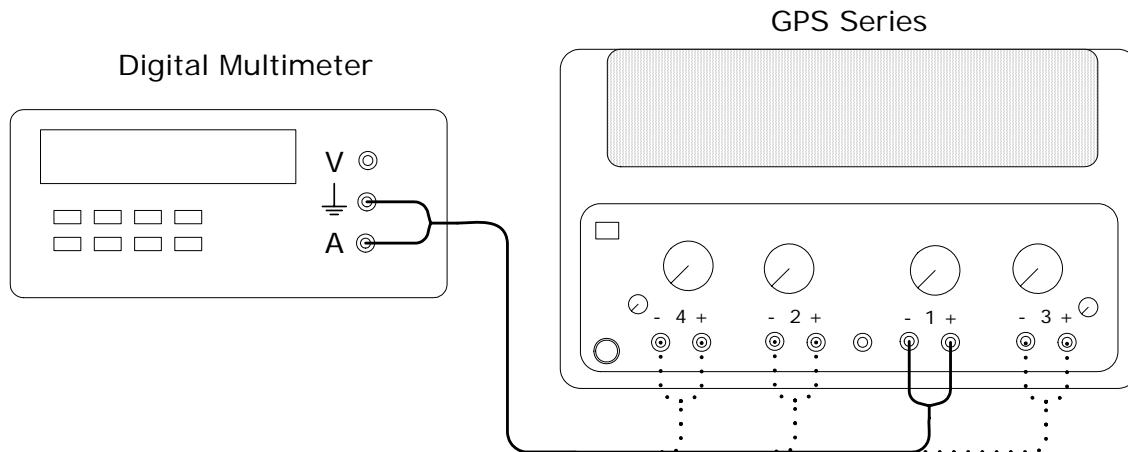
When out of range...

Refer to *Tracking Series Voltage* adjustment, page40.

Output Current Verification

Here we verify Minimum Output Current, Maximum Output Current, and Current Meter Accuracy.

Connection



Verification steps

1. Set the front panel according to *Default Settings*, page 7.
2. Connect the Multimeter to CH1 and turn ON the Output Switch.

Minimum Output Current

3. Turn up the Voltage Control to full.
4. (CH1, CH2 only) Make sure the indicator shows C.C. (red).
5. (CH1, CH2 only) Record the Multimeter readout as Minimum Output Current.

Maximum Output Current

6. (CH1, CH2 only) Turn up the Current Control to full.
7. (CH1, CH2 only) Make sure the indicator shows C.C. (red).
8. (CH3, CH4 only) Make sure the Overload indicator turns on.
9. Record the Multimeter readout as Maximum Output Current.

Out ON Meter Accuracy

10. Record the GPS readout. Calculate the difference between the previous Multimeter readout and record it as Out ON Meter Accuracy.

Out OFF Meter Accuracy

11. (CH1, CH2 only) Turn OFF the Output Switch.
12. (CH1, CH2 only) Record the GPS readout. Calculate the difference between the previous GPS readout (Output ON) and record it as Output OFF Meter Accuracy.
13. Switch the GPS connection to the next channel and turn ON the Output Switch.
14. Repeat step 3 to 13 for CH2, CH3, and CH4.

Acceptance range: Output Current

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	Min: < -30mA Max: 3A +2% ~ +10% (3.06~3.3)	Min: < -30mA Max: 0.5A +2%~ +10%(0.51~0.6)	Min: < -30mA Max: 3A +2% ~ +10% (3.06~3.3)	
CH2	Min: < -30mA Max: CH1 < CH2 < CH1+150mA		Min: < -30mA Max: CH1 < CH2 < CH1+150mA	
CH3	Min: N/A Max: 1.18A ~ 1.20A	Min: N/A Max: 2.8A ~ 2.9A	Min: N/A Max: 3.38A ~ 3.42A	
CH4	Min: N/A Max: 1.12A ~ 1.28A			

Acceptance range: Current Meter Accuracy

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	Out ON: $\pm(0.5\% \text{ rdg} + 2\text{digits})$ Out OFF: $\pm(0.5\% \text{ rdg} + 8\text{digits})$		Out ON: $\pm(0.5\% \text{ rdg} + 2\text{digits})$ Out OFF: $\pm(0.5\% \text{ rdg} + 8\text{digits})$	Out ON: $\pm(0.5\% \text{ rdg} + 2\text{digits})$
CH2				
CH3	N/A		N/A	
CH4				

When out of range...

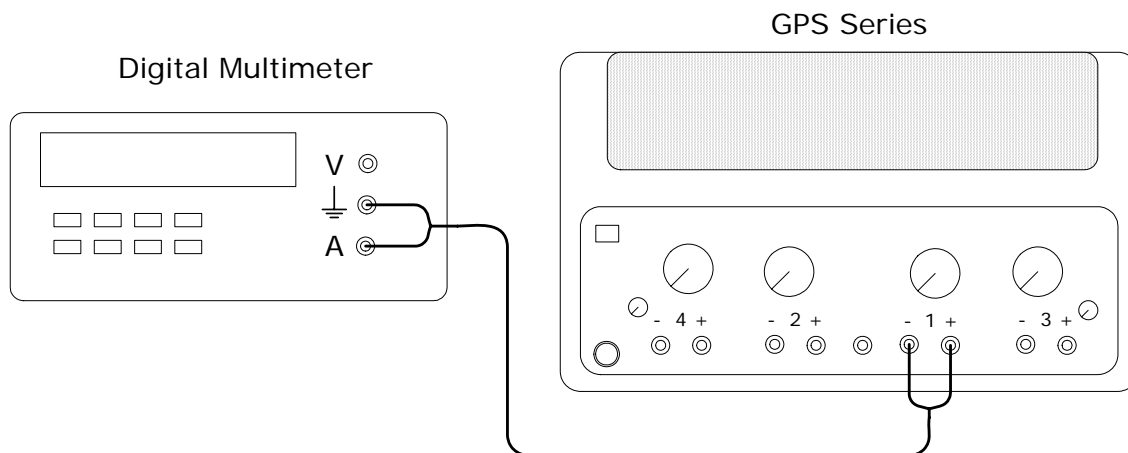
Refer to *Output Current* adjustment, page42.

Refer to *Overload Indicator* adjustment, page46.

Tracking Parallel Current Verification

Here we verify Tracking Parallel Maximum Current and Tracking Parallel Meter Accuracy.

Connection



Verification steps

1. Set the front panel according to *Default Settings*, page 7.
2. Connect the Multimeter to CH1 and turn ON the Output Switch.

Tracking Parallel Maximum Current

3. Turn up CH2 Voltage Control, CH2 Current Control, and CH1 Voltage Control to full.
4. Turn up CH1 Current Control to 3.000A by watching the Multimeter.
5. Set the Tracking Switch to Parallel ■ ■.
6. Record the Multimeter readout as Tracking Parallel Maximum Current.

Tracking Parallel Meter Accuracy

7. Record the GPS readout.
8. Turn OFF the Output Switch.
9. Record the GPS readout. Calculate the difference between the previous GPS readout (Output ON) and record it as Tracking Parallel Meter Accuracy.

Acceptance range: Output Current

GPS-4303	GPS-4251	GPS-3303	GPS-2303
Max: 6.000A		Max: 6.000A	

Acceptance range: Meter Accuracy

GPS-4303	GPS-4251	GPS-3303	GPS-2303
$\pm(0.5\% \text{ rdg} + 8\text{digits})$		$\pm(0.5\% \text{ rdg} + 8\text{digits})$	N/A

When out of range...

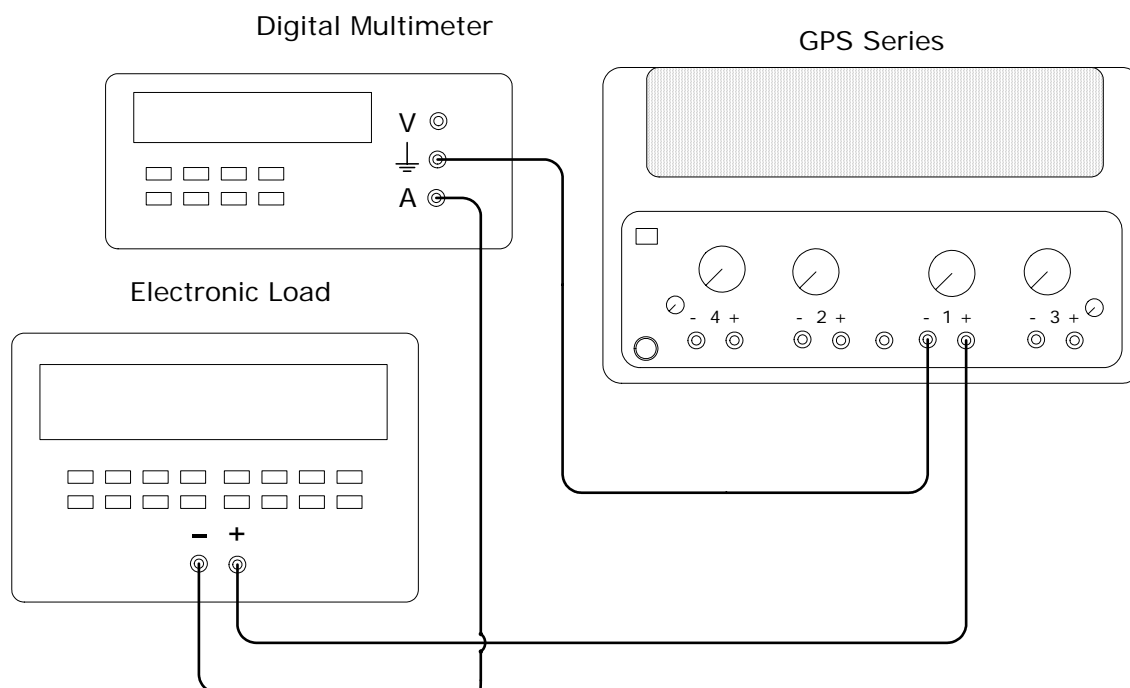
Refer to *Tracking Parallel Current* adjustment, page44.

Current Load Regulation Verification

Here we verify Current Load Regulation for Independent and Tracking Parallel mode.

Connection

Connect the Digital Multimeter in series with the Electronic Load and GPS.



Electronic Load settings

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	30V, 3A	25V, 0.5A	30V, 3A	
CH2	Tracking Parallel 30V, 6A	Tracking Parallel 25V, 1A	Tracking Parallel 30V, 6A	

Verification steps

1. Set the front panel according to *Default Settings*, page 7 and turn OFF the Electronic Load output.
2. Connect the Multimeter and Electronic Load to CH1 and turn ON the Output Switch.
3. Turn ON the Electronic Load output. Set the output value according to the table on the previous page.
4. Turn up the Voltage Control and Current Control to full.
5. (Tracking Parallel only) Set the Tracking Switch to Parallel ■ ■.
6. Record the Multimeter readout.
7. Short the Electronic Load output.
8. Record the Multimeter readout.
9. Calculate the difference between normal and shorted Load Multimeter readout and record as Current Load Regulation.
10. Set the Electronic Load output to normal (No short).
11. Switch the GPS connection to the next channel and turn ON the Output Switch.
12. Repeat step 3 to 11 for CH2 and Tracking Parallel (Connect to CH1).

Acceptance range

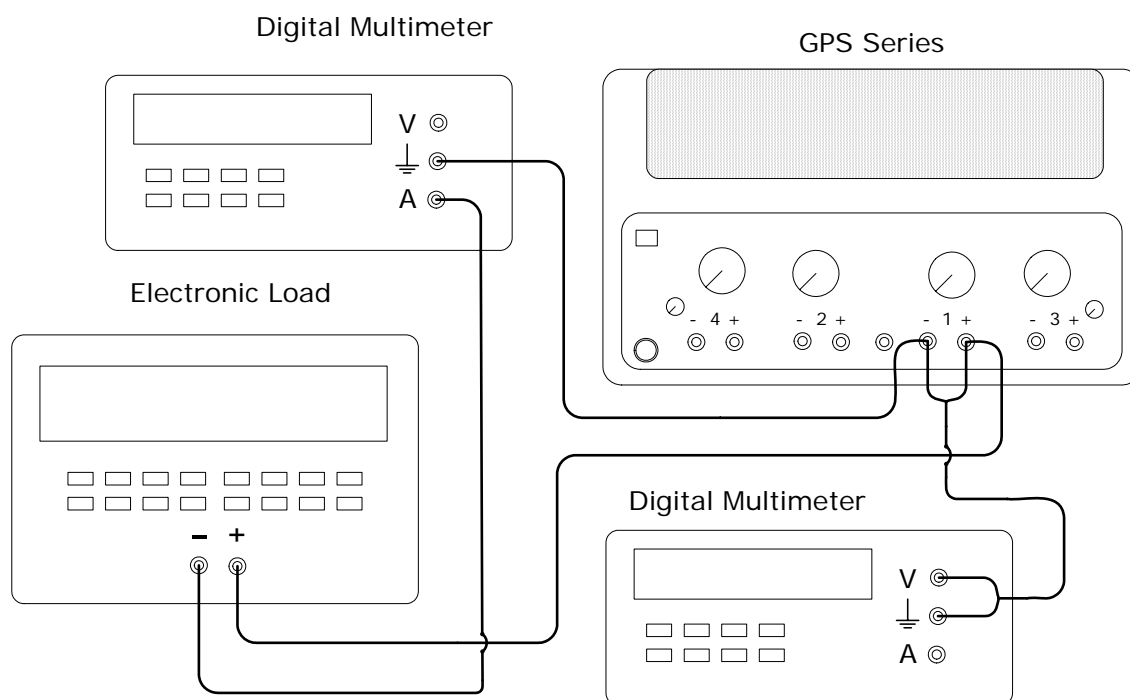
	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	$\leq 0.2\% + 3\text{mA}$ ($\leq 9\text{mA}$)	$\leq 0.2\% + 3\text{mA}$ ($\leq 4\text{mA}$)	$\leq 0.2\% + 3\text{mA}$ ($\leq 9\text{mA}$)	
CH2	Tracking Parallel $\leq 0.2\% + 5\text{mA}$ ($\leq 17\text{mA}$)	Tracking Parallel $\leq 0.2\% + 5\text{mA}$ ($\leq 7\text{mA}$)	Tracking Parallel $\leq 0.2\% + 5\text{mA}$ ($\leq 17\text{mA}$)	

Ripple Current Verification

Here we verify Ripple Current for Independent mode.

Connection

Connect the first Digital Multimeter in series with the Electronic Load and GPS. Connect the second Digital Multimeter in parallel to GPS.



Electronic Load settings

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	30V, 3A	25V, 0.5A	30V, 3A	
CH2				

Verification steps

1. Set the front panel according to *Default Settings*, page 7 and turn OFF the Electronic Load output.
2. Connect the Multimeter and Electronic Load to CH1 and turn ON the Output Switch.
3. Turn ON the Electronic Load output. Set the output value according to the table on the previous page
4. Change the Electronic Load to CR mode.
5. Decrease the Electronic Load value until the C.C. indicator turns on.
6. Record the first Multimeter readout (DC Current).
7. Record the second Multimeter readout (DC Voltage).
8. Calculate Load Resistance $R = (\text{DC Voltage}) / (\text{DC Current})$.
9. Switch the second Multimeter range to AC mV. Record the Multimeter readout.
10. Calculate the Ripple Current $I = (\text{AC mV}) / (\text{Load Resistance } R)$.
11. Switch the GPS connection to CH2 and turn ON the Output Switch.
12. Repeat step 3 to 11 for CH2.

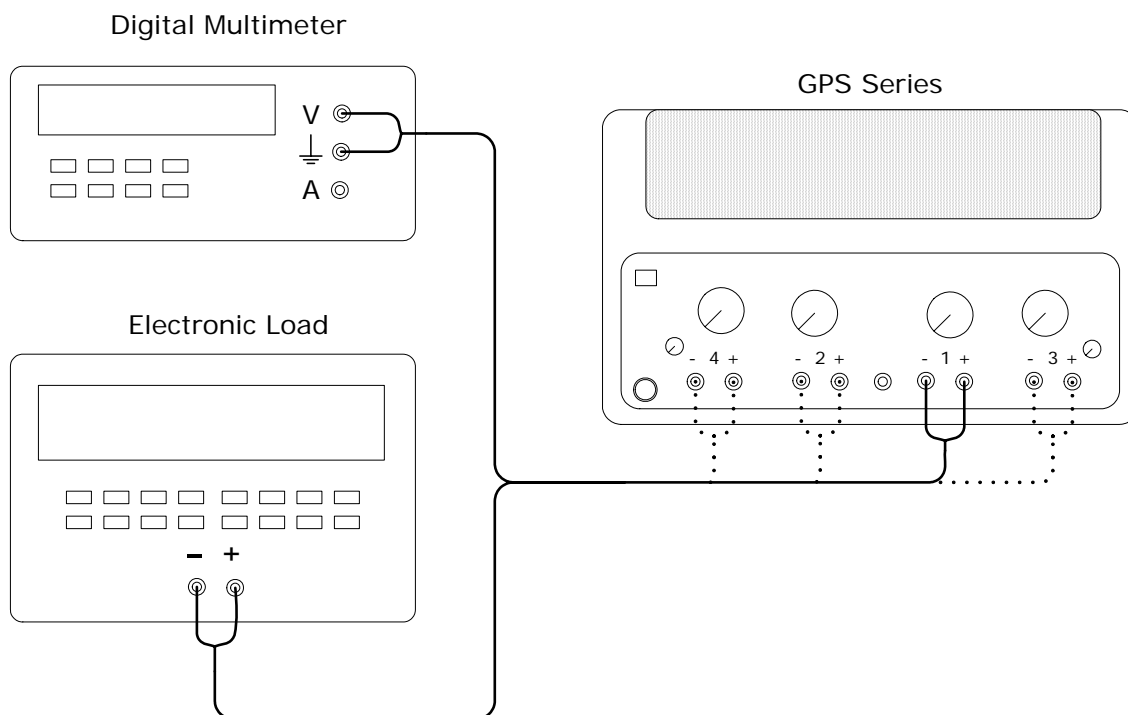
Acceptance range

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	$\leq 3\text{mA rms}$		$\leq 3\text{mA rms}$	
CH2				

Voltage Load Regulation Verification

Here we verify Voltage Load Regulation for Independent and Tracking Parallel mode.

Connection



Electronic Load settings

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	30V, 3A	25V, 0.5A	30V, 3A	
CH2				
CH3	5.2V, 1A	6V, 2.5A	5V, 3A	
CH4	15V, 1A			
	Tracking Parallel 30V, 6A	Tracking Parallel 25V, 1A	Tracking Parallel 30V, 6A	

Verification steps

1. Set the front panel according to *Default Settings*, page 7 and turn OFF the Electronic Load output.
2. Connect the Multimeter and Electronic Load to CH1 and turn ON the Output Switch.
3. Turn ON the Electronic Load output. Set the output value according to the table on the previous page.
4. Turn up the Voltage Control and Current Control to full.
5. (Tracking Parallel only) Set the Tracking Switch to Parallel ■ ■.
6. Record the Multimeter readout.
7. Turn OFF the Electronic Load output.
8. Record the Multimeter readout.
9. Calculate the difference between Load ON and OFF Multimeter readout and record as Voltage Load Regulation.
10. Switch the GPS connection to the next channel and turn ON the Output Switch.
11. Repeat step 3 to 10 for CH2, CH3, CH4, and Tracking Parallel (Connect to CH1).

Acceptance range: Load Regulation

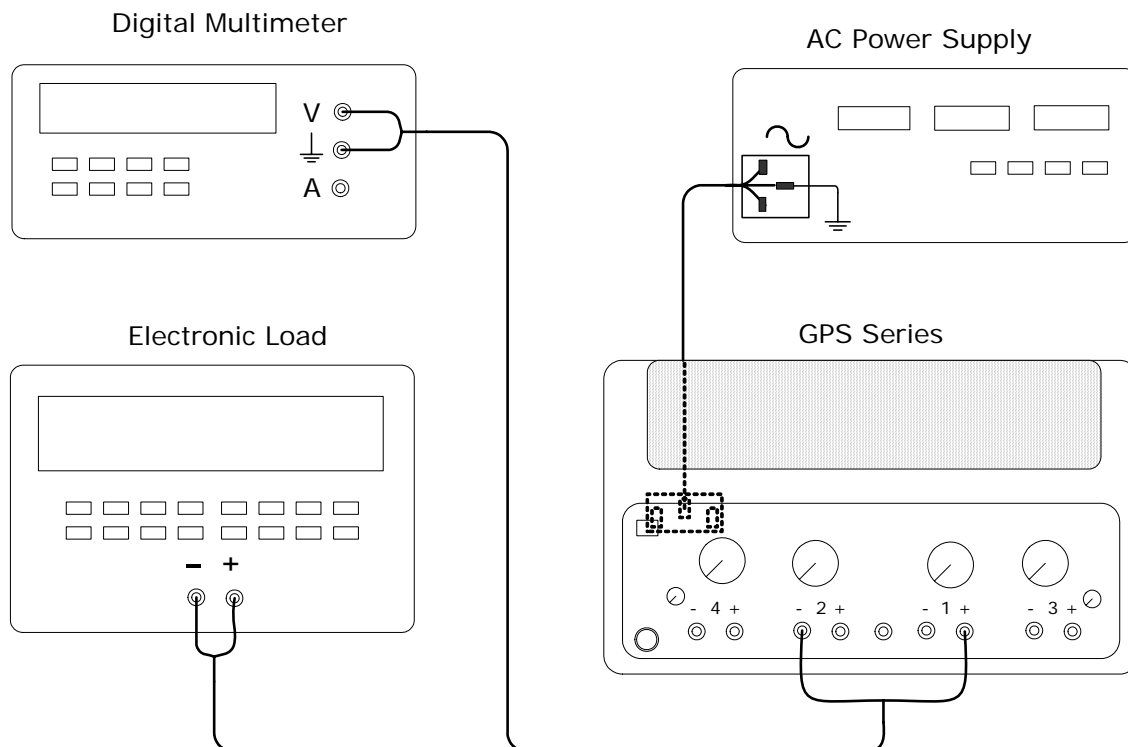
	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	≤ 0.01% +3mV (≤ 6mV)	≤ 0.01% +3mV (≤ 5.5mV)	≤ 0.01% +3mV (≤ 6mV)	
CH2				
CH3	≤ 15mV		≤ 15mV	
CH4	≤ 10mV			
	Tracking Parallel ≤ 0.01% +3mV (≤ 6mV)	Tracking Parallel ≤ 0.01% +3mV (≤ 5.5mV)	Tracking Parallel ≤ 0.01% +3mV (≤ 6mV)	

Tracking Series Load Regulation/ Ripple Verification

Here we verify Voltage Load Regulation and Ripple Voltage for Tracking Series mode.

Connection

Connect the positive side to CH1 + and the negative side to CH2 -.



Electronic Load settings

GPS-4303	GPS-4251	GPS-3303	GPS-2303
60V, 3A	50V, 0.5A	60V, 3A	

Verification steps

1. Set the front panel according to *Default Settings*, page 7 and turn OFF the Electronic Load output.
2. Connect the Multimeter and Electronic Load as shown in the previous page and turn ON the Output Switch.
3. Turn up CH1 Voltage Control and Current Control to full.
4. Turn up CH2 Voltage Control and Current Control to full.
5. Set the Tracking Switch to Series ■ ■.

Tracking Series Voltage Load Regulation

6. Record the Multimeter readout.
7. Turn ON the Electronic Load output. Set the output value according to the table on the previous page.
8. Record the Multimeter readout.
9. Calculate the difference between Load ON and OFF Multimeter readout and record as Tracking Series Load Regulation.

Tracking Series Ripple Voltage

10. Check the AC Selector on the rear panel for Power Supply Voltage Rating. Set AC Power to Rating value -10% , 50Hz. (for 230V, -6% , 50Hz).
11. Record the Multimeter readout (AC Voltage) as Ripple Voltage.
12. Repeat step 11 for AC Power -10% , 60Hz (for 230V, -6% , 50Hz) / $+10\%$, 50Hz / $+10\%$, 60Hz.
13. Pick up the largest value of the four as Tracking Series Ripple Voltage.

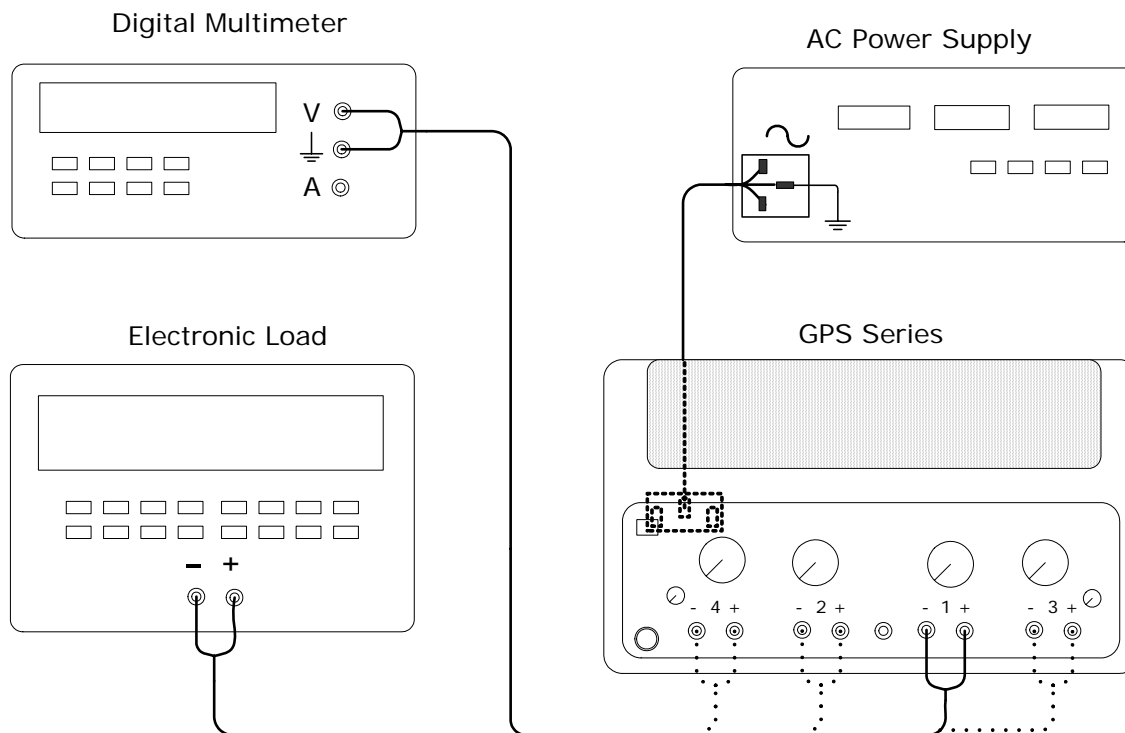
Acceptance range

GPS-4303	GPS-4251	GPS-3303	GPS-2303
Tracking Series Load Regulation $\leq 0.01\% + 3\text{mV}$ $(\leq 9\text{mV})$ Tracking Series Ripple Voltage $\leq 2\text{mVrms}$	Tracking Series Load Regulation $\leq 0.01\% + 3\text{mV}$ $(\leq 8\text{mV})$ Tracking Series Ripple Voltage $\leq 2\text{mVrms}$	Tracking Series Load Regulation $\leq 0.01\% + 3\text{mV}$ ($\leq 9\text{mV}$) Tracking Series Ripple Voltage $\leq 2\text{mVrms}$	

Ripple Voltage Verification

Here we verify Ripple Voltage for Independent and Tracking Parallel mode.

Connection



Electronic Load settings

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	30V, 3A	25V, 0.5A	30V, 3A	
CH2				
CH3	5.2V, 1A	6V, 2.5A	5V, 3A	
CH4	15V, 1A			
	Tracking Parallel 30V, 6A	Tracking Parallel 25V, 1A	Tracking Parallel 30V, 6A	

Verification steps

1. Set the front panel according to *Default Settings*, page 7 and turn OFF the Electronic Load output.
2. Connect the Multimeter and Electronic Load to CH1 and turn ON the Output Switch.
3. Turn up Voltage Control and Current Control to full.
4. (Tracking Parallel only) Set the Tracking Switch to Parallel ■ ■.
5. Turn ON the Electronic Load output. Set the output value according to the table on the previous page.
6. Check the AC Selector on the rear panel for Power Supply Voltage Rating. Set AC Power to Rating value -10%, 50Hz. (for 230V, -6%, 50Hz).
7. Record the Multimeter readout (AC Voltage) as Ripple Voltage.
8. Repeat step 7 for AC Power -10%, 60Hz (for 230V, -6%, 50Hz) / +10%, 50Hz / +10%, 60Hz.
9. Pick up the largest value of the four as Ripple Voltage.
10. Switch the GPS connection to the next channel and turn ON the Output Switch.
11. Repeat step 3 to 10 for CH2, CH3, CH4, and Tracking Parallel (Connect to CH1).

Acceptance range

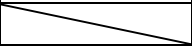
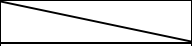
	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	$\leq 1\text{mVrms}$		$\leq 1\text{mVrms}$	
CH2				
CH3	$\leq 2\text{mVrms}$		$\leq 2\text{mVrms}$	
CH4				
	Tracking Parallel $\leq 2\text{mVrms}$		Tracking Parallel $\leq 2\text{mVrms}$	

Recording Tables

☐ GPS-4303 ☐ GPS-4251 ☐ GPS-3303 ☐ GPS-2303

Minimum Output Voltage	CH	C.V.	Multimeter		Pass/ Fail	Note
	1	<input type="checkbox"/> ON <input type="checkbox"/> OFF	mV		<input type="checkbox"/> P <input type="checkbox"/> F	
	2	<input type="checkbox"/> ON <input type="checkbox"/> OFF	mV		<input type="checkbox"/> P <input type="checkbox"/> F	
	3		V		<input type="checkbox"/> P <input type="checkbox"/> F	
	4		V		<input type="checkbox"/> P <input type="checkbox"/> F	
Maximum Output Voltage	CH	C.V.	Multimeter		Pass/ Fail	Note
	1	<input type="checkbox"/> ON <input type="checkbox"/> OFF	V		<input type="checkbox"/> P <input type="checkbox"/> F	
	2	<input type="checkbox"/> ON <input type="checkbox"/> OFF	(CH1 + 0.2V = V)		<input type="checkbox"/> P <input type="checkbox"/> F	
	3		V		<input type="checkbox"/> P <input type="checkbox"/> F	
	4		V		<input type="checkbox"/> P <input type="checkbox"/> F	
Out ON Voltage Meter Accuracy	CH	Multimeter Out ON	GPS Out ON	Multimeter – GPS	0.5% rdg + 2 digits	Pass/ Fail
	1	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	2	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	3	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	4	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
Out OFF Voltage Meter Accuracy	CH	GPS Out ON	GPS Out OFF	GPS Out ON – OFF	0.5% rdg + 8 digits	Pass/ Fail
	1	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	2	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	3	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	4	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
Tracking Series Minimum Voltage	CH	C.V.	Multimeter	CH2 – CH1	Pass/ Fail	Note
	1	<input type="checkbox"/> ON <input type="checkbox"/> OFF	V	mV	<input type="checkbox"/> P <input type="checkbox"/> F	
	2	<input type="checkbox"/> ON <input type="checkbox"/> OFF	V			
Tracking Series Error	CH	C.V.	Multimeter	CH2 – CH1	10mV + 0.5%(CH1)	Pass/ Fail
	1	<input type="checkbox"/> ON <input type="checkbox"/> OFF	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	2	<input type="checkbox"/> ON <input type="checkbox"/> OFF	V			
Tracking Series Meter Accuracy	CH	GPS Out OFF	GPS Out ON	GPS Out ON – OFF	0.5% rdg + 8 digits	Pass/ Fail
	1	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	2	V	V	mV	mV	<input type="checkbox"/> P <input type="checkbox"/> F

Recording Tables cont.

Minimum Output Current	CH	C.C.	Multimeter		Pass/ Fail	Note
	1	<input type="checkbox"/> ON <input type="checkbox"/> OFF	mA		<input type="checkbox"/> P <input type="checkbox"/> F	
	2	<input type="checkbox"/> ON <input type="checkbox"/> OFF	mA		<input type="checkbox"/> P <input type="checkbox"/> F	
Maximum Output Current	CH	C.C.	Overload	Multimeter	Pass/ Fail	Note
	1	<input type="checkbox"/> ON <input type="checkbox"/> OFF		A	<input type="checkbox"/> P <input type="checkbox"/> F	
	2	<input type="checkbox"/> ON <input type="checkbox"/> OFF		A	<input type="checkbox"/> P <input type="checkbox"/> F	
	3		<input type="checkbox"/> ON <input type="checkbox"/> OFF	A	<input type="checkbox"/> P <input type="checkbox"/> F	
	4		<input type="checkbox"/> ON <input type="checkbox"/> OFF	A	<input type="checkbox"/> P <input type="checkbox"/> F	
Out ON Current Meter Accuracy	CH	Multimeter	GPS	Multimeter – GPS	0.5% rdg + 2 digits	Pass/ Fail
	1	A	A	mA	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	2	A	A	mA	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	3	A	A	mA	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	4	A	A	mA	mV	<input type="checkbox"/> P <input type="checkbox"/> F
Out OFF Current Meter Accuracy	CH	GPS Out ON	GPS Out OFF	GPS Out ON – OFF	0.5% rdg + 8 digits	Pass/ Fail
	1	A	A	mA	mV	<input type="checkbox"/> P <input type="checkbox"/> F
	2	A	A	mA	mV	<input type="checkbox"/> P <input type="checkbox"/> F
Tracking Parallel Maximum Current	CH	Multimeter Independent	Multimeter Parallel		Pass/ Fail	Note
	1	A	A		<input type="checkbox"/> P <input type="checkbox"/> F	
Tracking Parallel Meter Accuracy	CH	GPS Out ON	GPS Out OFF	GPS Out ON – OFF	0.5% rdg + 8 digits	Pass/ Fail
	1	A	A	mA	mV	<input type="checkbox"/> P <input type="checkbox"/> F
Current Load Regulation	CH	Load ON	Load short	Load ON – short	Pass/ Fail	Note
	1	A	A	mA	<input type="checkbox"/> P <input type="checkbox"/> F	
	2	A	A	mA	<input type="checkbox"/> P <input type="checkbox"/> F	
Tracking Parallel Current Load Regulation	CH	Load ON	Load short	Load ON – short	Pass/ Fail	Note
	1	A	A	mA	<input type="checkbox"/> P <input type="checkbox"/> F	
Ripple Current Regulation CH1 <input type="checkbox"/> P <input type="checkbox"/> F CH2 <input type="checkbox"/> P <input type="checkbox"/> F	CH	DC Current	DC Voltage	Load Resistance	AC Voltage	Ripple Current
	1	A	V	Ω	mV	mA
	2	A	V	Ω	mV	mA
Voltage Load Regulation	CH	Load ON	Load OFF	Load ON – OFF	Pass/ Fail	Note
	1	V	V	mV	<input type="checkbox"/> P <input type="checkbox"/> F	
	2	V	V	mV	<input type="checkbox"/> P <input type="checkbox"/> F	
	3	V	V	mV	<input type="checkbox"/> P <input type="checkbox"/> F	
	4	V	V	mV	<input type="checkbox"/> P <input type="checkbox"/> F	

Recording Tables cont.

Tracking Parallel Voltage Load Regulation	CH	Load ON	Load OFF	Load ON – OFF	Pass/Fail	Note
	1	V	V	mV	<input type="checkbox"/> P <input type="checkbox"/> F	
Tracking Series Voltage Load Regulation	CH	Load OFF	Load ON	Load ON – OFF	Pass/Fail	Note
	1 2	V	V	mV	<input type="checkbox"/> P <input type="checkbox"/> F	
Tracking Series Ripple Voltage	CH	AC Power	Multimeter	Largest	Pass/ Fail	Note
	1 2	-10/6%,50Hz	mV	<input type="checkbox"/>	<input type="checkbox"/> P <input type="checkbox"/> F	
		+10%, 50Hz	mV	<input type="checkbox"/>		
		-10/6%,60Hz	mV	<input type="checkbox"/>		
		+10%, 60Hz	mV	<input type="checkbox"/>		
Ripple Voltage	CH	AC Power	Multimeter	Largest	Pass/ Fail	Note
	1	-10/6%,50Hz	mV	<input type="checkbox"/>	<input type="checkbox"/> P <input type="checkbox"/> F	
		+10%, 50Hz	mV	<input type="checkbox"/>		
		-10/6%,60Hz	mV	<input type="checkbox"/>		
		+10%, 60Hz	mV	<input type="checkbox"/>		
Ripple Voltage	CH	AC Power	Multimeter	Largest	Pass/ Fail	Note
	2	-10/6%,50Hz	mV	<input type="checkbox"/>	<input type="checkbox"/> P <input type="checkbox"/> F	
		+10%, 50Hz	mV	<input type="checkbox"/>		
		-10/6%,60Hz	mV	<input type="checkbox"/>		
		+10%, 60Hz	mV	<input type="checkbox"/>		
Ripple Voltage	CH	AC Power	Multimeter	Largest	Pass/ Fail	Note
	3	-10/6%,50Hz	mV	<input type="checkbox"/>	<input type="checkbox"/> P <input type="checkbox"/> F	
		+10%, 50Hz	mV	<input type="checkbox"/>		
		-10/6%,60Hz	mV	<input type="checkbox"/>		
		+10%, 60Hz	mV	<input type="checkbox"/>		
Ripple Voltage	CH	AC Power	Multimeter	Largest	Pass/ Fail	Note
	4	-10/6%,50Hz	mV	<input type="checkbox"/>	<input type="checkbox"/> P <input type="checkbox"/> F	
		+10%, 50Hz	mV	<input type="checkbox"/>		
		-10/6%,60Hz	mV	<input type="checkbox"/>		
		+10%, 60Hz	mV	<input type="checkbox"/>		
Tracking Parallel Ripple Voltage	CH	AC Power	Multimeter	Largest	Pass/ Fail	Note
	1	-10/6%,50Hz	mV	<input type="checkbox"/>	<input type="checkbox"/> P <input type="checkbox"/> F	
		+10%, 50Hz	mV	<input type="checkbox"/>		
		-10/6%,60Hz	mV	<input type="checkbox"/>		
		+10%, 60Hz	mV	<input type="checkbox"/>		

Adjustment

Overall Procedure

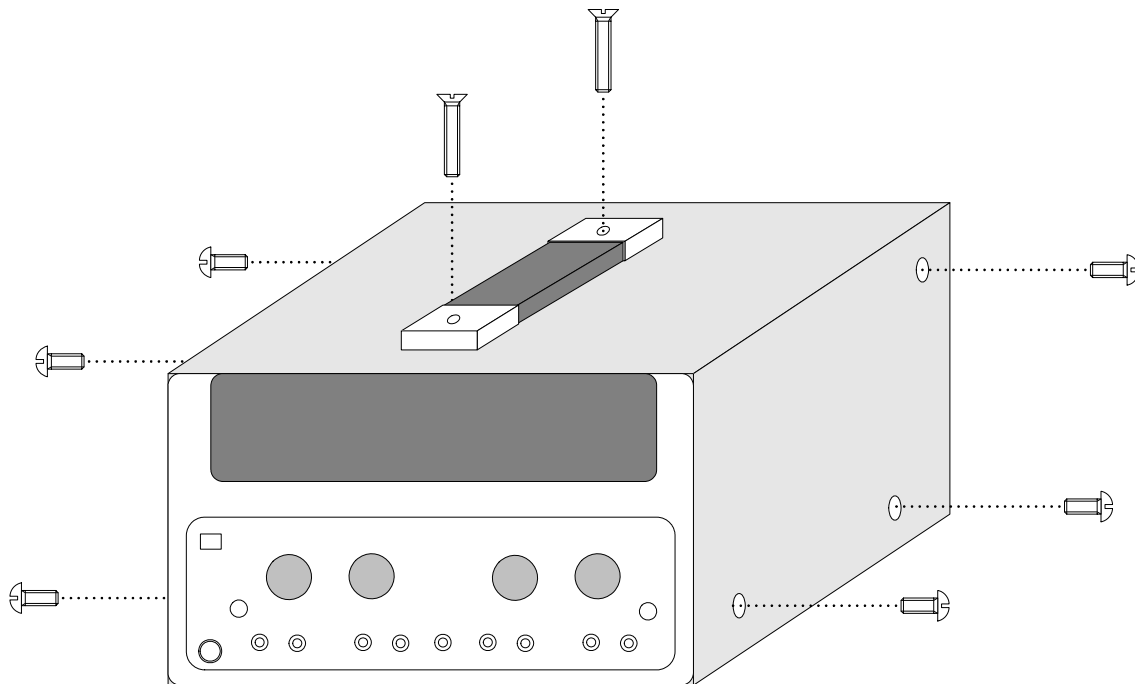
1. Prepare the Equipment according to the following table.
2. Open the Case according to the diagram on page32.
3. Set the front panel according to *Default Settings*, page7.
4. Connect the Multimeter to GPS CH1 and turn ON the Output Switch.
5. Adjust the specifications according to your needs (page34 to 46). The adjustment points are shown in the diagram: page33 (GPS-4303), page34 (GPS-4251), page35 (GPS-3303), page36 (GPS-2303).
6. When the adjustment is completed, run the Performance Verification again to verify the result (page9).

Adjustment Equipment

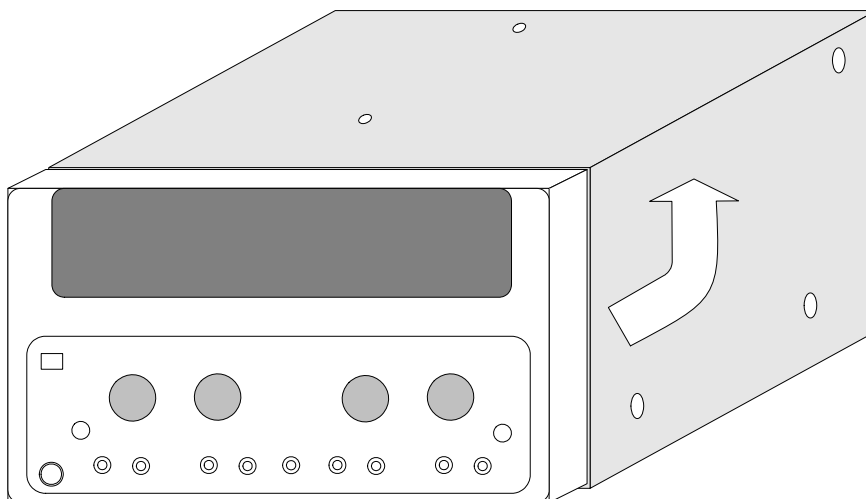
Equipment	Required Specification	Used in	Recommended Model
Digital Multimeter	<ul style="list-style-type: none"> AC & DC Voltage Accuracy: $< \pm 0.1\%$ DC Current Range: $\geq 6A$ DC Current Accuracy: $< \pm 0.1\%$ 	All items	<ul style="list-style-type: none"> GDM-8245 GDM-8246
Electronic Load	<ul style="list-style-type: none"> DC Voltage Range: $\geq 60V$ Current Range: $\geq 6A$ 	<ul style="list-style-type: none"> Overload Indicator 	<ul style="list-style-type: none"> Agilent N3305A
GPS – Multimeter cable	<ul style="list-style-type: none"> Voltage rating: $> 60V$ Current rating: $> 6A$ 	All items	---
GPS – Electronic Load cable	<ul style="list-style-type: none"> Voltage rating: $> 60V$ Current rating: $> 6A$ 	<ul style="list-style-type: none"> Overload Indicator 	---
Flathead Screw Driver Small	<ul style="list-style-type: none"> 1.5mm For adjustment 	All items	---
Phillips Screw Driver Small	<ul style="list-style-type: none"> 2mm For adjustment 	All items	---
Phillips Screw Driver Large	<ul style="list-style-type: none"> 3mm/ 4mm For opening the case 	All items	---

Opening the Case

1. Take off six screws, 3x6mm, on the side panels.
2. Take off two screws, 4x12mm, holding the belt on the top panel.

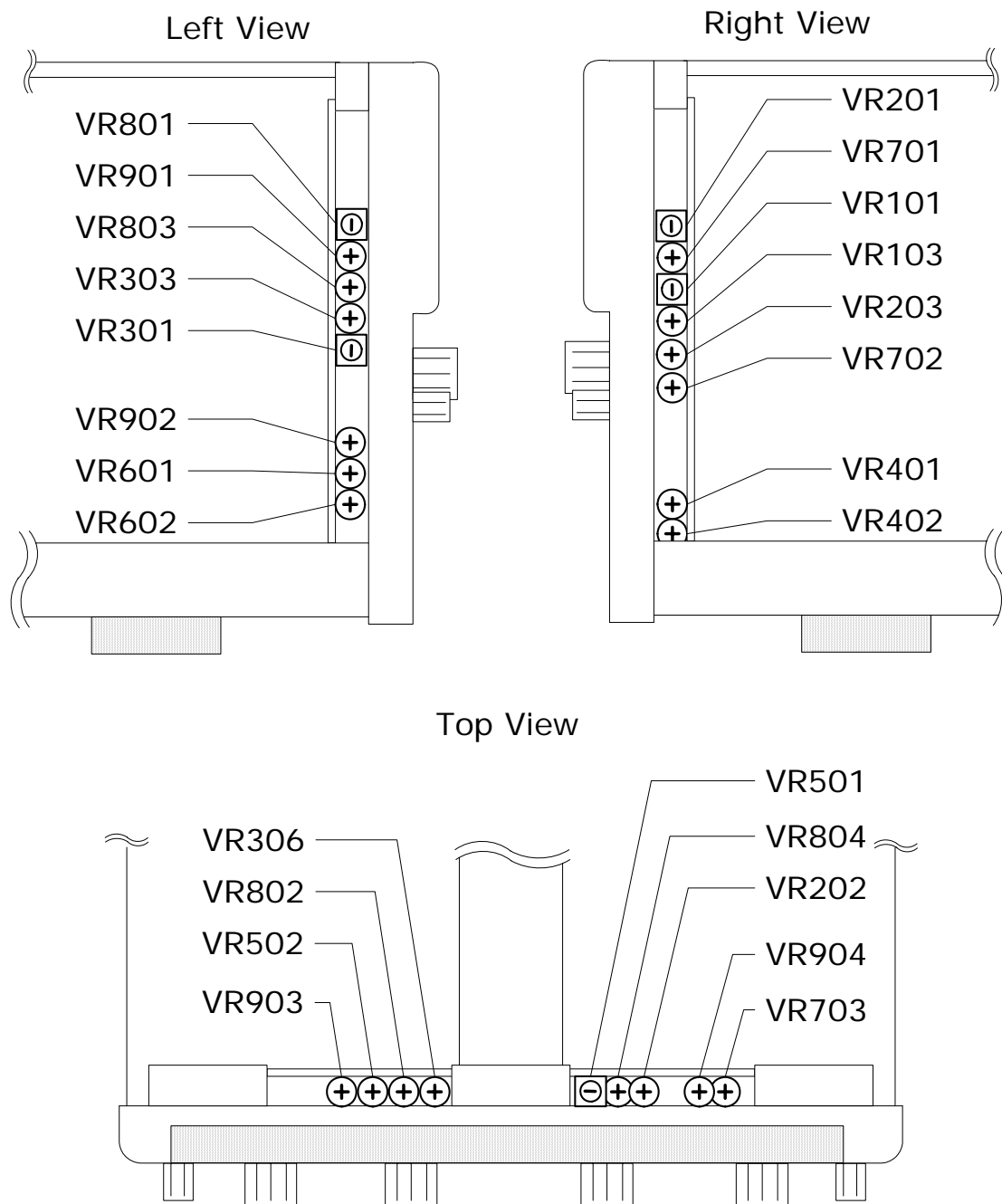


3. Hold the case, slide it behind, and pull it off upward.

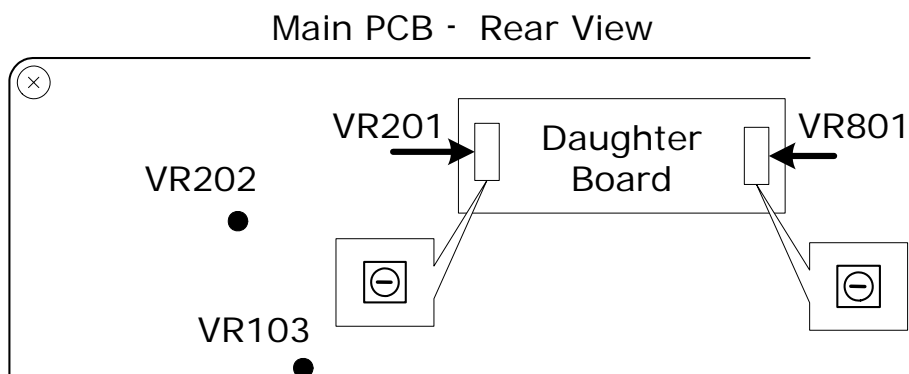
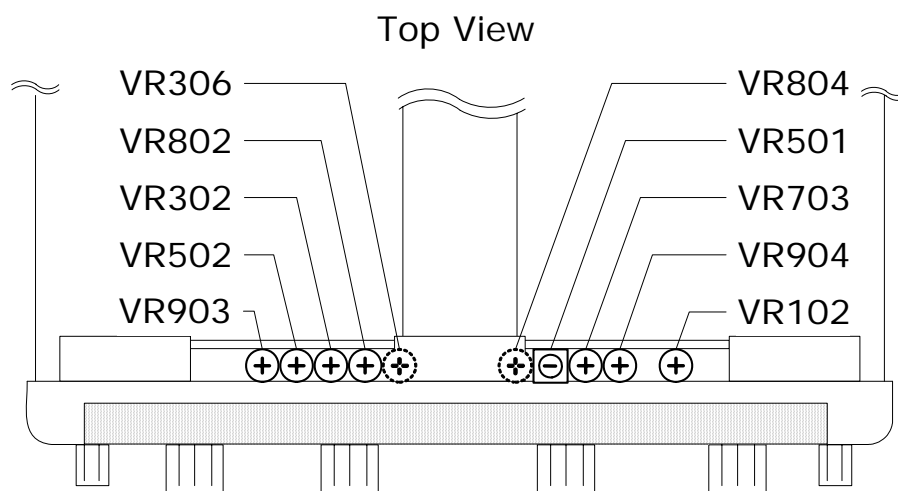
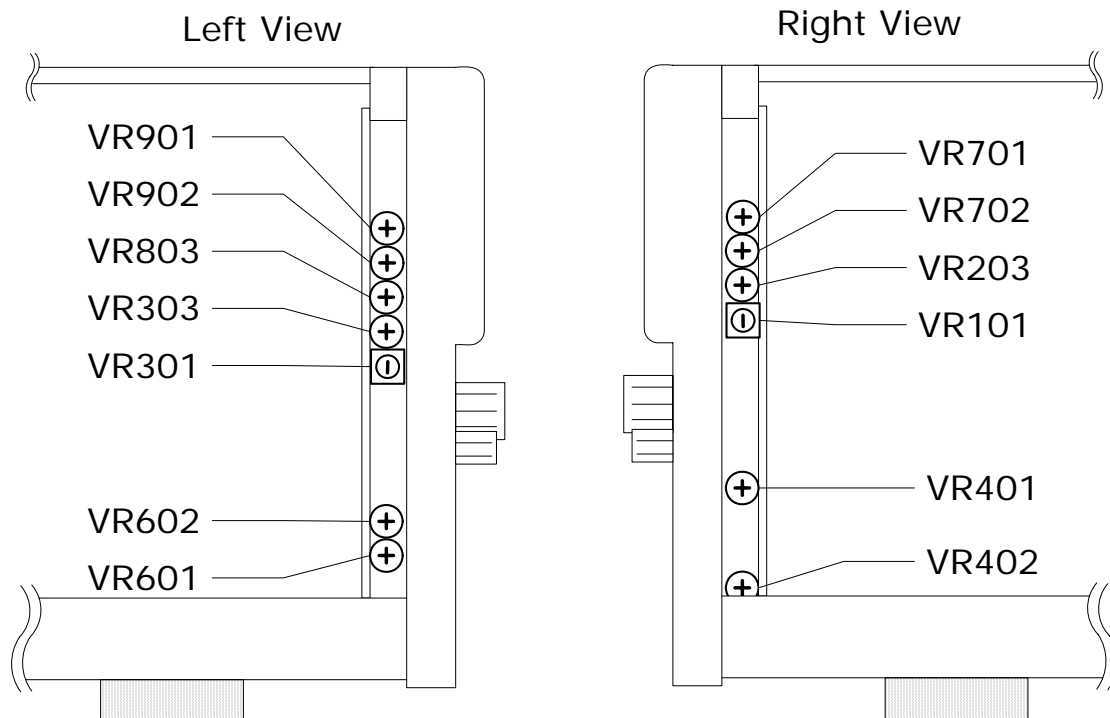


Adjustment Point

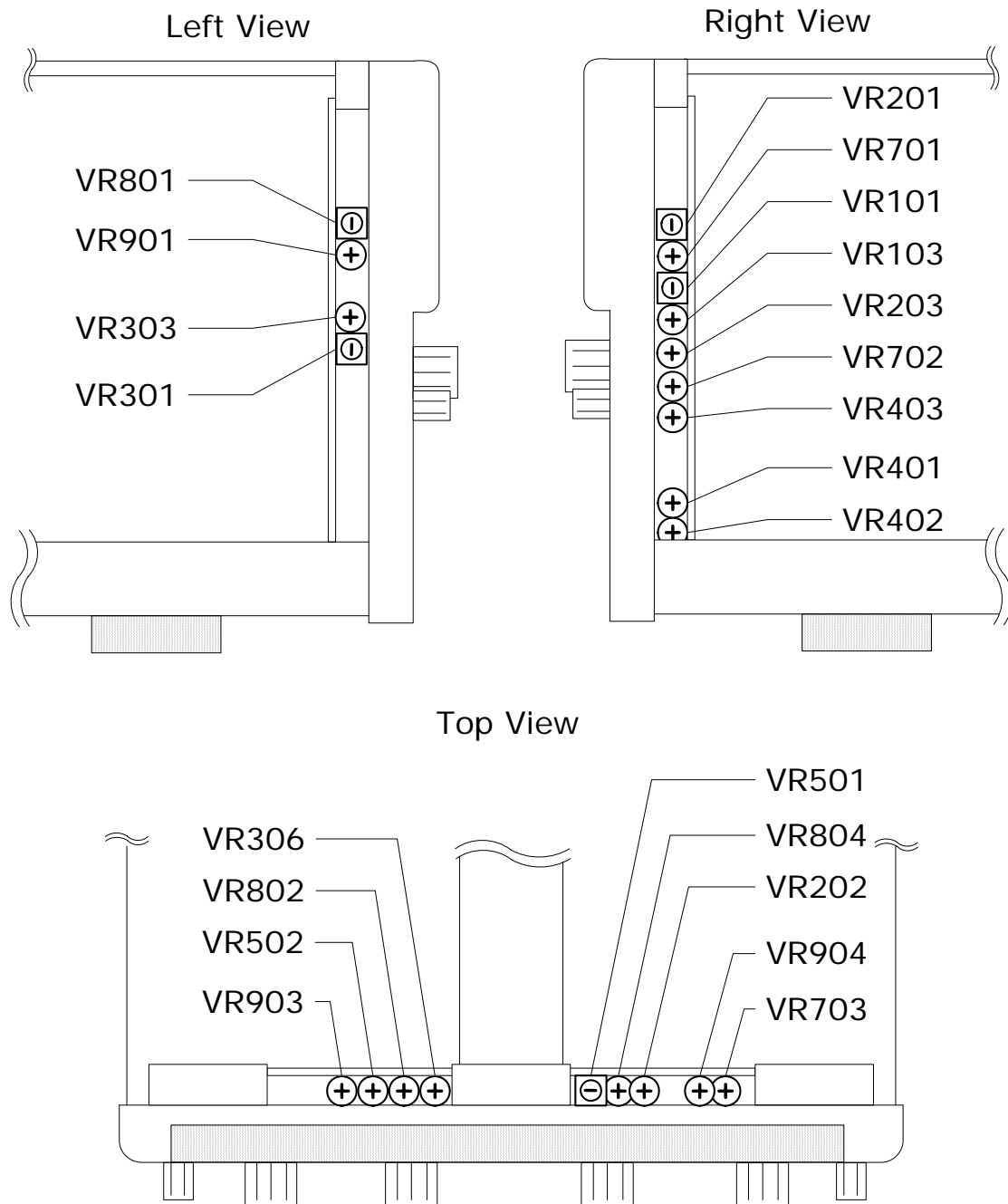
GPS-4303



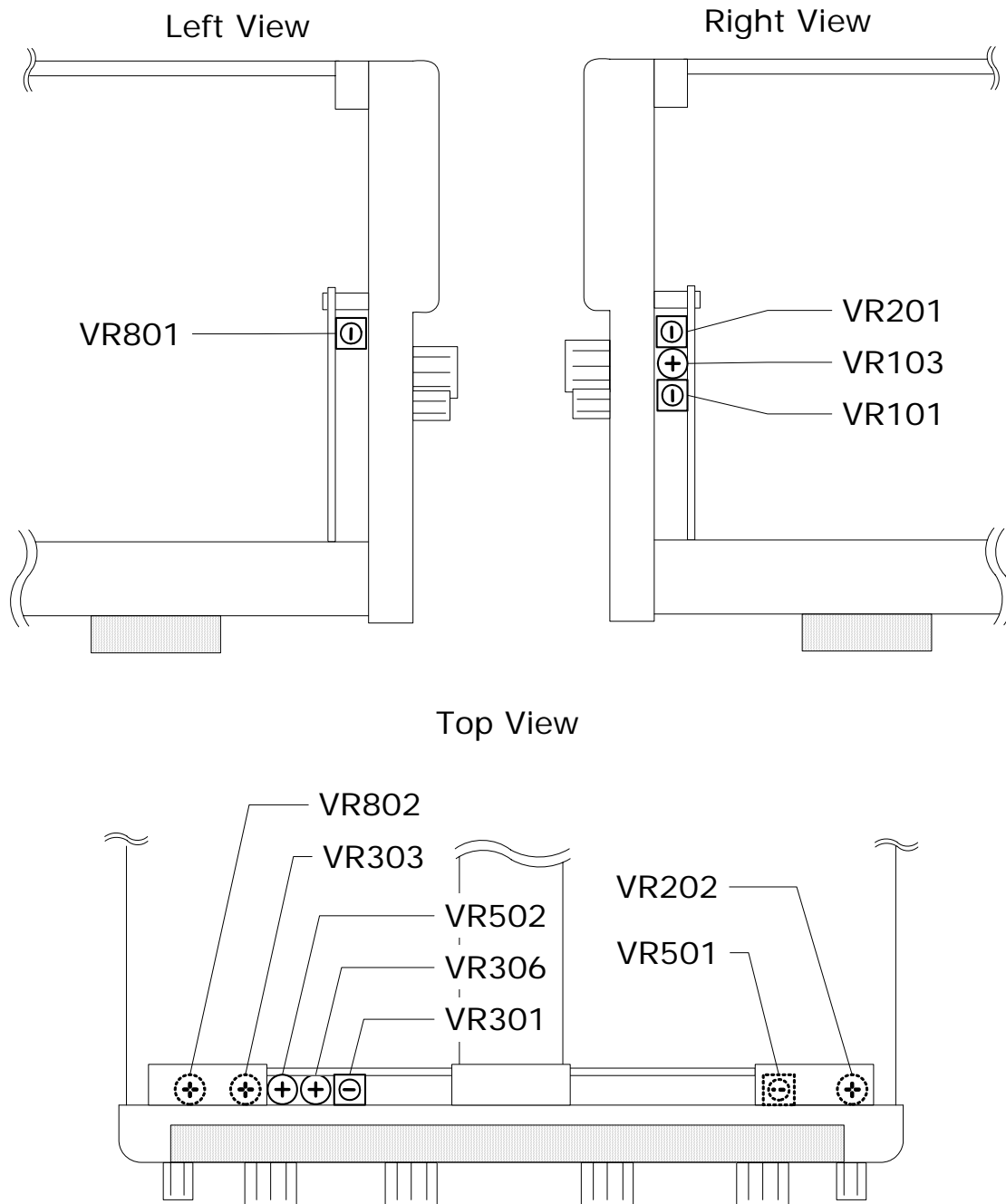
GPS-4251



GPS-3303



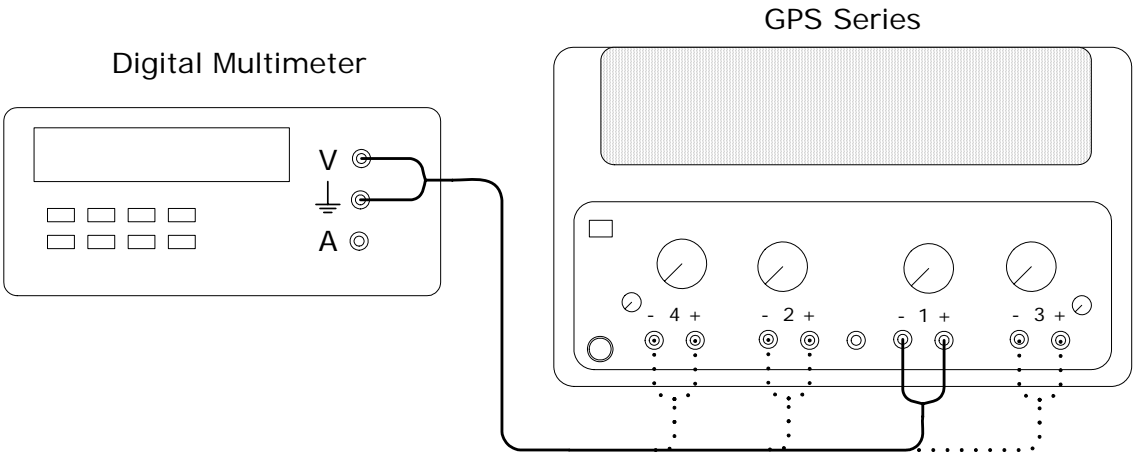
GPS-2303



Output Voltage Adjustment

Here we adjust Minimum Output Voltage, Maximum Output Voltage, Out ON Voltage Meter Accuracy, and Out OFF Voltage Meter Accuracy.

Connection



Minimum Output Voltage Adjustment (GPS-4251 only)

- 1. Set the front panel according to *Default Settings*, page7, and connect the Multimeter to CH1. Turn on the Output.
- 2. Turn up the Current Control to full.
- 3. Adjust the Multimeter readout. The following table shows the adjustment point and range.
- 4. Switch the connection to CH2 and repeat step 2 and 3.

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	N/A	VR102 < -30mV	N/A	
CH2		VR302 < -30mV	N/A	
CH3	N/A		N/A	
CH4				

Maximum Output Voltage Adjustment

1. Set the front panel according to *Default Settings*, page7, and connect the Multimeter to CH1. Turn on the Output.
2. Turn up the Current Control and Voltage Control to full.
3. Adjust the Multimeter readout. The following table shows the adjustment point and range.
4. Switch the connection to CH2. Repeat step 2 and 3 for CH2 and CH3 (GPS-3303 only).

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	VR101 30V +3% ~ +8% (30.9 ~ 32.4)	VR101 25V +3% ~ +8% (25.75 ~ 27)	VR101 30V +3% ~ +8% (30.9 ~ 32.4)	
CH2	VR301 > CH1 +0.2V		VR301 > CH1 +0.2V	
CH3	N/A		VR403 5V ±8% (4.6 ~ 5.4)	
CH4				

Out ON Voltage Meter Accuracy Adjustment

1. Set the front panel according to *Default Settings*, page7, and connect the Multimeter to CH1. Turn on the Output.
2. Turn up the Current Control and Voltage Control to full.
3. Adjust the difference between Multimeter and GPS readout. The following table shows the adjustment point and range.
4. Switch the connection to CH2 and repeat step 2 and 3.

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	VR201 ±(0.5% rdg + 2digits)		VR201 ±(0.5% rdg + 2digits)	
CH2	VR801 ±(0.5% rdg + 2digits)		VR801 ±(0.5% rdg + 2digits)	
CH3	N/A		N/A	
CH4				

Out OFF Voltage Meter Accuracy Adjustment

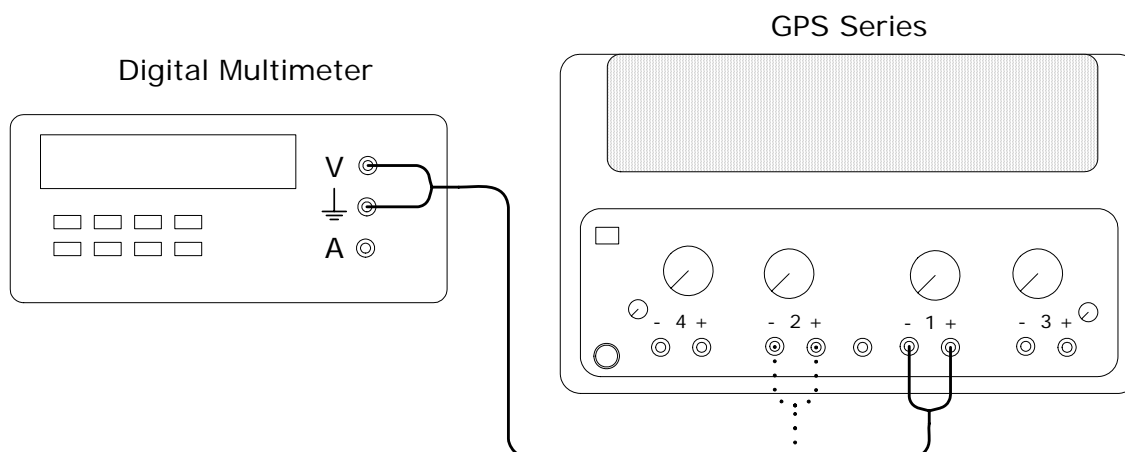
1. Set the front panel according to *Default Settings*, page 7, and connect the Multimeter to CH1. Turn ON the Output.
2. Turn up the Current Control and Voltage Control to full.
3. Check the GPS readout. Turn OFF the Output and adjust the difference between Out ON and OFF GPS readout. The following table shows the adjustment point and range.
4. Switch the connection to CH2. Repeat step 2 and 3 for CH2, CH3, and CH4.

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	<div>VR202</div> <div>$\pm(0.5\% \text{ rdg} + 8\text{digits})$</div>		<div>VR202</div> <div>$\pm(0.5\% \text{ rdg} + 8\text{digits})$</div>	N/A
CH2				
CH3	<div>VR203</div> <div>$\pm(0.5\% \text{ rdg} + 8\text{digits})$</div>		N/A	
CH4	<div>VR803</div> <div>$\pm(0.5\% \text{ rdg} + 8\text{digits})$</div>			

Tracking Series Voltage Adjustment

Here we adjust Tracking Series Minimum Voltage, Tracking Series Error, and Tracking Series Meter Accuracy.

Connection





Tracking Series Minimum Voltage Adjustment

1. Set the front panel according to *Default Settings*, page 7, and connect the Multimeter to CH1. Turn on the Output.
2. Turn up the Current Control to full and set the Tracking Switch to Series **■ ■**. Turn up the Voltage Control to 1.0V.
3. Check the Multimeter readout. Switch the connection to CH2 and adjust the difference between CH1 and CH2 Multimeter readout. The following table shows the adjustment point and range.



GPS-4303	GPS-4251	GPS-3303	GPS-2303
VR306 ±10mV		VR306 ±10mV	

Tracking Series Error Adjustment

1. Set the front panel according to *Default Settings*, page 7, and connect the Multimeter to CH1. Turn on the Output.
2. Turn up CH1 Current Control and Voltage Control to full. Turn up CH2 Current Control and Voltage Control to full.
3. Set the Tracking Switch to Series.   and check the Multimeter readout.
4. Switch the connection to CH2 and adjust the difference between CH1 and CH2 Multimeter readout. The following table shows the adjustment point and range.

GPS-4303	GPS-4251	GPS-3303	GPS-2303
VR501 $\leq 0.5\%$ of CH1 + 10mV		VR501 $\leq 0.5\%$ of CH1 + 10mV	

Tracking Series Meter Accuracy Adjustment

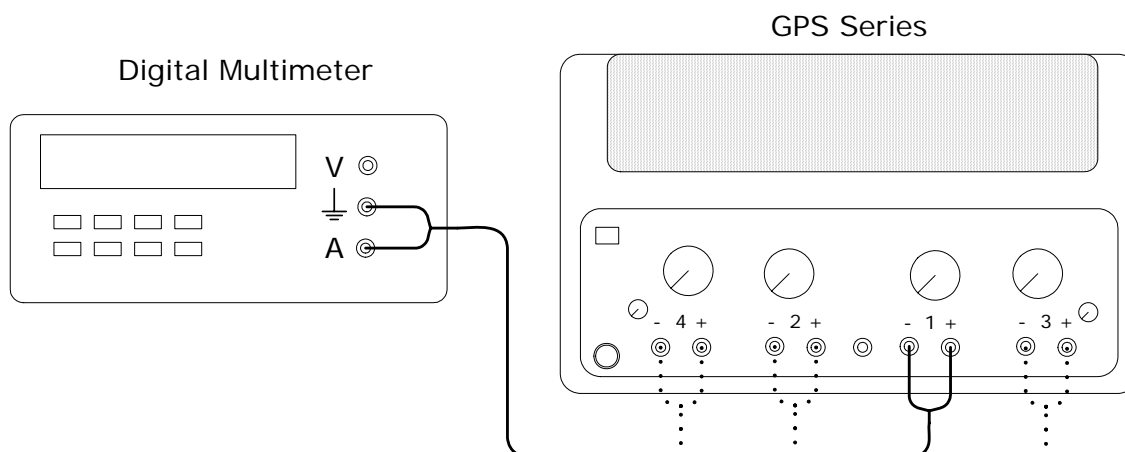
1. Set the front panel according to *Default Settings*, page 7, and connect the Multimeter to CH1. Turn on the Output.
2. Turn up CH1 Current Control and Voltage Control to full. Turn up CH2 Current Control and Voltage Control to full.
3. Set the Tracking Switch to Series.  .
4. Check the GPS readout and turn OFF the Output.
5. Adjust the difference between Out ON and OFF GPS readout. The following table shows the adjustment point and range.
6. Switch the connection to CH2 and repeat step 2, 3, and 4.

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	VR804 $\pm(0.5\% \text{ rdg} + 8\text{digits})$		VR804 $\pm(0.5\% \text{ rdg} + 8\text{digits})$	N/A
CH2				

Output Current Adjustment

Here we adjust Maximum Output Current, Out ON Current Meter Accuracy, and Out OFF Current Meter Accuracy.

Connection



Maximum Output Current Adjustment

1. Set the front panel according to *Default Settings*, page7, and connect the Multimeter to CH1. Turn on the Output.
2. Turn up the Current Control and Voltage Control to full.
3. Adjust the Multimeter readout. The following table shows the adjustment point and range.
4. Switch the connection to CH2 and repeat step 2 and 3.

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	VR103 3A +2% ~ +10% (3.06 ~ 3.3)	VR103 0.5A +2%~+10% (0.51 ~ 0.6)	VR103 3A +2% ~ +10% (3.06 ~ 3.3)	
CH2	VR303 CH1 < CH2 < CH1+150mA		VR303 CH1 < CH2 < CH1+150mA	
CH3	N/A		N/A	
CH4				

Out ON Current Meter Accuracy Adjustment

1. Set the front panel according to *Default Settings*, page 7, and connect the Multimeter to CH1. Turn on the Output.
2. Turn up the Current Control and Voltage Control to full.
3. Adjust the difference between Multimeter and GPS readout. The following table shows the adjustment point and range.
4. Switch the connection to CH2. Repeat step 2 and 3 for CH2, CH3, and CH4.

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	VR701 $\pm(0.5\% \text{ rdg} + 2\text{digits})$		VR701 $\pm(0.5\% \text{ rdg} + 2\text{digits})$	VR202 $\pm(0.5\% \text{ rdg} + 2\text{digits})$
CH2	VR901 $\pm(0.5\% \text{ rdg} + 2\text{digits})$		VR901 $\pm(0.5\% \text{ rdg} + 2\text{digits})$	VR802 $\pm(0.5\% \text{ rdg} + 2\text{digits})$
CH3	VR702 $\pm(0.5\% \text{ rdg} + 2\text{digits})$		N/A	
CH4	VR902 $\pm(0.5\% \text{ rdg} + 2\text{digits})$			

Out OFF Meter Accuracy Adjustment

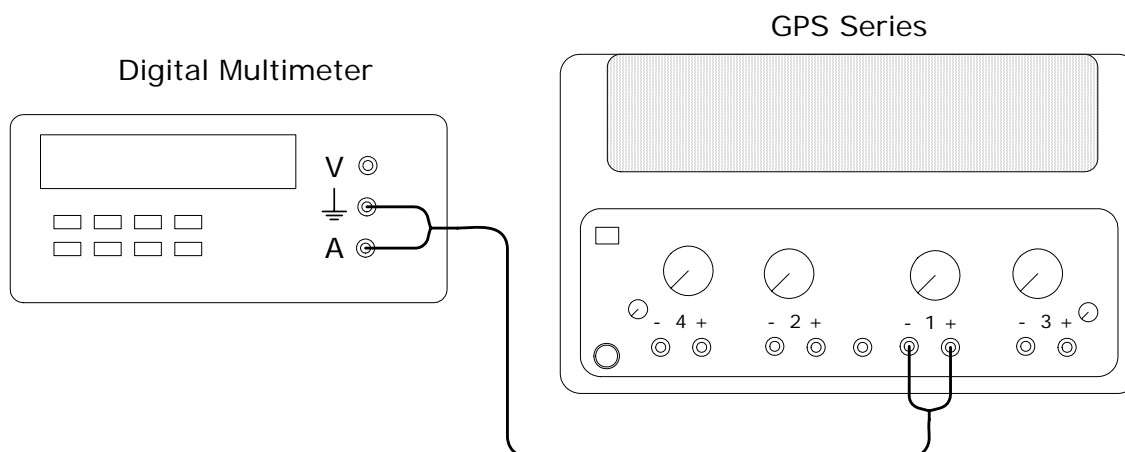
1. Set the front panel according to *Default Settings*, page 7, and connect the Multimeter to CH1. Turn ON the Output.
2. Turn up the Current Control and Voltage Control to full.
3. Check the GPS readout. Turn OFF the Output and adjust the difference between Out ON and OFF GPS readout. The following table shows the adjustment point and range.
4. Switch the connection to CH2 and repeat step 2 and 3.

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	VR703 $\pm(0.5\% \text{ rdg} + 8\text{digits})$		VR703 $\pm(0.5\% \text{ rdg} + 8\text{digits})$	N/A
CH2	VR903 $\pm(0.5\% \text{ rdg} + 8\text{digits})$		VR903 $\pm(0.5\% \text{ rdg} + 8\text{digits})$	
CH3	N/A		N/A	
CH4				

Tracking Parallel Current Adjustment

Here we adjust Tracking Parallel Error and Tracking Parallel Meter Accuracy.

Connection



Tracking Parallel Error Adjustment

1. Set the front panel according to *Default Settings*, page 7, and connect the Multimeter to CH1. Turn on the Output.
2. Turn up CH1 Voltage Control, CH2 Current Control, and CH2 Voltage Control to full. Turn up CH1 Current Control to 3.000A by watching the Multimeter.
3. Set the Tracking Switch to Parallel ☒ ☐ and adjust the Multimeter readout.

GPS-4303	GPS-4251	GPS-3303	GPS-2303
VR502 6.000A		VR502 6.000A	

Tracking Parallel Meter Accuracy Adjustment

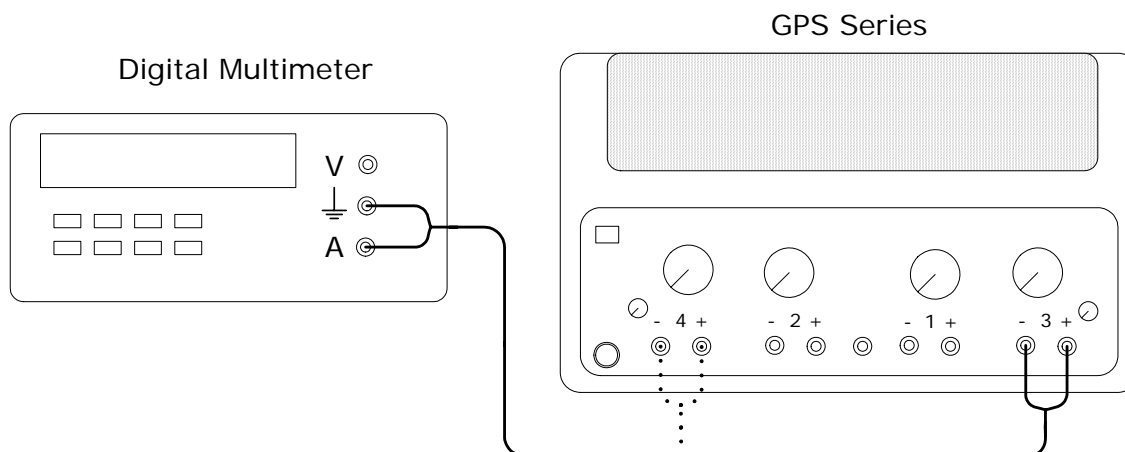
1. Set the front panel according to *Default Settings*, page 7, and connect the Multimeter to CH1. Turn on the Output.
2. Turn up the Current Control and Voltage Control to full and set the Tracking Switch to Parallel ■ ■.
3. Check the GPS readout and turn OFF the Output.
4. Adjust the difference between Out ON and OFF GPS readout. The following table shows the adjustment point and range.

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	VR904 $\pm(0.5\% \text{ rdg} + 8\text{digits})$		VR904 $\pm(0.5\% \text{ rdg} + 8\text{digits})$	N/A

Overload Indicator Adjustment

Here we adjust Overload Indicator Accuracy.

Connection



Overload Indicator Accuracy Adjustment

1. Set the front panel according to *Default Settings*, page7, and connect the Multimeter to CH3. Turn on the Output.
2. Turn up the Voltage Control to full.
3. Check the Multimeter readout and adjust the Overload Indicator turns ON at the correct range. The following table shows the adjustment point and range.
4. Switch the connection to CH4 and repeat step 2 and 3.

	GPS-4303	GPS-4251	GPS-3303	GPS-2303
CH1	N/A		N/A	
CH2				
CH3	VR402 1.10A ~ 1.14A	VR402 2.67A ~ 2.73A	VR402 3.22 ~ 3.28A	
CH4	VR602 1.04A ~ 1.2A			