Cal 00063

June 20,1991

OK Ahs

Calibration Procedures for Model 2414/2415

Setup for Calibration : AC Standard Voltage/Current Generator or Calibrator (0 - 500V, 0 - 10A, 250Hz 50/60Hz.)

: Coils 1T, 10T & 20T

: Power Supply DC +/-1V - +/-2V(more than 10mA) with COM terminal or 2 pcs. of SUM-3 batteries(No BATT symbol shall appear on the display when they are installed into the instrument)

: Testing Leads attached to the unit

: Screw Drivers

Preparation before calibration

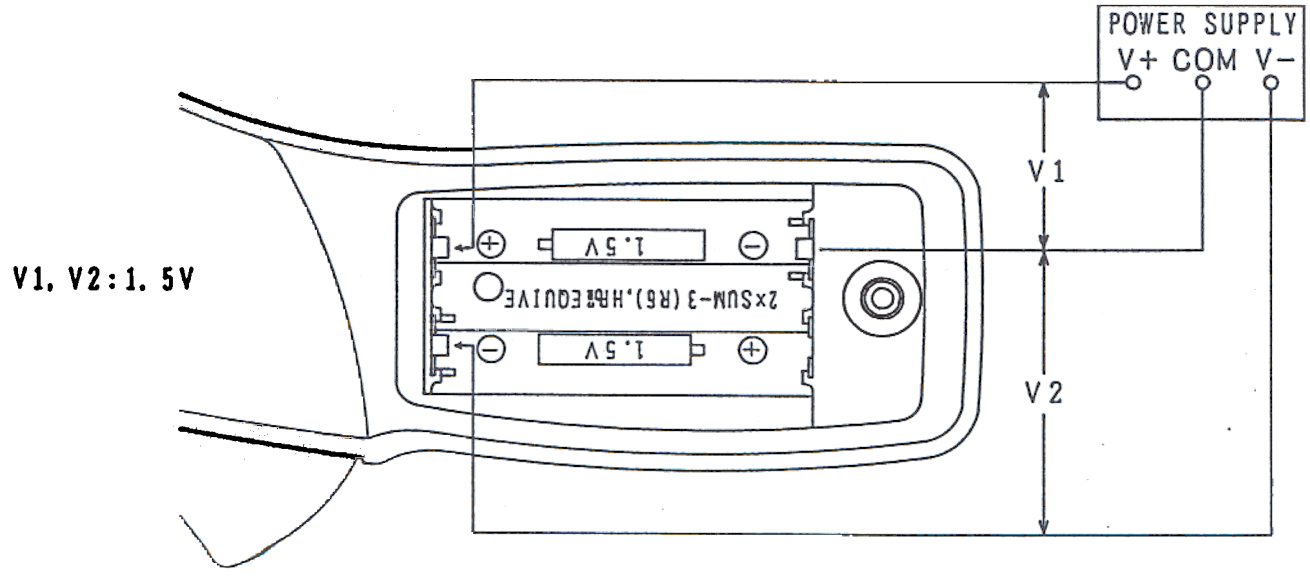
Remove the name plate from the unit beforehand. To avoid the influence of the temperature, keep the ambient temperature at around 23°C where the calibration of the unit is made.

Calibration

Refer to Fig. 2 for the locations of the potentiom-eters.

(1) Install the batteries in the unit or connect the unit to the power supply using lead wires as per Fig.1.

Fig.1



V1, V2 : 1.5V

Set the power switch of the unit to the "V" position. In this case, the frequency selector switch and ampere range selector switch may be left at any position.

Insert one end of the red test lead into the VOLT terminal and black test lead into the COM terminal of the unit respectively. And then connect the other end of the red and black test leads to the output terminal of the AC Standard Voltage/Current Generator or Calibrator.

Note : Make sure that the output of the AC Standard Voltage/ Current Generator or Calibrator is zero(0).

4) With a 50Hz/500V test voltage applied to the unit from AC Standard Voltage/Current Generator or Calibrator, adjust potentiometer VR(4) so that the unit reads "500".
Then, make sure that the reading falls within the specified accuracy of +/-1.2%rdg+/-2dgt when output of AC Standard Voltage/Current Generator or Calibrator is changed to 10V, 100V and 500V(50/60Hz) respectively.
If not, check linearity and adjust the readings at both 50Hz and 60Hz to obtain specified accuracy using VR(4).

Calibration for AC Volt Range is now finished

Set the function selector slide switch to the "A" position, frequency selector switch to the "WIDE" position and range selector slide switch to the "20mA" position respectively.

Connect the coil to the current output terminals of the AC Standard Voltage/Current Generator or Calibrator and then clamp the transformer jaws of the unit onto the coil.

Set output current of the AC Standard Voltage/Current Generator or Calibrator and number of turns of the coil so that 19mAT current flows through the coil.
When the coil carries 19mAT, adjust VR(2) so that the unit indicates "19.00".

Then make sure that the reading is within the specified accuracy of +/-1.2%rdg+/-5dgt on both the 50Hz and 60Hz frequencies.
If not, check linearity and adjust the readings at both 50Hz and 60Hz to obtain specified accuracy using VR(2).

Calibration for 200mA range of Model 2414)

For the calibration of Model 2415, follow steps 8' and (9').

8 Set the current range selector switch to the "200mA" position. Leave the other switches undone.

Set output current of the AC Standard Voltage/Current Generator or Calibrator and number of turns of the coil so that 190mAT current(50Hz) flows through the coil.
When the coil carries 190mAT, adjust VR(3) so that the unit indicates "190.0".
Then make sure that the indication is within the specified accuracy of +/-1.2%rdg+/-5dgt on both the 50Hz and 60Hz frequencies.
If not, check linearity and adjust the readings at both 50Hz and 60Hz to obtain specified accuracy using VR(3).

Calibration for 200mA range of Model 2414 is now finished

(Calibration for 2A range of Model 2415)

Set the current range selector switch to the "2A" position Leave the other switches undone.

Set output current of the AC Standard Voltage/Current Generator or Calibrator and number of turns of the coil so that 1.9AT current(50Hz) flows through the coil.
When the coil carries 1.9AT, adjust VR(3) so that the unit reads "1.900".
Then make sure that the reading is within the specified accuracy of +/-1.2%rdg+/-5dgt on both the 50Hz/60Hz frequencies.
If not, check linearity and adjust the readings at both 50Hz and 60Hz to obtain specified accuracy using VR(3).

Calibration for 2A range of Model 2415 is now finished -

10 Set the current range selector switch to the "100A" position. Leave the other switches undone.

Set output current of the AC Standard Voltage/Current Generator or Calibrator and number of turns of the coil so that 100AT current(50Hz) flows through the coil.
When the coil carries 100AT, adjust VR(1) so that the reading falls within "99.0 ~ 99.5". Then make sure that the reading is within the specified accuracy of +/-1.8%rdg +/-2dgt on both the 50Hz/60Hz frequencies.
If not, check linearity and adjust the readings at both 50Hz and 60Hz to obtain specified accuracy using VR(1).

Calibration for AC ampere ranges is now finished -

Set the Frequency Selector Switch to the "50/60Hz" position and Current Range Selector Switch to the "20mA" position respectively. Leave the other switches undone.

(13) Set output current of the AC Standard Voltage/Current Generator or Calibrator and number of turns of the coil so

that 19mAT current(50Hz) flows through the coil.
Check the readings of the unit when the coil carries 19mAT(50Hz).
With 19mAT(60Hz) current fed into the coil, adjust the instrument readings on the 50Hz and 60Hz frequencies using potentiometer VR(5).

Example	Before Calibration	After Calibration
50Hz	18.90mA ——→	18.95mA
60Hz)	19.00mA ——→	19.05mA

And then make sure that the readings fall within the specified accuracy of 1.2%rdg+/-2dgt on both the 50Hz/60Hz frequencies.
If the readings are out of accuracy, re-calibrate on the 50Hz and 60Hz using potentiometer VR(5).

14 Set the Current Range Selector Switch to the "200mA" position on Model 2414 and to the "2A" position on Model 2415 respectively. Leave other switches undone.

15 For Model 2414

Set output current of the AC Standard Voltage/Current Generator or Calibrator and number of turns of the coil so that 100mAT(50Hz) current flows through the coil.
Then read the indicated value of the unit when the coil carries 100mAT(50Hz).
Also, make sure that when the coil carries 100mAT(250Hz), the unit indicates less than 1/10 of the reading the unit will give when the coil carries 100mAT(50Hz).

This is to be done to confirm that the filter circuit of the unit works right.

(15' For Model 2415

Set output current of the AC Standard Voltage/Current Generator or Calibrator and number of turns of the coil so that the coil carries 1AT(50Hz).
Then read the indicated value of the unit when the coil carries 1AT(50Hz).
Also, make sure that when the coil carries 1AT(250Hz), the unit indicates less than 1/10 of the reading the unit will give when the coil carries 1AT(50Hz).

This is to be done to confirm that the filter circuit of the unit works right.

16) Calibration procedures for both Model 2414 and 2415 are now finished.

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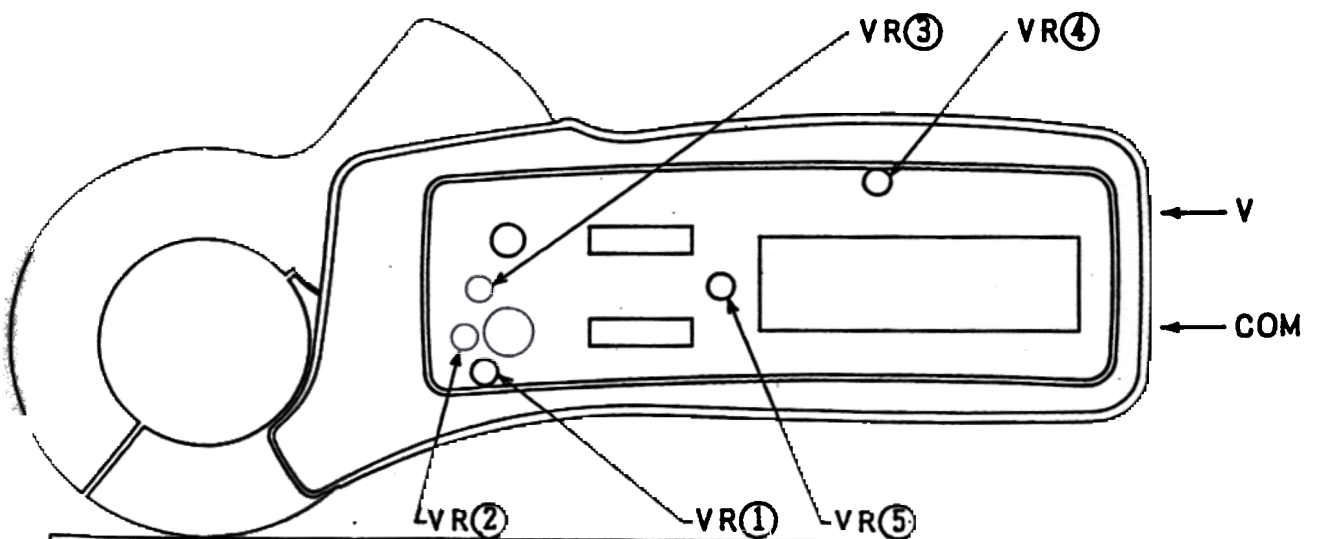
Reference

Following is a table showing the relationship between number of turns of the coil and value of output current of the AC Standard Voltage/Current Generator or Calibrator.
A.T.(Ampere Turns) is figured out by the product of the number of turns of the coil and value of output current of the AC Standard Voltage/Current Generator or Calibrator.

	Number of turns of the coil	Value of output current of Generator or Calibrator
19mAT	1T	19mA
	10T	1.9mA
	20T	0.95mA
190mAT	1T	190mA
	10T	19mA
	20T	9.5mA
1.9AT	1T	1.9A
	10T	190mA
	20T	95mA
100AT	1T	100A
	10T	10A
	20T	5A

Fig. 2 Location of the calibration potentiometers VR



Number of VR	Calibration Range	
	Model 2414	Model 2415
VR(1)	for calibration of 100A AC range	
VR(2)	for calibration of 20mA AC range	
VR(3)	for calibration of 200mA AC range	for calibration of 2A AC range
VR(4)	for calibration of AC Volt range	
VR(5)	for calibration of Frequency Characteristics(50Hz/60Hz)	

使用機種
MODEL-2415
D S A-2415
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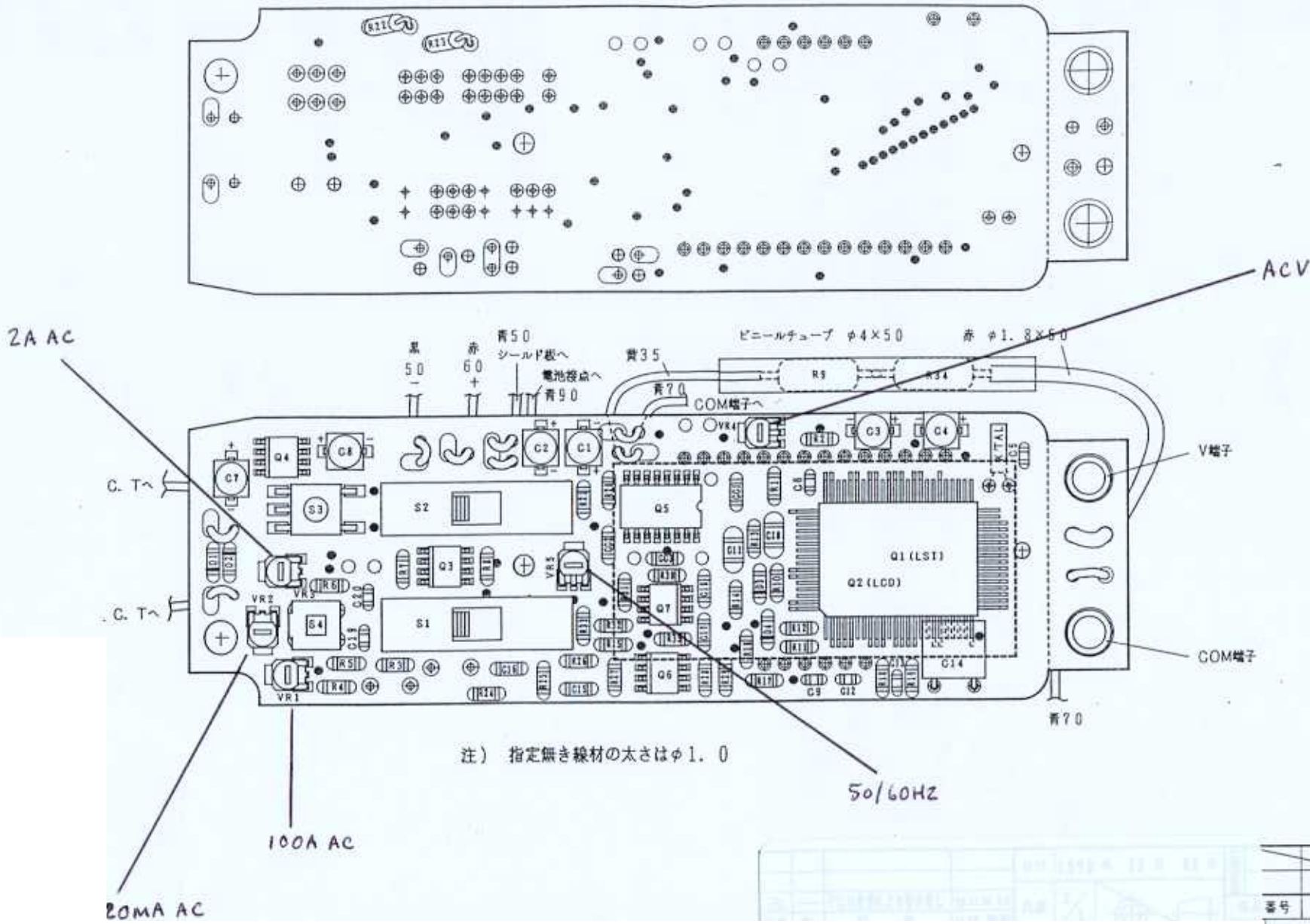

番号	07-1128A

PCB実装図

PCB#:50-1226A

MODEL K-2415 PARTS LIST June 14,1991

PA 00063

CODE	SYMBOL	DESCRIPTION	QTY	REV.
5474	50-1226	P. .B.	1	
1484	Q1	LSI NJU9207F	1	
1485	Q2	LCD DLC-7001PN	1	
5475	Q3,6,7	IC LT1097S8	3	
3728	Q4	IC LTC1044CS8 or equivalent	1	
5476	Q5	IC TC74HC4053AF or equivalent	1	
1487	X'TAL	Crystal DS-VT-200	1	
1488	D1-4	Silicon Diode RLS4448-TE-11	4	
2218	R9,34	Metal Glaze Res. 1/2P 5MF ohm	2	
5492	R22,23	Metal Film Res. SN14L2E 1F ohm	2	
"	R35	" " 1/6P 1KJ ohm	1	
"	R10	Flat Chip Res. RN73F2B 1KD ohm	1	
"	R6	" " RK73H2B 150F ohm	1	
"	R1,4,27,31	" " " 10KF ohm	4	
"	R5	" " " 15KF ohm	1	
"	R24,25	" " " 140KF ohm	2	
"	R28,29	" " " "	2	
"	R26	" " " 64.9KF ohm	1	
"	R32	" " " 56KF ohm	1	
"	R33	" " " 36KF ohm	1	
"	R30	" " " 8.06KF ohm	1	
"	R13,14	" " " 5.6KF ohm	2	
"	R15	" " " 5.1KF ohm	1	
"	R3	" " " 3.3KF ohm	1	
"	R2,19	" " " 510F ohm	2	
"	R11,12	" " RK73M2B 10MJ ohm	2	
"	R16,17,18	" " RK73K2B 330KJ ohm	3	
"	R20,21	" " " "	2	
"	R7	" " " 1KJ ohm	1	
"	R8	" " " 510J ohm	1	
5477	C.C1-3	MELF TYPE CROSS-CONDUCTOR CC-20	3	
5478	VR2	Variable Res. C4212 TB 5K ohm	1	
5479	VR1	3K ohm	1	
5482	VR3	" " " 100 ohm	1	
5537	VR4	" " C4312 TB 3K ohm	1	
5487	VR5	" " " " 10K ohm	1	
3755	S1,2	Slide Switch SSSS 3-4-3A L2	2	
5483	S3	Tact Switch SKHMPF	1	
5493	S4	Push Switch ESB-64805	1	
5485	C1,2,3,4,	Electrolytic Cap. 50 RCV 2R2 2.2uF 50V	4	
		" " 16 RCV 10 10uF 16V		
			2	
1497	C6,9,12,13	" " 0.1uF 50V	4	
1498	C5	" " " 62pF 50	1	
5535	C15-18	Multilayer Film Cap. 0.01uF 25V	4	
		MKT Capacitor 0.1uF 63V	1	
1758	C19	Mylar Capacitor 1000pF 50V	1	
1803	C20	" 0.01uF 50V	1	
37		Input Terminal	2	

		red 0.6 X 90mm	
"		Heat Resistant Vinyl Lead Wire	1
		red 0.6 X 100mm	
2754		Heat Resistant Vinyl Lead Wire	2
		blue 0.6 X 90mm	
1266		Vinyl Tube 1.5 X 50mm	1
1266		" " 1.5 X 30mm	1
1267		Varnished Cotton Tube 1 X 15mm	1
0237		Battery Cushion	-
3851	45-1316	Warning Label	1
5604	45-1563	Saturation Characteristic Label	1
5734	92-1238	Instruction Manual	1
1289		Vinyl Bag	1
3524	91-1067	Carrying Case	1
1934		Battery SUM-3	2
3026		Test Lead Model 7053	1
5733	90-1164	Outer Cardboard Box	1
1920		Warranty Sheet	1