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	1	PCB Diagram	4128101 - 4119792 - 4126904

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	1	PCB Diagram	07-1332B

DISPLAY PCB	1	Display PCB Diagram	07-1330
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KTS1620 Serial Numbers	
KTS1620 Original (25A test current)	3288750 - 3374089
KTS1620 Second (3A test current, EN 61557)	4119792 - 4126904
KTS1620 Update (25A test current, EN 61557)	4128101 -

Revision	Date	Notes	Prepared	Approved
0	Jan 16 th , 2003	Initial issue	Shari	Kawamoto
A	Jul 29 th , 2003	Loop test current was changed to 25A.	Shari	Fujita

Issued	Jul. 29 th , 2003	Service Manual	Approved	Checked	Prepared
Revised	Rev.A		KTS1620		

1. Scope

This service manual applies to MULTI-FUNCTION TESTER KTS1620.

2. Contents

This document consists of the following sections.

- (1) Component Layout
- (2) Disassembly
- (3) Calibration
- (4) Trouble-shooting
- (5) List of spare parts

3. Component Layout

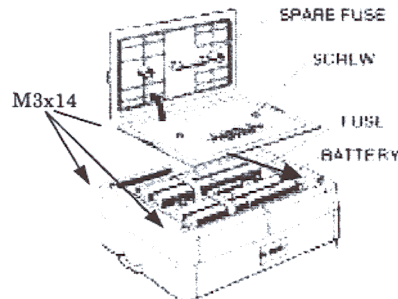
See the component layout (see attachment).

4. Disassembly

4.1 Removal of battery cover

- (1) Loosen two setscrews [33] for battery cover and remove the battery cover [32].

Note : Care should be taken not to lose the fuse [29] when removing the battery cover.



4.2 Removal of instrument case

- (1) unscrew four setscrews [28] (M3x14B tight) for instrument case.
- (2) Remove the instrument case [26] out of the instrument panel [5].

4.3 Removal of PCB

Note1) Before disassembling, be sure to take notes the position of the range selector[1], as well as the direction of the switch axis[20] (the position of the sliding contacts) when removing the main PCB in order to make them in the same position at reassembling.

Note2) Be careful not to lose water-proof parts and component parts of the Test button when disassembling.

- (1) Unscrew the setscrew [24](Polycarbonate screw M4x8) for main PCB.
- (2) Remove the flat cable(FFC) from the socket.

- (3) Remove the spacer ① [19] which is fixing sub PCB.
- (4) Remove the safety shutter [6] on top of the instrument panel [5].
- (5) Remove the connector plate [8] on top of the instrument panel [5] from the end by tweezers etc.
- (6) Unscrew five setscrews [7] (B tight +N 2.3x8) on top of the instrument panel [5].
- (7) Remove the sub PCB [18] out of the instrument panel [5].
- (8) Unscrew five screws [17] (B tight +N 2.3x8), which is fixing the display PCB.
- (9) Remove the display PCB out of the instrument panel [5].

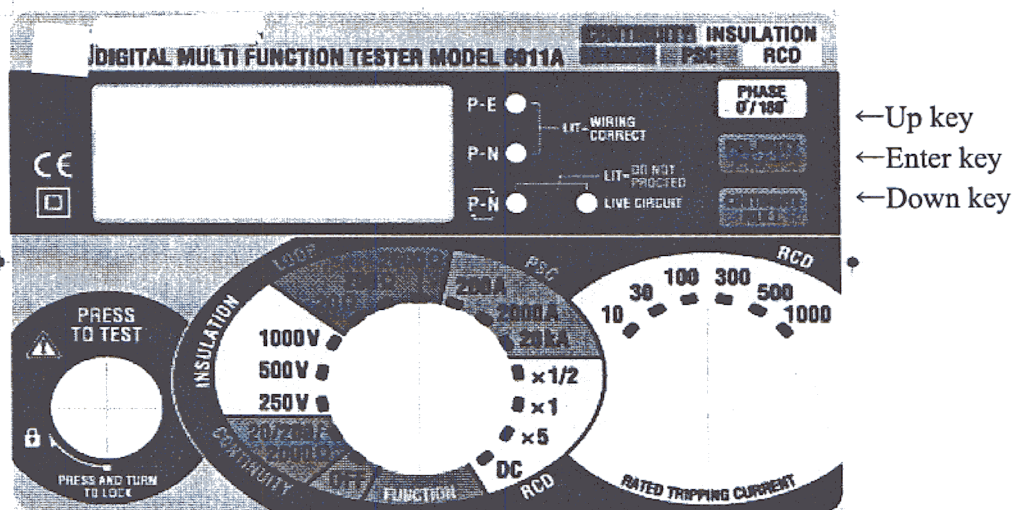
5. Calibration procedures

5.1 Preparation

In order to perform the calibration, get the product into adjustment mode.

- (1) Lock the Test button and turn the Function switch and power on the unit while pressing the PHASE key (SW201), POLARITY key (SW202), NULL key (SW203) all together.
- (2) If the indications are blinking on the LCD, it means the product is being in the adjustment mode.

5.2. Keys for adjustment



At the adjustment mode, each key has the following function.

PHASE ————— Up key (Increase the value.)

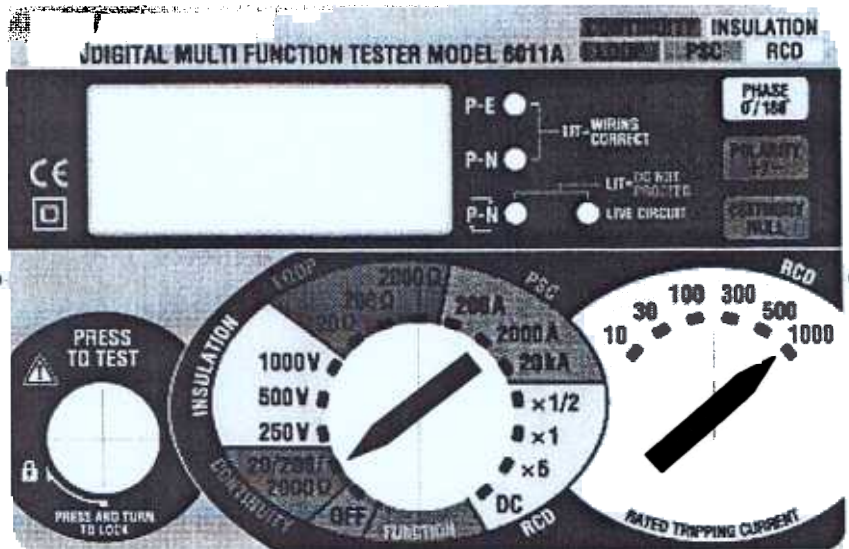
POLARITY ————— Enter key (Confirm the changed value.)

NULL ————— Down key (Decrease the value.)

Note) Be sure to press the Enter key when you change the value.

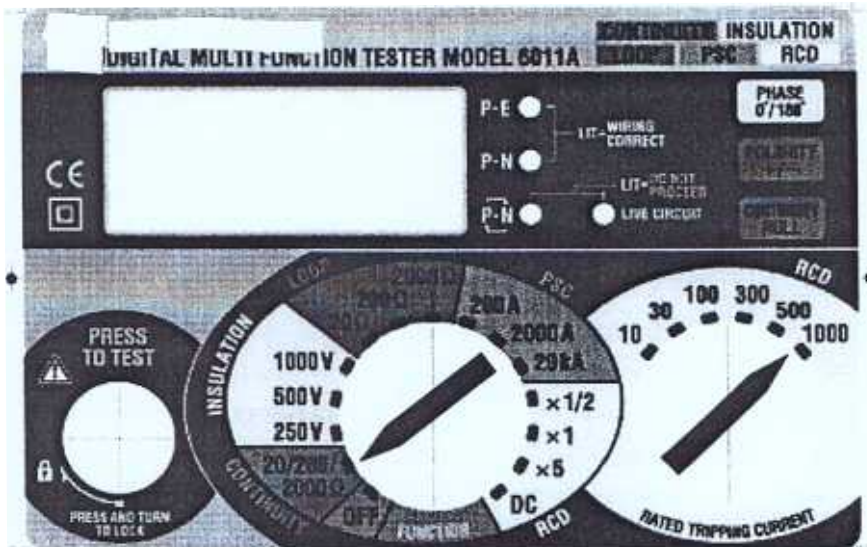
5.3. Voltage adjustment

5.3.1 AC voltage adjustment (IEC connector)



- (1) Set the Function switch to CONTINUITY range.
- (2) Set the Current setting switch to 1000mA range.
- (3) Apply AC230V/50Hz to the IEC connector.
- (4) Then the present voltage value and VP-E are displayed on the LCD.
(approx.230V)
- (5) The warning lamp for live wire lights up and the warning buzzer for live wire sounds.
- (6) Press the PRESS TO TEST button. Then the LCD shows the blinking 230V.

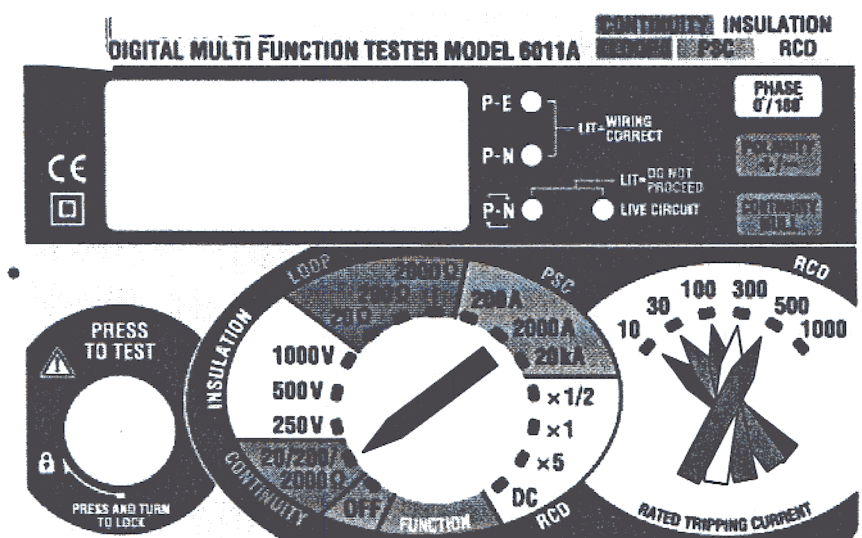
5.3.2 AC voltage adjustment (LINE-EARTH terminal)



- (1) Set the Function switch to CONTINUITY range.

- (2) Set the Current setting switch to 1000mA range.
- (3) Apply AC230V/50Hz to LINE-EARTH terminal.
- (4) Then the present voltage value is displayed on the LCD.(approx.230V)
- (5) The lamp for live wire warning lights up and the warning buzzer for live wire sounds.
- (6) Press the PRESS TO TEST button. Then the LCD shows the blinking 230V.

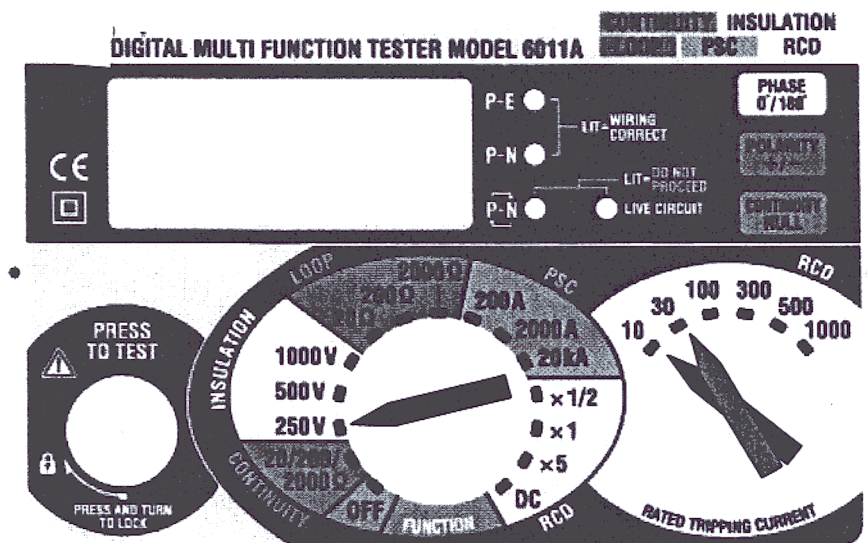
5.3.3. Resistance adjustment



- (1) Set the Function switch to CONTINUITY range.
- (2) Set the Current setting switch to 10mA range
- (3) Set the resistance value of the regulator to 0ohm.
- (4) Press the PRESS TO TEST button. Then the LCD shows the blinking "0.00ohm".
Three seconds later, release the PRESS TO TEST button.
- (5) Set the Current setting switch to 30mA range.
- (6) Set the resistance value of the regulator to 10ohm.
- (7) Press the PRESS TO TEST button. Then the LCD shows the blinking "10.00ohm".
Three seconds later, release the PRESS TO TEST button.
- (8) Set the Current setting switch to 100mA range.
- (9) Set the resistance value of the regulator to 100ohm.
- (10) Press the PRESS TO TEST button. Then the LCD shows the blinking "100.0ohm".
Three seconds later, release the PRESS TO TEST button.
- (11) Set the Current setting switch to 300mA range.
- (12) Set the resistance value of the regulator to 1000ohm.
- (13) Press the PRESS TO TEST button. Then the LCD shows the blinking "1000ohm".
Three seconds later, release the PRESS TO TEST button.
- (14) Set the Current setting switch to 500mA range.
- (15) Set the resistance value of the regulator to 1900ohm.
- (16) Press the PRESS TO TEST button. Then the LCD shows the blinking "1900ohm".
Three seconds later, release the PRESS TO TEST button.

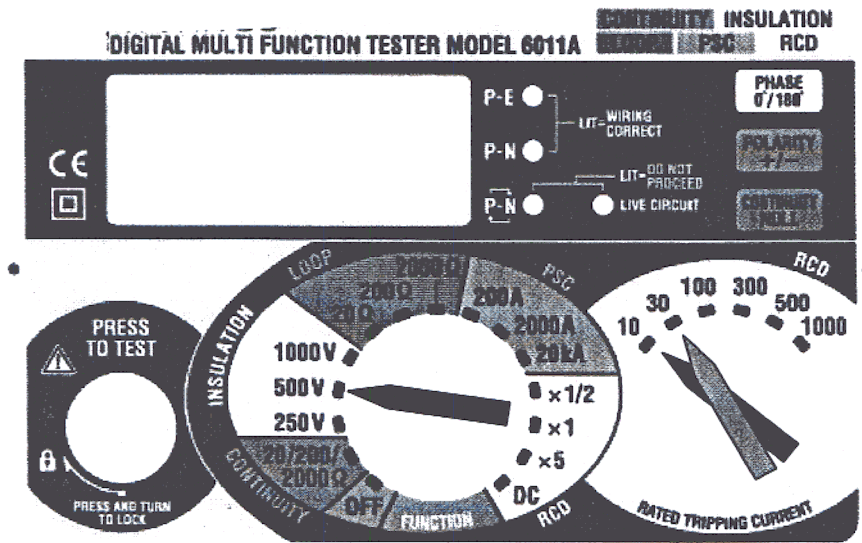
5.4. Insulation resistance adjustment

5.4.1 250V



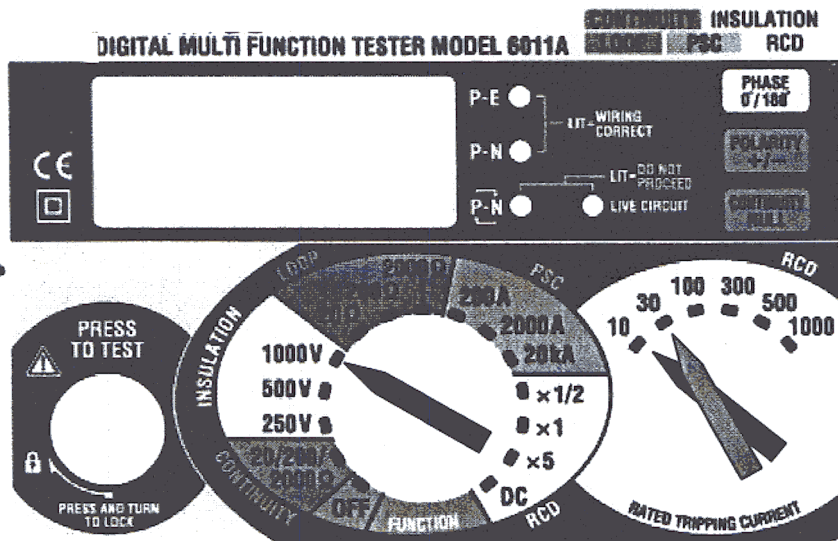
- (1) Set the Function switch to **INSULATION-250V** range.
- (2) Set the Current setting switch to **10mA** range.
- (3) Set the resistance value of the regulator to **10Mohm**.
- (4) Press the **PRESS TO TEST** button. Then the LCD shows the blinking "**10.00Mohm**". Three seconds later, release the **PRESS TO TEST** button.
- (5) Set the Current setting switch to **30mA** range.
- (6) Set the resistance value of the regulator to **100Mohm**.
- (7) Press the **PRESS TO TEST** button. Then the LCD shows the blinking "**100.0Mohm**". Three seconds later, release the **PRESS TO TEST** button.

5.4.2 500V



- (1) Set the Function switch to INSULATION-500V range.
- (2) Set the Current setting switch to 10mA range.
- (3) Set the resistance value of the regulator to 10Mohm.
- (4) Press the PRESS TO TEST button. Then the LCD shows the blinking "10.00Mohm". Three seconds later, release the PRESS TO TEST button.
- (5) Set the Current setting switch to 30mA range.
- (6) Set the resistance value of the regulator to 100Mohm.
- (7) Press the PRESS TO TEST button. Then the LCD shows the blinking "100.0Mohm". Three seconds later, release the PRESS TO TEST button.

5.4.3. 1000V



- (1) Set the Function switch to **INSULATION-1000V** range.
- (2) Set the Current setting switch to **10mA** range.
- (3) Set the resistance value of the regulator to **10Mohm**.
- (4) Press the **PRESS TO TEST** button. Then the LCD shows the blinking "**10.00Mohm**". Three seconds later, release the **PRESS TO TEST** button.
- (5) Set the Current setting switch to **30mA** range.
- (6) Set the resistance value of the regulator to **100Mohm**.
- (7) Press the **PRESS TO TEST** button. Then the LCD shows the blinking "**100.0Mohm**". Three seconds later, release the **PRESS TO TEST** button.

5.5 LOOP adjustment

(Adjustment procedures for LOOP of KTS1620 by using TX8000 and Resistance box of 18Ω/1800Ω/5kΩ)

Preparation

(We described the following procedure according to the operation of TX8000 which we have.)

- (1) Connect TX8000 to the outlet, which has well-known LOOP resistance, and power on TX8000.
Be sure to use AC230V±10%/50Hz as a power supply.
- (2) When the SELECT SWITCH on TX8000 is pressed five times, TX8000 is set to SET LOCAL LOOP mode, and "LOCAL_0.***R" will be displayed on the LCD.
The readings of "0.***R" is the resistance value of LOCAL LOOP, which has already been set.
- (3) Connect the calibrated LOOP tester to the outlet on the panel of TX8000 and measure the LOOP resistance several times.
- (4) Press SELECT VALUE switch on TX8000 to adjust the readings of "LOCAL_0.***R" on the LCD of TX8000 to the readings displayed on the calibrated LOOP tester.
TX8000 has variable range of 0.200 ~ 2.000R.
- (5) When the setting is completed, press SELECT TEST switch on TX8000 once and set TX8000 to LOOP TEST mode. In this bout, the value of LOOP resistance +the resistance of TX8000 shall be displayed as "Loop_0.***R" on the LCD of TX8000.
- (6) Connect the resistance box of 18Ω, instead of TX8000, to an outlet. Also connect a calibrated LOOP tester to the outlet on the resistance box of 18Ω. Then measure LOOP resistance several times and record the measured values.
- (7) Change the resistance box of 18Ω to the resistance box of 1800Ω and connect it to an outlet. Also connect a calibrated LOOP tester to the outlet on the resistance box of 1800Ω. Then measure LOOP resistance several times and record the measured values.

Now, you can ready for performing adjustments.

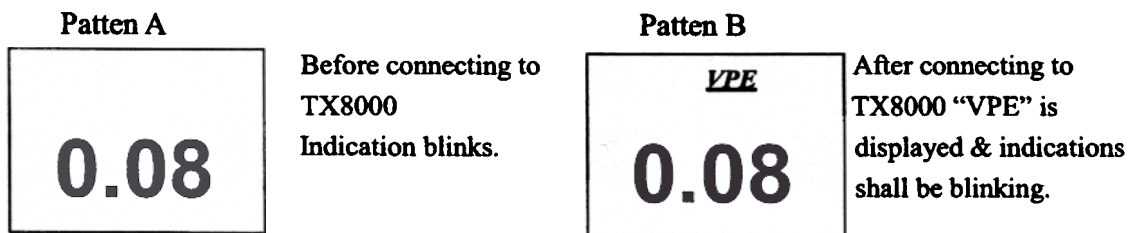
Table.1 Adjustment point at LOOP RANGE

Range	0ΩOFF SET	Middle point	Upper point
20Ω	0Ω TX8000	10Ω TX8000	18Ω 18/1800 Ω Resistance BOX
200Ω	0Ω TX8000	10Ω TX8000	100Ω TX8000
2000Ω	0Ω TX8000	1000Ω TX8000	1800Ω 18/1800 Ω Resistance BOX
20kΩ	0Ω TX8000	1000Ω TX8000	5kΩ 18/1800/5k Ω Resistance BOX

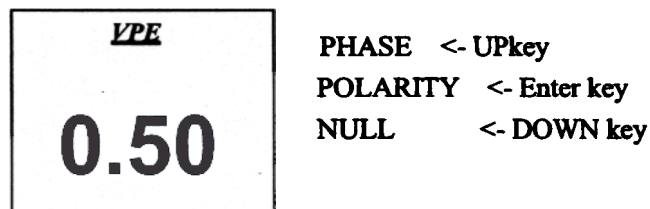
- (8) In the case of replacing the display PCB with a new PCB, the LOOP 20k ohm range should additionally be adjusted as per the procedures explained in the clause of "20k ohm range adjustment".
The 5.00k ohm resistance is required for the adjustment additionally to 18 ohm and 1800 ohm.

20Ω range adjustment

- (1) "Loop_0.***R" will be displayed on the LCD of TX8000, but in order to proceed the explanation more smooth, hereinafter let's assume that the LOCAL LOOP resistance is 0.500R.
- (2) Set the FUNCTION SW on KTS1620 to OFF position, and set the RATED TRIPPING CURRENT SW to 10mA range.
- (3) To set KTS1620 to adjustment mode, first press the PRESS TO TEST button, then turn and lock it. Next, while pressing PHASE . POLARITY . NULL. key all together, turn the FUNCTION SW from OFF to LOOP 20Ω range.
- (4) To confirm whether KTS1620 is being adjustment mode, check the indication on the LCD. When the value of patternA, which is represented in the following figure, is displayed and blinking on the LCD, the instrument is being adjustment mode. While the instruments is being adjustment mode, indication keeps blinking. If it not, repeat the adjustment procedures (3) ~ (4). After setting the instrument to adjustment mode, release the PRESS TO TEST button and connect KTS1620 to the outlet on the panel of TX8000. Make sure to check that "VPE" is displayed and blinking on the LCD of KTS1620 and the indication shall be as patternB as below. Also be sure to check the green LED, P-E and P-N, are lit up and the connection is correct. If the red LED of reversed connection of P-N is lit up or the green LED is not lit up, check the connection and instrument failure(KTS1620) is also suspect, so stop the test immediately.



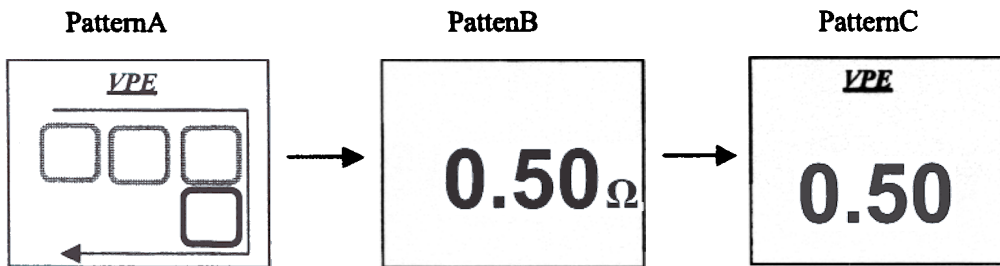
- (5) The value of "0.08" which is displayed on the LCD of KTS1620 is a default value of the LOOP resistance, which is used at our factory. So please adjust this value to the LOOP value of the place where the adjustment is performed. The LOOP resistance value that we use to explain this adjustment procedure is 0.500R. Readings on the LCD of TX8000 has already been adjusted to "Loop_0.500R" at the preparation. To adjust the readings on KTS1620 to this value, press PHASE key and adjust it to 0.50. The value can be settled by using the POLARITY key. When the value is settled, buzzer should beep. By using NULL key, a value can be decreased.



- (6) Press the PRESS TO TEST button on KTS1620.

After "□" moves on the LCD as shown in patternA, then readings as shown in patternB will blink. When writing in EEPROM is finished, the readings will change to patternC and the value

can be settled with blinking.



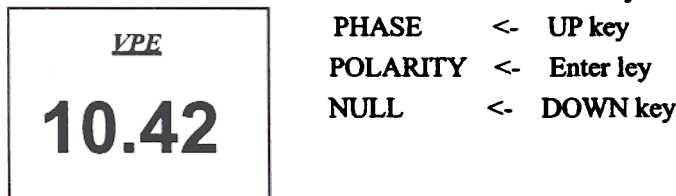
(7) Press the SELECT VALUE switch on TX8000 and set the reading to “Loop_10.42R”.

(The value of 10.42 will be a little different depending on each TX8000.)

(8) Set the RATED TRIPPING CURRENT SW of KTS1620 to 30mA range.

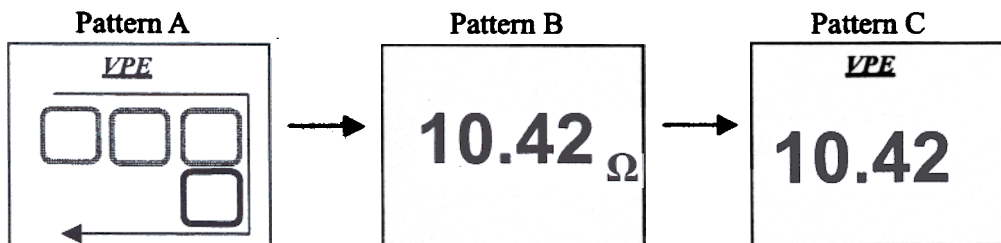
(9) At this moment, “10.50” is displayed and blinking on the LCD of KTS1620.

In order to adjust the value to “Loop_10.42R” of TX8000, press NULL key and adjust the value on the LCD of KTS1620 to “10.42” and settled it with POLARITY key. Buzzer should beep in this bout.

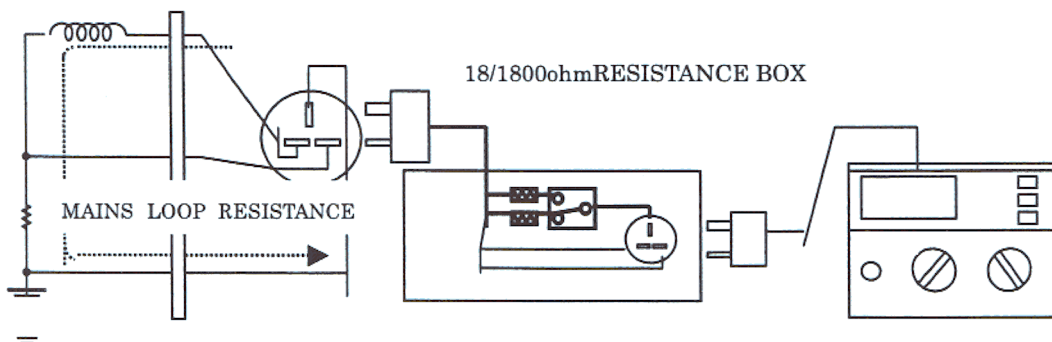


(10) Press the PRESS TO TEST button on KTS1620.

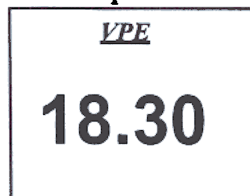
After “ moves on the LCD as shown in Pattern A, then readings as shown in Pattern B will blink. When writing in EEPROM finished, the readings will change to Pattern C and the value can be settled with blinking.



(11) In order to perform 18Ω adjustment, prepare a resistance box of 18Ω aside from TX8000. Set the RATED TRIPPING CURRENT SW of KTS1620 to 100mA range. In this bout, “18.50” is displayed and blinking on the LCD of KTS1620. Remove TX8000 from the outlet, which has well-known LOOP resistance, and connect the resistance box of 18Ω.



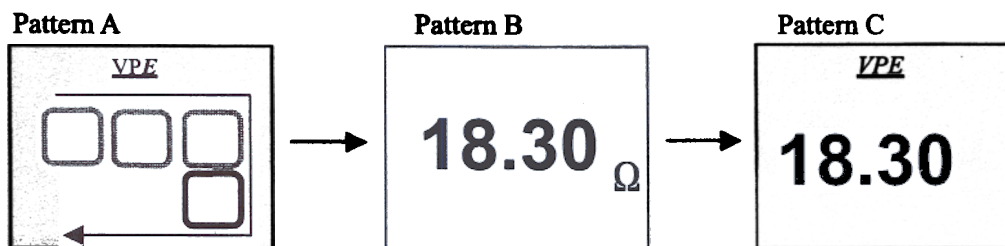
- (12) To adjust the readings on KTS1620 to the measured value at the preparation stage; the resistance of 18Ω + Loop resistance of main power supply (let's assume it is 18.30Ω), press NULL key and adjust the value on the LCD of KTS1620 to "18.30" and settle it with POLARITY key. Buzzer should beep in this bout.



PHASE <-UP key
POLARITY <-Enter key
NULL <- Down key

- (13) Press the PRESS TO TEST button on KTS1620.

After "□" moves on the LCD as shown in patternA, then readings as shown in patternB will blink. When writing in EEPROM is finished, the readings will change to patternC and the value can be settled with blinking.

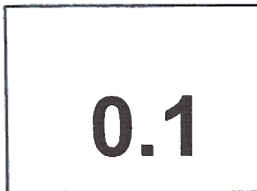


- (14) Remove the cord(KAMP10) of KTS1620 from the outlet on the resistance box of 18Ω , and turn the FUNCTION SW of KTS1620 to OFF position and power off the instrument.

200Ω range adjustment

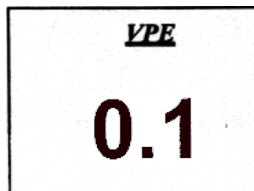
- (1) "Loop_0.***R" will be displayed on the LCD of TX8000, but in order to proceed the explanation more smooth, hereinafter let's assume that the LOCAL LOOP resistance is $0.500R$.
- (2) Set the FUNCTION SW on KTS1620 to OFF position, and set the RATED TRIPPING CURRENT SW to 10mA range.
- (3) To set KTS1620 to adjustment mode, first press the PRESS TO TEST button, then turn and lock it. Next, while pressing PHASE . POLARITY . NULL. key all together, turn the FUNCTION SW from OFF to LOOP 200Ω range.
- (4) To confirm whether KTS1620 is being adjustment mode, check the indication on the LCD. When the value of pattern A, which is represented in the following figure, is displayed and blinking on the LCD, the instrument is being adjustment mode. While the instruments is being adjustment mode, indication keeps blinking. If it not, repeat the adjustment procedures (3) ~ (4). After setting the instrument to adjustment mode, release the PRESS TO TEST button and connect KTS1620 to the outlet on the panel of TX8000. Make sure to check that "VPE" is displayed and blinking on the LCD of KTS1620 and the indication shall be as pattern B as below. Also be sure to check the green LED, P-E and P-N, are lit up and the connection is correct. If the red LED of reversed connection of P-N is lit up or the green LED is not lit up, check the connection and instrument failure(KTS1620) is also suspect, so stop the test immediately.

Patten A



Before connecting to TX8000 Indication blinks.

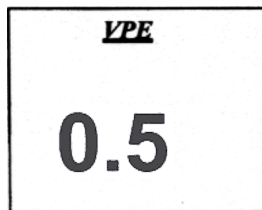
Patten B



After connecting to TX8000 "VPE" is displayed & indications shall be blinking.

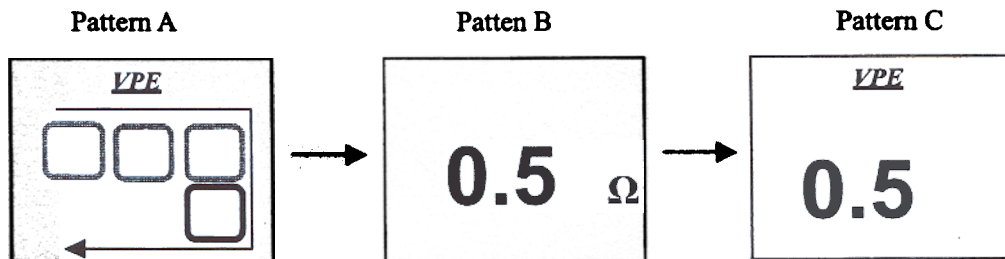
- (5) The value of "0.1" which is displayed on the LCD of KTS1620 is a default value of the LOOP resistance, which is used at our factory. So please adjust this value to the LOOP value of the place where the adjustment is performed. The LOOP resistance value that we use to explain this adjustment procedure is 0.500R. Readings on the LCD of TX8000 has already been adjusted to "Loop_0.500R" at the preparation. To adjust the readings on KTS1620 to this value, press PHASE key and adjust it to 0.5. The value can be settled by using the POLARITY key. When the value is settled, buzzer should beep. By using NULL key, a value can be decreased.

Note) Even if 0Ω adjustment is done at 20Ωrange, it is not effective at 200Ω and 2000Ωrange. Therefore, be sure to do 0Ω adjustment at each 200Ωand 2000Ωrange.

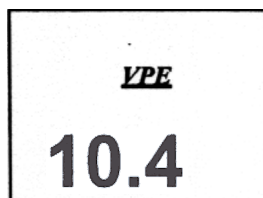


PHASE <- UPkey
POLARITY <- Enter key
NULL <- DOWN key

- (6) Press the PRESS TO TEST button on KTS1620. After " moves on the LCD as shown in pattern A, then readings as shown in pattern B will blink. When writing in EEPROM is finished, the readings will change to pattern C and the value can be settled with blinking.



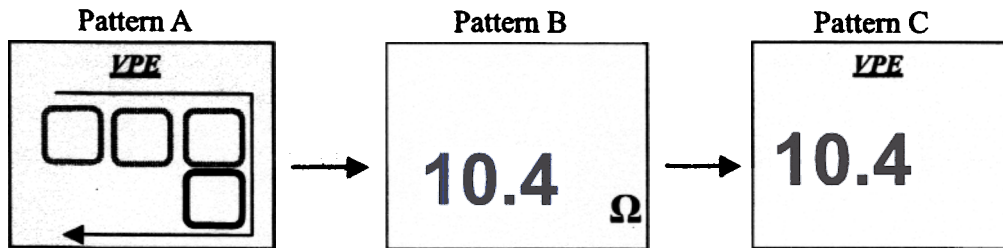
- (7) Press the SELECT VALUE switch on TX8000 and set the reading to "Loop_10.42R". (The value of 10.42 will be a little different depending on each TX8000.)
- (8) Set the RATED TRIPPING CURRENT SW of KTS1620 to 30mA range.
- (9) At this moment, "10.5" is displayed and blinking on the LCD of KTS1620. In order to adjust the value to "Loop_10.42R" of TX8000, press the NULL key and adjust the value on the LCD of KTS1620 to "10.4" and settled it with POLARITY key. Buzzer should beep in this bout.



PHASE <- UP key
POLARITY <- Enter ley
NULL <- DOWN key

(10) Press the PRESS TO TEST button on KTS1620.

After “□” moves on the LCD as shown in Pattern A, then readings as shown in Pattern B will blink. When writing in EEPROM finished, the readings will change to Pattern C and the value can be settled with blinking.



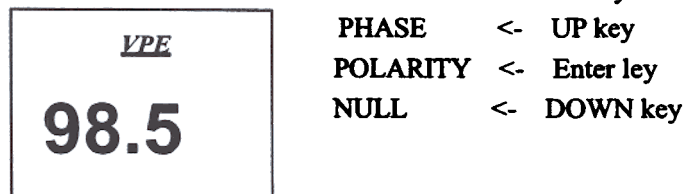
(11) Press the SELECT VALUE switch on TX8000 and set the reading to “Loop_98.5R”.

(The value of 98.5 will be a little different depending on each TX8000.)

(12) Set the RATED TRIPPING CURRENT SW of KTS1620 to 100mA range.

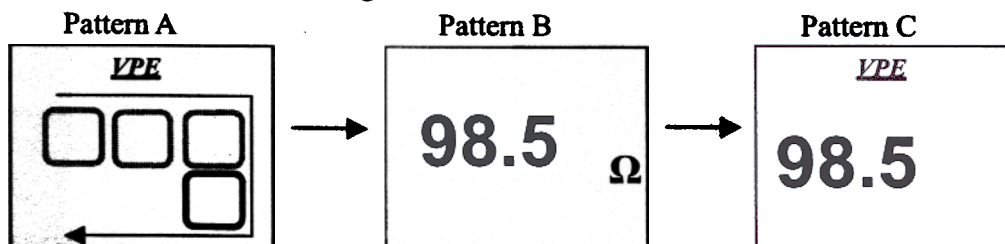
(13) At this moment, “100.5” is displayed and blinking on the LCD of KTS1620.

In order to adjust the value to “Loop_98.5R” of TX8000, press the NULL key and adjust the value on the LCD of KTS1620 to “98.5” and settled it with POLARITY key. Buzzer should beep in this bout.



(14) Press the PRESS TO TEST button on KTS1620.

After “□” moves on the LCD as shown in Pattern A, then readings as shown in Pattern B will blink. When writing in EEPROM finished, the readings will change to Pattern C and the value can be settled with blinking.



(15) The adjustment for LOOP200Ω by using TX8000 is finished now.

(16) Remove the cord(KAMP10) of KTS1620 from the outlet on TX8000, and turn the FUNCTION SW of KTS1620 to OFF position and power off the instrument.

2000Ω range adjustment

(1) “Loop_0.***R” will be displayed on the LCD of TX8000, but in order to proceed the explanation more smooth, hereinafter let’s assume that the LOCAL LOOP resistance is 0.500R.

(2) Set the FUNCTION SW on KTS1620 to OFF position, and set the RATED TRIPPING CURRENT SW to 10mA range.

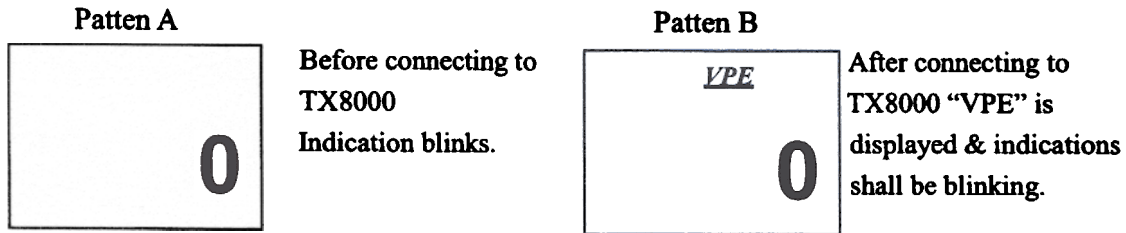
(3) To set KTS1620 to adjustment mode, first press the PRESS TO TEST button, then turn and

lock it. Next, while pressing PHASE . POLARITY . NULL. key all together, turn the FUNCTION SW from OFF to LOOP 2000Ω range.

- (4) To confirm whether KTS1620 is being adjustment mode, check the indication on the LCD. When the value of pattern A, which is represented in the following figure, is displayed and blinking on the LCD, the instrument is being adjustment mode.

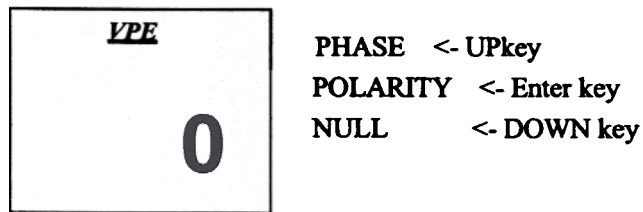
While the instruments is being adjustment mode, indication keeps blinking.


If it not, repeat the adjustment procedures (3) ~ (4). After setting the instrument to adjustment mode, release the PRESS TO TEST button and connect KTS1620 to the outlet on the panel of TX8000. Make sure to check that “VPE” is displayed and blinking on the LCD of KTS1620 and the indication shall be as pattern B as below. Also be sure to check the green LED, P-E and P-N, are lit up and the connection is correct. If the red LED of reversed connection of P-N is lit up or the green LED is not lit up, check the connection and instrument failure(KTS1620) is also suspect, so stop the test immediately.

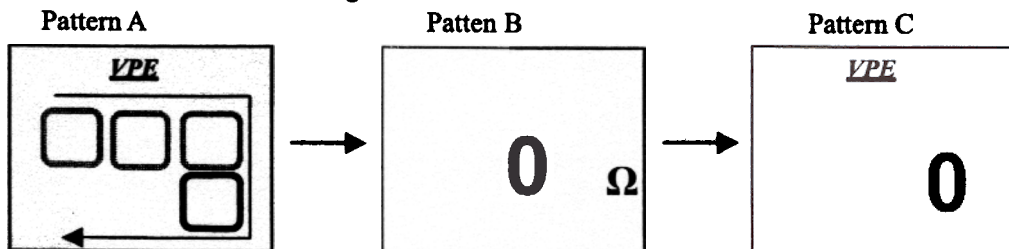


- (5) The value of “0” which is displayed on the LCD of KTS1620 is a default value of the LOOP resistance, which is used at our factory. So please adjust this value to the LOOP value of the place where the adjustment is performed. The LOOP resistance value that we use to explain this adjustment procedure is 0.500R. Readings on the LCD of TX8000 has already been adjusted to “Loop_0.500R” at the preparation. To adjust the readings on KTS1620 to this value, press PHASE key and adjust it to 0. The value can be settled by using the POLARITY key. When the value is settled, buzzer should beep. By using NULL key, a value can be decreased.

Note) Even if 0Ω adjustment is done at 20Ωrange, it is not effective at 200Ω and 2000Ωrange. Therefore, be sure to do 0Ω adjustment at each 200Ωand 2000Ωrange.



- (6) Press the PRESS TO TEST button on KTS1620. After “” moves on the LCD as shown in pattern A, then readings as shown in pattern B will blink. When writing in EEPROM is finished, the readings will change to pattern C and the value can be settled with blinking.



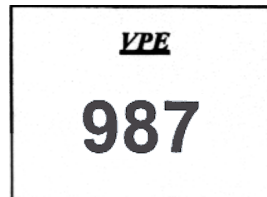
(7) Press the SELECT VALUE switch on TX8000 and set the reading to "Loop_987R".

(The value of 987 will be a little different depending on each TX8000.)

(8) Set the RATED TRIPPING CURRENT SW of KTS1620 to 30mA range.

(9) At this moment, "1000" is displayed and blinking on the LCD of KTS1620.

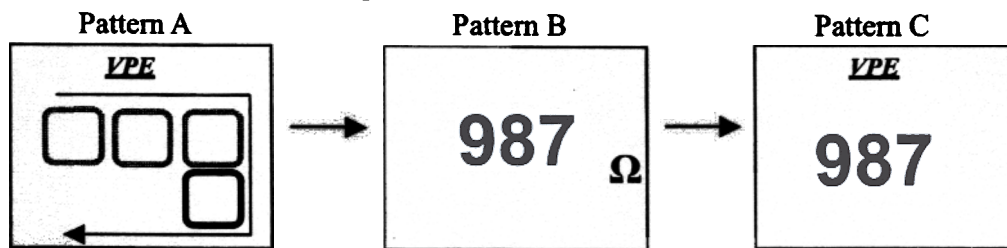
In order to adjust the value to "Loop_987R" of TX8000, press the NULL key and adjust the value on the LCD of KTS1620 to "987" and settled it with POLARITY key. Buzzer should beep in this bout.



PHASE <- UP key
POLARITY <- Enter key
NULL <- DOWN key

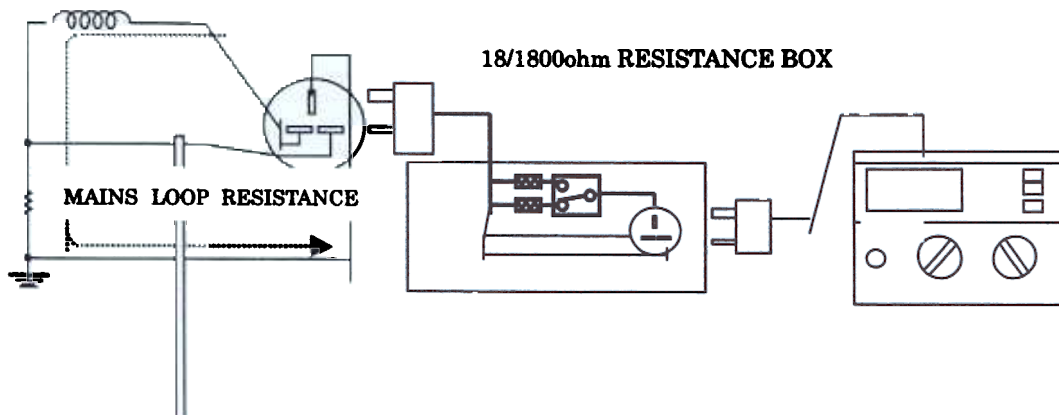
(10) Press the PRESS TO TEST button on KTS1620.

After "□" moves on the LCD as shown in Pattern A, then readings as shown in Pattern B will blink. When writing in EEPROM finished, the readings will change to Pattern C and the value can be settled with blinking.

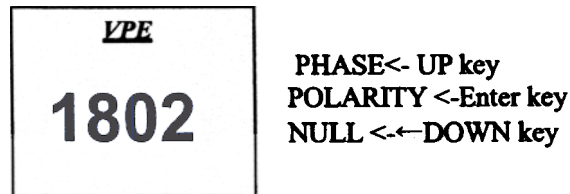


(11) In order to perform 1800Ω adjustment, prepare a resistance box of 1800Ω aside from TX8000.

Set the RATED TRIPPING CURRENT SW of KTS1620 to 100mA range. In this bout, "1800" is displayed and blinking on the LCD of KTS1620. Remove TX8000 from the outlet, which has well-known LOOP resistance and connect the resistance box of 1800Ω.

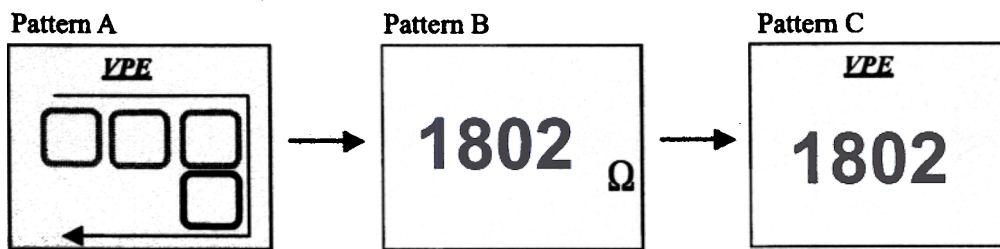


- (12) To adjust the readings on KTS1620 to the measured value at the preparation stage; the resistance of 1800Ω + Loop resistance of main power supply (let's assume it is 1802Ω), press NULL key and adjust the value on the LCD of KTS1620 to "1802" and settle it with POLARITY key. Buzzer should beep in this bout.



- (13) Press the PRESS TO TEST button on KTS1620.

After "□" moves on the LCD as shown in patternA, then readings as shown in patternB will blink. When writing in EEPROM is finished, the readings will change to patternC and the value can be settled with blinking.



- (14) Remove the cord(KAMP10) of KTS1620 from the outlet on the resistance box of 1800Ω , and turn the FUNCTION SW of KTS1620 to OFF position and power off the instrument.

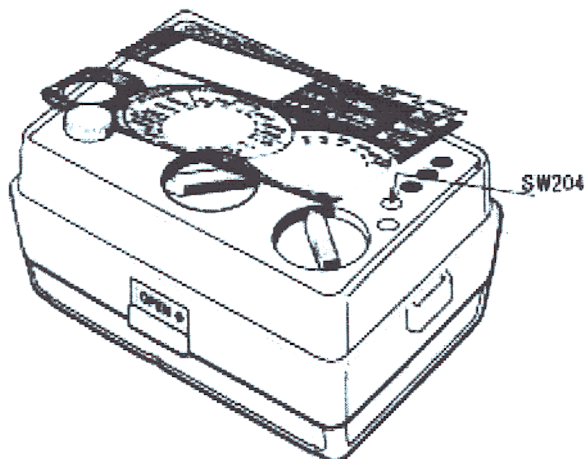
20k ohm range adjustment

* This adjustment is required in the case of replacing the display PCB with a new PCB.

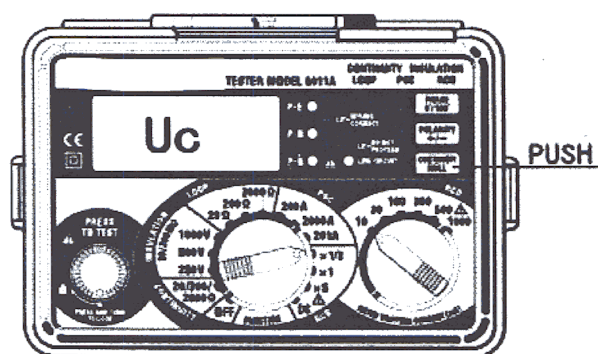
- (1) "Loop_0.***R" will be displayed on the LCD of TX8000, but in order to proceed the explanation more smooth, hereinafter let's assume that the LOCAL LOOP resistance is $0.500R$.
- (2) Set the FUNCTION SW on KTS1620 to OFF position, and set the RATED TRIPPING CURRENT SW to 10mA range.
- (3) To set KTS1620 to adjustment mode, first press the PRESS TO TEST button, then turn and lock it. Next, while pressing PHASE . POLARITY . NULL. key all together, turn the FUNCTION SW from OFF to LOOP 2000Ω range.
- (4) To confirm whether KTS1620 is being adjustment mode, check the indication on the LCD.

When the value of pattern A, which is represented in the following figure, is displayed and blinking on the LCD, the instrument is being adjustment mode. While the instruments is being adjustment mode, indication keeps blinking. If it not, repeat the adjustment procedures (3) ~ (4). After setting the instrument to adjustment mode, release the PRESS TO TEST button and connect KTS1620 to the outlet on the panel of TX8000. Make sure to check that "VPE" is displayed and blinking on the LCD of KTS1620 and the indication shall be as pattern B as below. Also be sure to check the green LED, P-E and P-N, are lit up and the connection is correct. If the red LED of reversed connection of P-N is lit up or the green LED is not lit up, check the connection and instrument failure (KTS1620) is also suspect, so stop the test immediately.

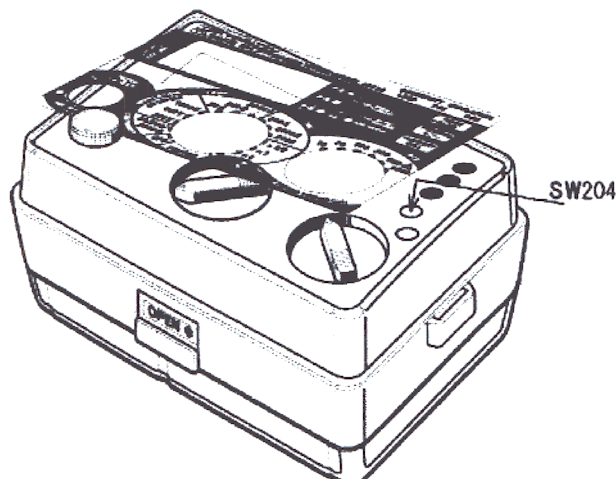
- (5) Peel off the front panel graphic label from the right corner just enough to press the "SW204"
Press the "SW204" on the panel to cancel the adjustment mode.



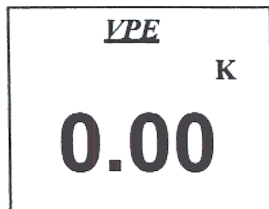
- (6) After cancel the adjustment mode, set the function switch to RCD x 1/2 range, and press the
"CONTINUITY NULL" switch. Confirm that "Uc" is indicated on the LCD.



- (7) Peel the front panel graphic label again, and press the "SW204" to be in the adjustment mode for
the LOOP 20k ohm range.

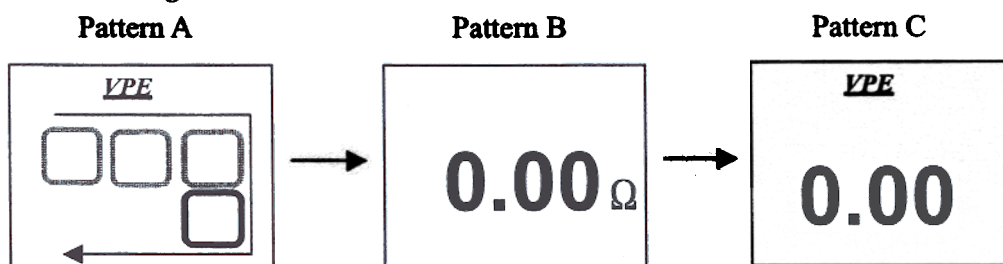


- (8) So please adjust this value to the LOOP value of the place where the adjustment is performed. The LOOP resistance value that we use to explain this adjustment procedure is 0.500R. Readings on the LCD of TX8000 has already been adjusted to "Loop_0.500R" at the preparation.



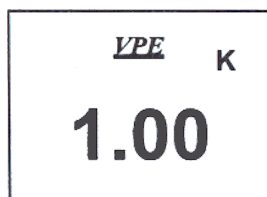
- (9) Press the PRESS TO TEST button on KTS1620.

After "□" moves on the LCD as shown in pattern A, then readings as shown in pattern B will blink. When writing in EEPROM is finished, the readings will change to pattern C and the value can be settled with blinking.



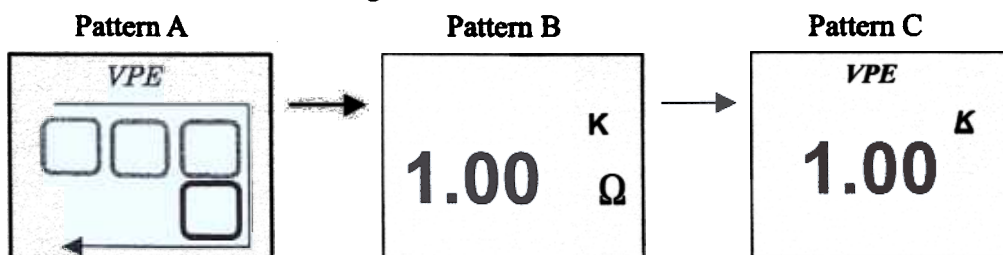
- (10) Press the SELECT VALUE switch on TX8000 and set the reading to "Loop_987R".
(The value of 987 will be a little different depending on each TX8000.)

- (11) Set the RATED TRIPPING CURRENT SW of KTS1620 to 30mA range.
(12) At this moment, "1.00k" is displayed and blinking on the LCD of KTS1620.

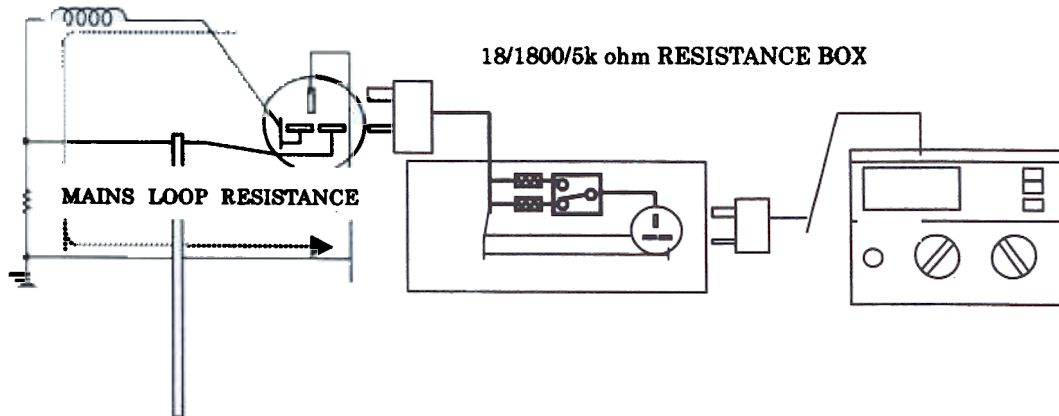


- (13) Press the PRESS TO TEST button on KTS1620.

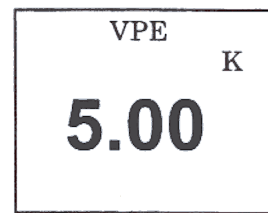
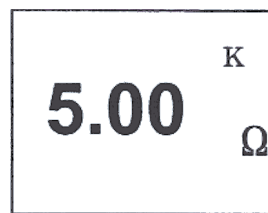
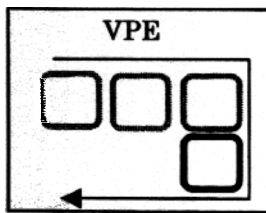
After "□" moves on the LCD as shown in Pattern A, then readings as shown in Pattern B will blink. When writing in EEPROM finished, the readings will change to Pattern C and the value can be settled with blinking.



- (14) In order to perform $5k\Omega$ adjustment, prepare a resistance box of $5k\Omega$ aside from TX8000. Set the RATED TRIPPING CURRENT SW of KTS1620 to 100mA range. In this bout, "1800" is displayed and blinking on the LCD of KTS1620. Remove TX8000 from the outlet, which has well-known LOOP resistance and connect the resistance box of 1800Ω .



- (15) To adjust the readings on KTS1620 to the $5k\Omega$. Press the PRESS TO TEST button on KTS1620. After "□" moves on the LCD as shown in pattern A, then readings as shown in pattern B will blink. When writing in EEPROM is finished, the readings will change to pattern C and the value can be settled with blinking.



- (16) Remove the cord(KAMP10) of KTS1620 from the outlet on the resistance box of 1800Ω , and turn the FUNCTION SW of KTS1620 to OFF position and power off the instrument.

* Outline procedures of 20k ohm range

Set to the adjustment mode at any functions except for the RCD.

Cancel the adjustment mode by pressing the "SW204" switch.

Set the function switch to the RCD range.

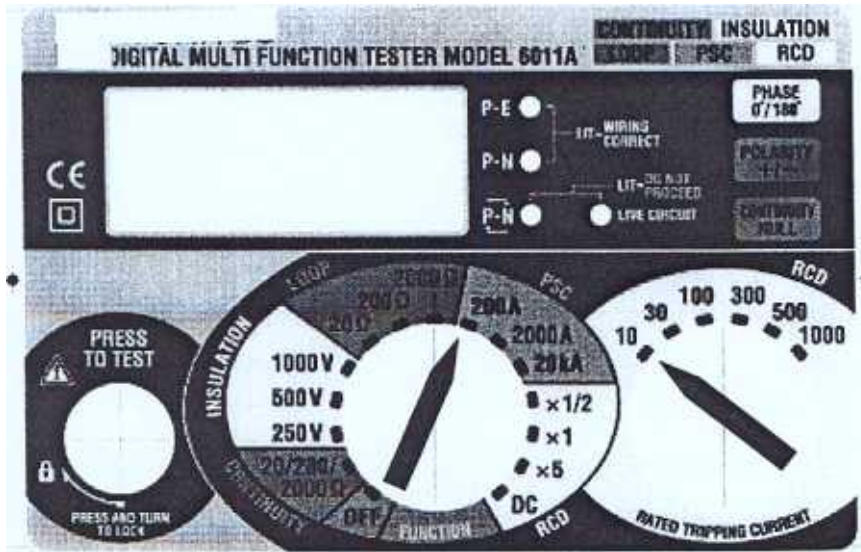
Press the "CONTINUITY NULL" switch so that "Uc" is indicated on the LCD.

Press the "SW204" switch again to be set to the adjustment mode.

Adjust the LOOP 20k ohm range.

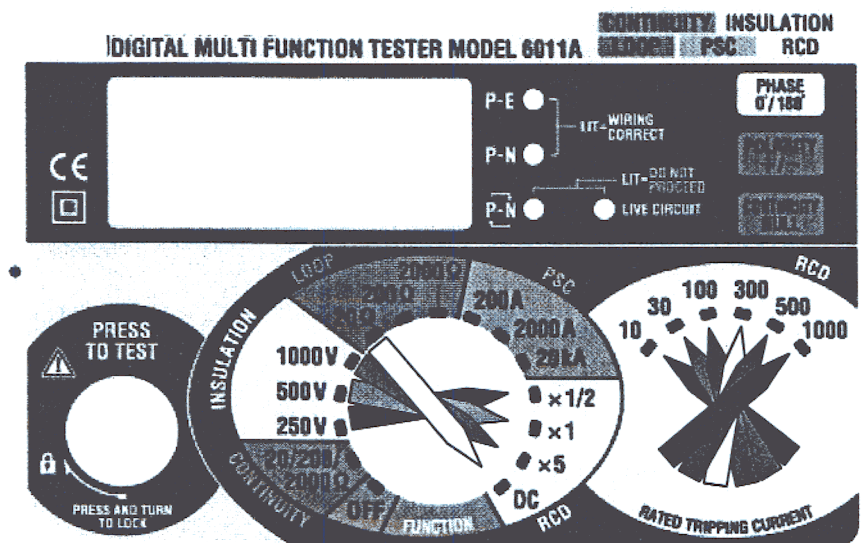
5.6 PSC adjustment

5.6.1 Power factor setting (230V / 50Hz)



- (1) Set the Function switch to PSC-200A range.
- (2) Set the Current setting switch to 10mA range.
- (3) The present value (1.00 : STD 1.00 / RBN 0.84) of power factor is displayed on the LCD.
- (4) If it is necessary, change the indicated value into 0.84 ~ 1.00 with adjustment keys.

5.7 RCD adjustment



- (1) Set the Function switch to RCD x1/2 ~ xDC range.
- (2) Set the Current setting switch to 10mA ~ 1000mA range.
- (3) The maximum output value of DAC (170 ~ 200) is displayed on the LCD.
- (4) Measure the output current.
- (5) If it is necessary, change the indicated value into 50 ~ 250 with adjustment keys.

6. Trouble shooting

Symptoms	Possible Causes	Remedies
The instrument can not be turned on.	Insufficient capacity of battery	Replace the battery.
	Poor contact at the battery contact	Check the defect at the battery contact.
	Poor contact of the rotary switch	Check the defect of the rotary switch.
Incapable measurement of Continuity only.	A break in a fuse	Replace the fuse of 500mA.
	Poor contact of fuse	Make sure that there is no poor contact between a fuse and a fuse holder.
	Defect of Circuit	Replace the PCB.
Incapable measurement of Insulation only.	Defect of circuit	Replace the PCB.
Incapable measurement of Continuity and Insulation.	Defect of Test Leads	Make a continuity test of Test Lead. If there is no continuity, replace the Test Leads.
	Defect of Circuit	Replace the PCB.
When measuring Continuity and Insulation, error of measurement is notable.	Error	Do adjustment again according to the calibration procedure paragraph 5.3 and 5.4. If it is impossible, replace the PCB.
Incapable measurement of Loop and PSC.	Defect of Test Leads	Make a continuity test of Test Lead. If there is no continuity, replace the Test Leads.
	Test Leads insert error	Make sure that Test Leads are firmly connected with the instrument or the power supply.
	A break in a fuse.	Replace the fuse of 6.3A on the main PCB.
	High temperature mark appears. Resistor or FET used for the instrument is overheated.	If the High temperature mark appears on the LCD, stop measuring and cool down the instrument. If the high temperature mark does not go off, when the instrument became cool, replace the PCB.
	Defect of Circuit	Replace the PCB.
DO NOT PROCEED LED lights up.	P-N reverse connection	Insert the Test Leads correctly.
	Defect of Main and Display PCB	Replace the PCB.
P-E, P-N LED does not light up when inputting voltage.	Defect of Main and Display PCB	Replace the PCB.
When measuring Continuity and Insulation, error of measurement is notable.	Error	Do adjustment again according to the calibration procedure paragraph 5.3 and 5.4. If it is impossible, replace the PCB.

Symptoms	Possible Causes	Remedies
Incapable measurement of Loop and PSC.	Defect of Test Leads	Do adjustment again according to the calibration procedure paragraph 5 when replacing the Test Leads.
	Replace a fuse	Do adjustment again according to the calibration procedure paragraph 5.7 when replacing the fuse of 6.3A on the main PCB.
Incapable measurement of RCD	Defect of Test Leads	Make a continuity test of Test Lead. If there is no continuity, replace the Test Leads.
	High temperature mark appears. Resistor or FET used for the instrument is overheated.	If the High temperature mark appears on the LCD, stop measuring and cool down the instrument. If the high temperature mark does not go off, when the instrument became cool, replace the PCB.
	Defect of Circuit	Replace the PCB.

7. Spare parts list KTS1620

Parts No.	Spare parts No.	Description	Qty.	Note
1	0008219	Range selector M-6011	2	
2	0008224	Push switch M-6011	1	
3	0011723	Name plate kts1620A	1	
4	0006862	Window plate 6020	1	
5	0011725	Panel KTS1620A	1	
6	0008221	Safety shutter M-6011	1	
7	0001303	Screw B tight +N2.3x8	5	
8	0011629	Connector plate 6011A	1	
9	0008227	PCB spacer (1)6011	2	
10	0007090	O ring N-7	1	
11	0008225	Lock guide M-6011	1	
12	0003400	Push spring	1	
13	0011632	Shutter seal KTS1620A	1	
14	16011A403A	Finished connector block	1	
15	0003389	Silicone 1.6Φx0.8	1	
16	11620A203A	Display PCB	1	①¥3,650.00 FOB Japan
17	0001303	Screw B tight +N2.3x8	10	
18	11620A205A	Sub PCB	1	②¥2,610.00 FOB. Japan
19	0008228	PCB spacer (2) 6011	1	
20	0008223	Switch axis M-6011	2	
21	0003843	2003 Switch axis lock	2	
22	11620A204A	Main PCB	1	③¥4,100.00 PCB. Japan
23	0011630	Instruction plate 6011A	1	
24	0006562	Screw +N M4x8 Polycarbonate	1	
25	0003389	Silicone 1.6Φx0.8	1	
26	0008215	Case (Yellow) KTS1620	1	
27	0008217	Cover(Yellow) KTS1620	1	
28	0003391	Screw B tight +N3x14	4	
29	0008472	Fuse 600V/500mA	1	
30	0001934	Battery SUM-3	8	
31	0003389	Silicone 1.6Φx0.8	1	
32	0008218	Battery cover KTS1620	1	

Parts No.	Spare parts No.	Description	Qty.	Note
33	0000236	1200P Bottom cover screw	2	
34	0004040	Serial No. seal	1	
35	0010813	Foam pad for battery M-6017	2	
36	0007092	O ring N-12	2	
37	0008246	Model seal KTS1620A	1	
38	0008460	Battery harness M-6015	1	
39	0008472	Fuse 600V/500mA	1	
40	0007905	Stainless coil contact (1)	1	
41	0007906	Stainless coil contact (2)	1	
42	0005521	Coil contact SWC(4)	2	
43	0007011	Coil contact SWC(6)	1	
44	0009109	PCB insulation plate M-6011	1	

Parts No.	Spare parts No.	Description	Qty.	Note
		Finished case (16011A402A)		
26	0008215	Case (Yellow) KTS1620A	1	
38	0008460	Battery harness M-6015	1	
40	0007905	Stainless coil contact (1)	1	
41	0007906	Stainless coil contact (2)	1	
42	0005521	Coil contact SWC(4)	2	
43	0007011	Coil contact SWC(6)	1	
44	0009109	PCB insulation plate M-6011	1	

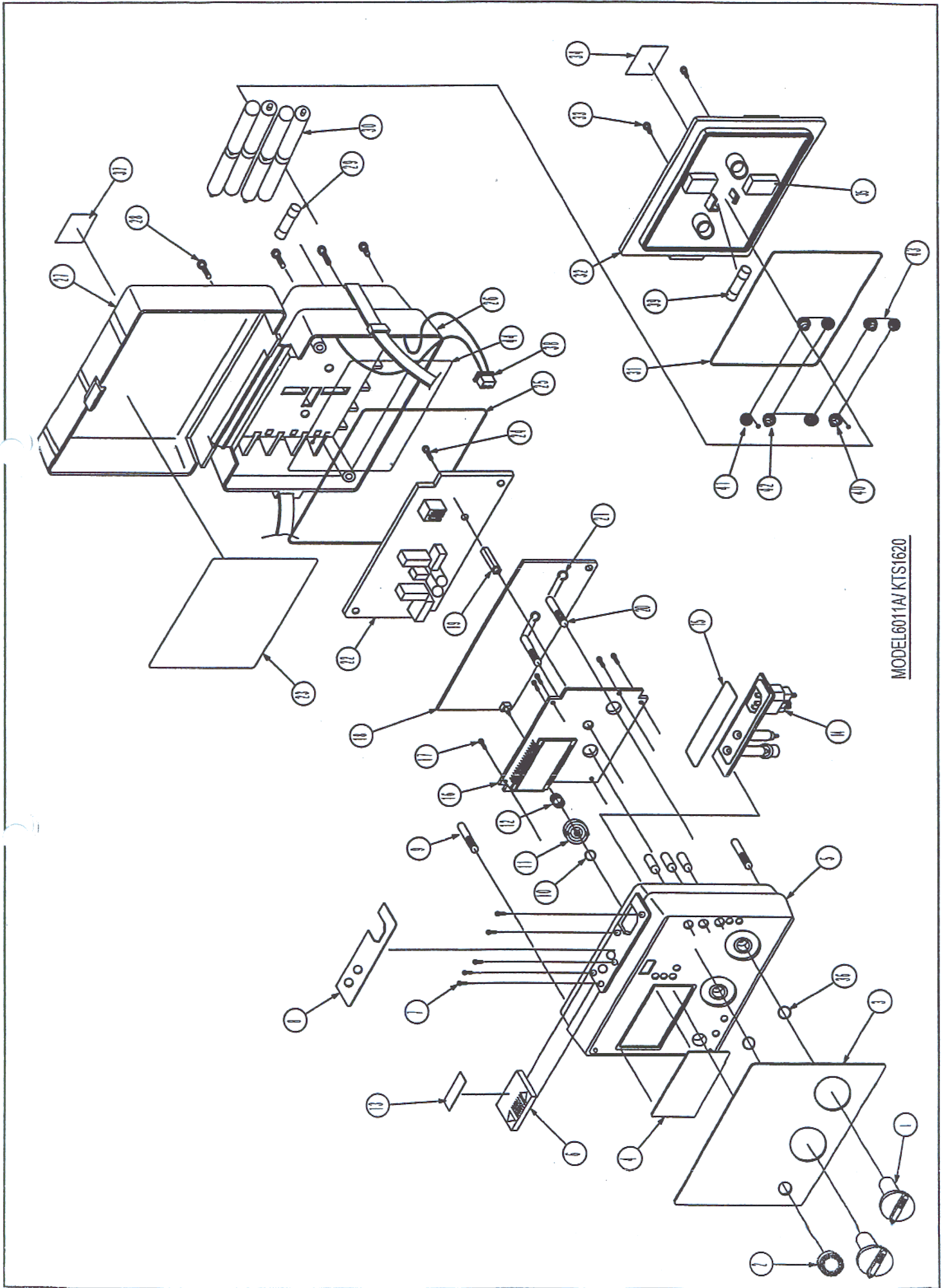
Parts No.	Spare parts No.	Description	Qty.	Note
		Finished panel (16011A401A)		
1	0008219	Range selector M-6011	2	
2	0008224	Push switch M-6011	1	
3	0011723	Name plate KTS1620	1	
4	0006862	Window plate 6020	1	
5	0011725	Panel KTS1620	1	
8	0011629	Connector plate 6011A	1	
10	0007090	O ring N-7	1	
11	0008225	Lock guide M-6011	1	

Parts No.	Spare parts No.	Description	Qty.	Note
Finished connector block (16011A403A)				
	0011983	Connector block 6011A	1	
	0011629	Connector plate 6011A	1	
	0011978	Change-over shaft for the terminal 6011A	1	
	0011771	Spring for the earth terminal 6011A	1	
	0011772	Change-over shaft cap 6011A	1	
	0011773	O ring N3	1	
	0011779	Nut for insert metal parts 6011A	1	
	0011808	Terminal R1.25-6 M6011	1	
	0011851	SW M6 Phosphor bronze Nickel	1	

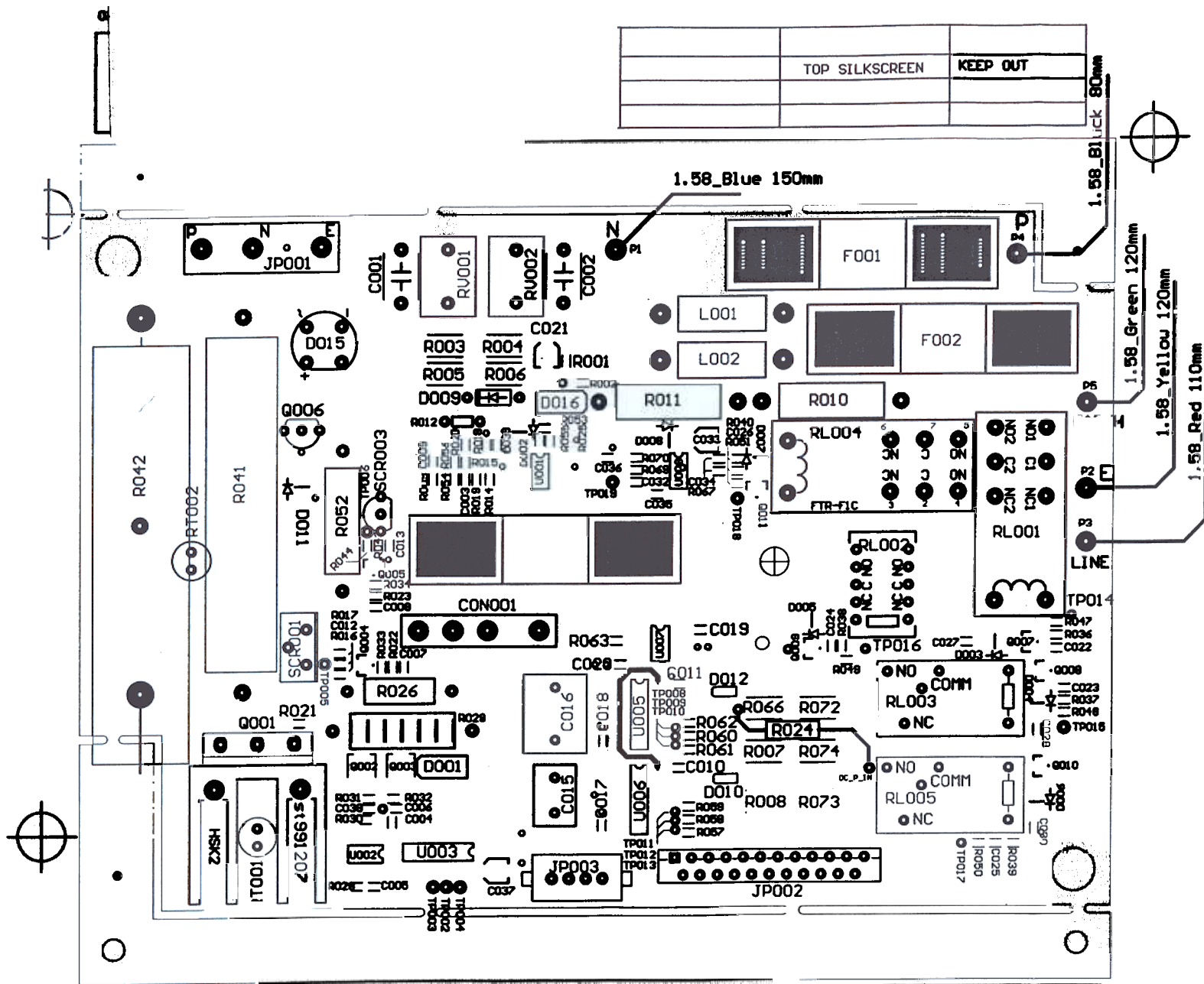
Parts No.	Spare parts No.	Description	Qty.	Note
Finished display PCB (11620A203A)				@¥3,650.00 FOB Japan

Parts No.	Spare parts No.	Description	Qty.	Note
Finished main PCB (11620A204A)				@¥4,100.00 FOB Japan

Parts No.	Spare parts No.	Description	Qty.	Note
Finished sub PCB (11620A205A)				@¥2,610.00 FOB Japan



MODEL6011A/KTS1620



	TOP SILKSCREEN	KEEP OUT

07-1359
 KTS1620A
 Main PCB No50-1485G/H
 CP No 11619



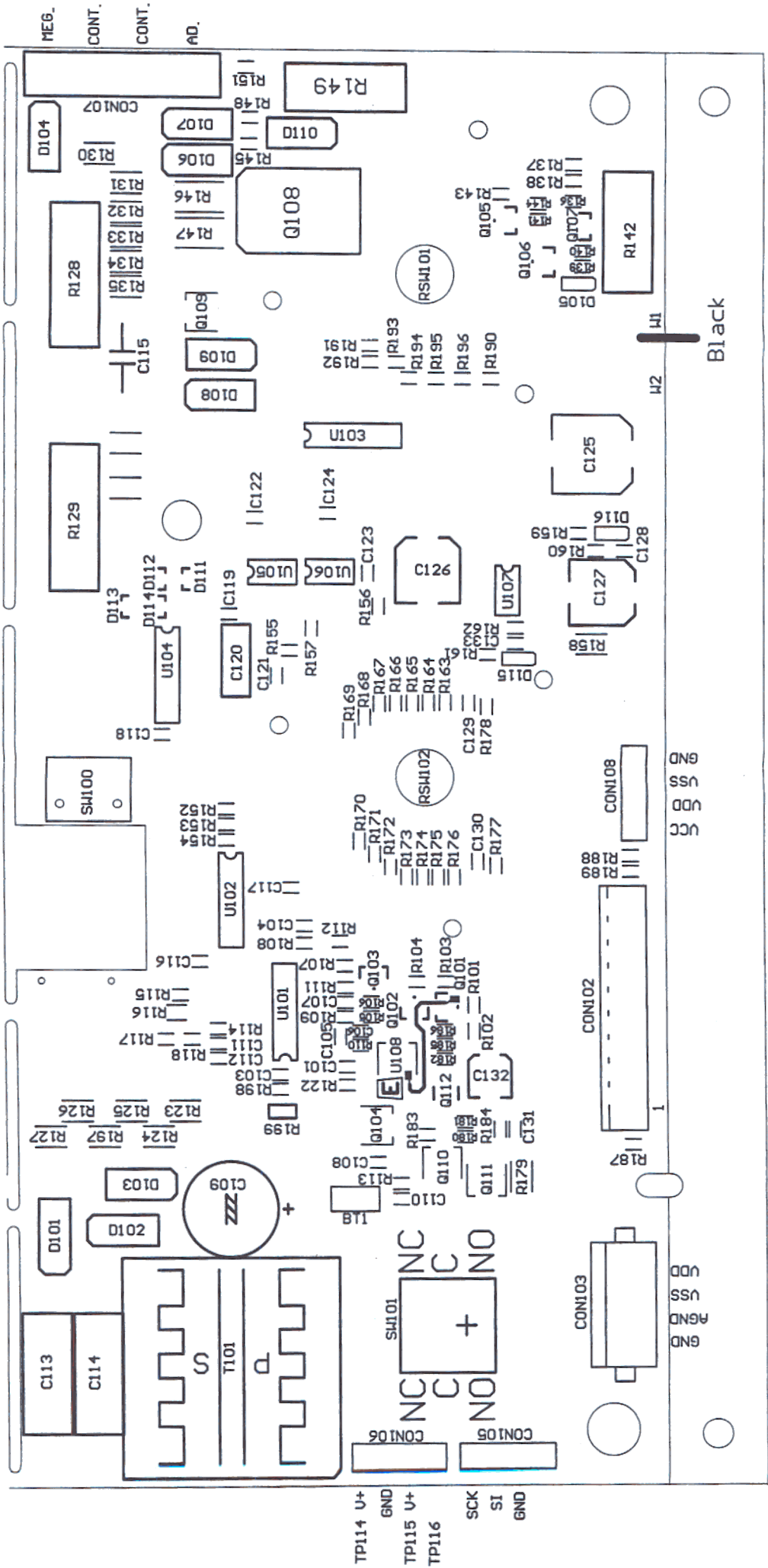
KTS1620A Main Pcb		PCB No:50-1485G/H			
Drawing No:00-2229		Parts list			
Part Type	Designator		Part Type	Designator	
1	1SS380	D010	43	MCH182FN104ZK	C011
2	1SS380	D012	44	MCH182FN104ZK	C010
3	23FE-BT-VK-N	CON001B	45	MCH182FN104ZK	C034
4	2SA1162Y/GR	Q005	46	MCH182FN104ZK	C024
5	2SA1162Y/GR	Q004	47	MCH182FN104ZK	C028
6	2SC1623	Q010	48	MCH182FN104ZK	C038
7	2SC1623	Q007	49	MCH182FN104ZK	C036
8	2SC1623	Q008	50	MCH182FN104ZK	C035
9	2SC1623	Q009	51	MCH182FN104ZK	C022
10	2SC1623	Q011	52	MCH182FN104ZK	C025
11	2SK1772	Q003	53	MCH182FN104ZK	C030
12	2SK2615	Q002	54	MCH182FN104ZK	C023
13	2SK2837	Q001	55	MCH182FN104ZK	C026
14	2SK2998	Q006	56	MCH182FN104ZK	C027
15	3W15KJ	R052	57	MCH182FN104ZK	C008
16	500V T6.3A	F002	58	MCH182FN104ZK	C006
17	500V T6.3A	F001	59	MCH182FN104ZK	C005
18	50SMC105JSTTV	C015	60	MCH182FN104ZK	C007
19	50SMC155JTS	C016	61	MCH185A101JK	C004
20	600V 0.5A	F003	62	MCH185C103KK	C032
21	A-9W-K/ATQ207	RL002	63	MCH185C103KK	C013
22	AJQ1345/VE-9H-K	RL005	64	MCH185C103KK	C012
23	AJQ1345/VE-9H-K	RL003	65	MCR03EZHF1000	R028
24	B4P-SHF-1AA	CON008B	66	MCR03EZHF1002	R054
25	BA10393	U001	67	MCR03EZHF1003	R053
26	BT151-800R	SCR001	68	MCR03EZHF1501	R002
27	BU4052BCF	U003	69	MCR03EZHF2203	R030
28	BU4053BCF	U006	70	MCR03EZHF2402	R063
29	BU4053BCF	U005	71	MCR03EZHF3001	R055
30	DE0807E102M-KH	C002	72	MCR03EZHF3002	R019
31	DE0807E102M-KH	C001	73	MCR03EZHF3002	R018
32	DTN-D502K3V	RT002	74	MCR03EZHF5603	R009
33	DTN-D502K3V	RT001	75	MCR03EZHF6202	R056
34	ERZV10D681	RV001	76	MCR03EZHF6802	R001
35	ERZV10D681	RV002	77	MCR03EZHF7502	R067
36	HZ3A1	D009	78	MCR03EZHJ101	R016
37	LMK107BJ474KYD	C009	79	MCR03EZHJ101	R017
38	LMK107BJ474KYD	C003	80	MCR03EZHJ101	R015
39	MCH182FN104ZK	C018	81	MCR03EZHJ102	R047
40	MCH182FN104ZK	C017	82	MCR03EZHJ102	R069
41	MCH182FN104ZK	C019	83	MCR03EZHJ102	R050
42	MCH182FN104ZK	C020	84	MCR03EZHJ102	R051

	Part Type	Designator		Part Type	Designator
85	MCR03EZHJ102	R048	130	RK73H2HF510k	R008
86	MCR03EZHJ102	R049	131	RK73H2HF510k	R073
87	MCR03EZHJ102	R044	132	RLS4448	D007
88	MCR03EZHJ102	R043	133	RLS4448	D005
89	MCR03EZHJ103	R023	134	RLS4448	D006
90	MCR03EZHJ103	R020	135	RLS4448	D004
91	MCR03EZHJ103	R025	136	RLS4448	D008
92	MCR03EZHJ103	R022	137	RLS4448	D002
93	MCR03EZHJ103	R021	138	RLS4448	D003
94	MCR03EZHJ104	R031	139	RM1/2WF 2.5M	R024
95	MCR03EZHJ104	R033	140	RTB-1.5-4P	CON007B
96	MCR03EZHJ104	R037	141	RTB-1.5-4P	CON004B
97	MCR03EZHJ104	R038	142	SF0R3G42	SCR003
98	MCR03EZHJ104	R032	143	SN14K2CF 130k	R012
99	MCR03EZHJ104	R039	144	SP0508-220k 1R4	L001
100	MCR03EZHJ104	R070	145	SP0508-220k 1R4	L002
101	MCR03EZHJ104	R036	146	SPR3WJ100k	R010
102	MCR03EZHJ104	R034	147	SPR3WJ100k	R011
103	MCR03EZHJ104	R040	148	VB9ST-TBU	RL001
104	MCR03EZHJ105	R014	149	VB9ST-TBU	RL004
105	MCR03EZHJ224	R062	150	W10G	D15
106	MCR03EZHJ224	R060	151	巻線3W 10_F	R029
107	MCR03EZHJ224	R059	152	金皮1/2WF10	R026
108	MCR03EZHJ224	R061			
109	MCR03EZHJ224	R057			
110	MCR03EZHJ224	R058			
111	MV16VC10MB55	C033			
112	MV16VC10MF55	C037			
113	MV50VC1MB55	C021			
114	NJM2904M	U007			
115	NJM2904M	U008			
116	NJMOP07M	U002			
117	OPEN	R027			
118	PTZ5.1A	D016			
119	PTZ5.1A	D001			
120	RGBS10L75J	R041			
121	RGBS20L9.1J	R042			
122	RK73H2HF1M	R074			
123	RK73H2HF1M	R005			
124	RK73H2HF1M	R006			
125	RK73H2HF2.2M	R007			
126	RK73H2HF2.7M	R004			
127	RK73H2HF2.7M	R003			
128	RK73H2HF3.3M	R066			
129	RK73H2HF5.6M	R072			

O A ub

07 Cp No 11 0

P SILKSCREEN		KEEP OUT	



TP114 V+
 GND
 TP115 V+
 TP116
 SCK
 SI
 GND

GND
 VSS
 VDD
 VCC

VDD
 VSS
 AGND
 GND

Black

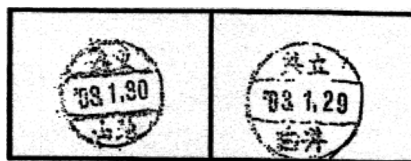
H1
 H2

KTS1620A Sub Pcb

M6011A Sub Pcb

PCB No:50-1486E

Drawing No:00-2121D Parts list



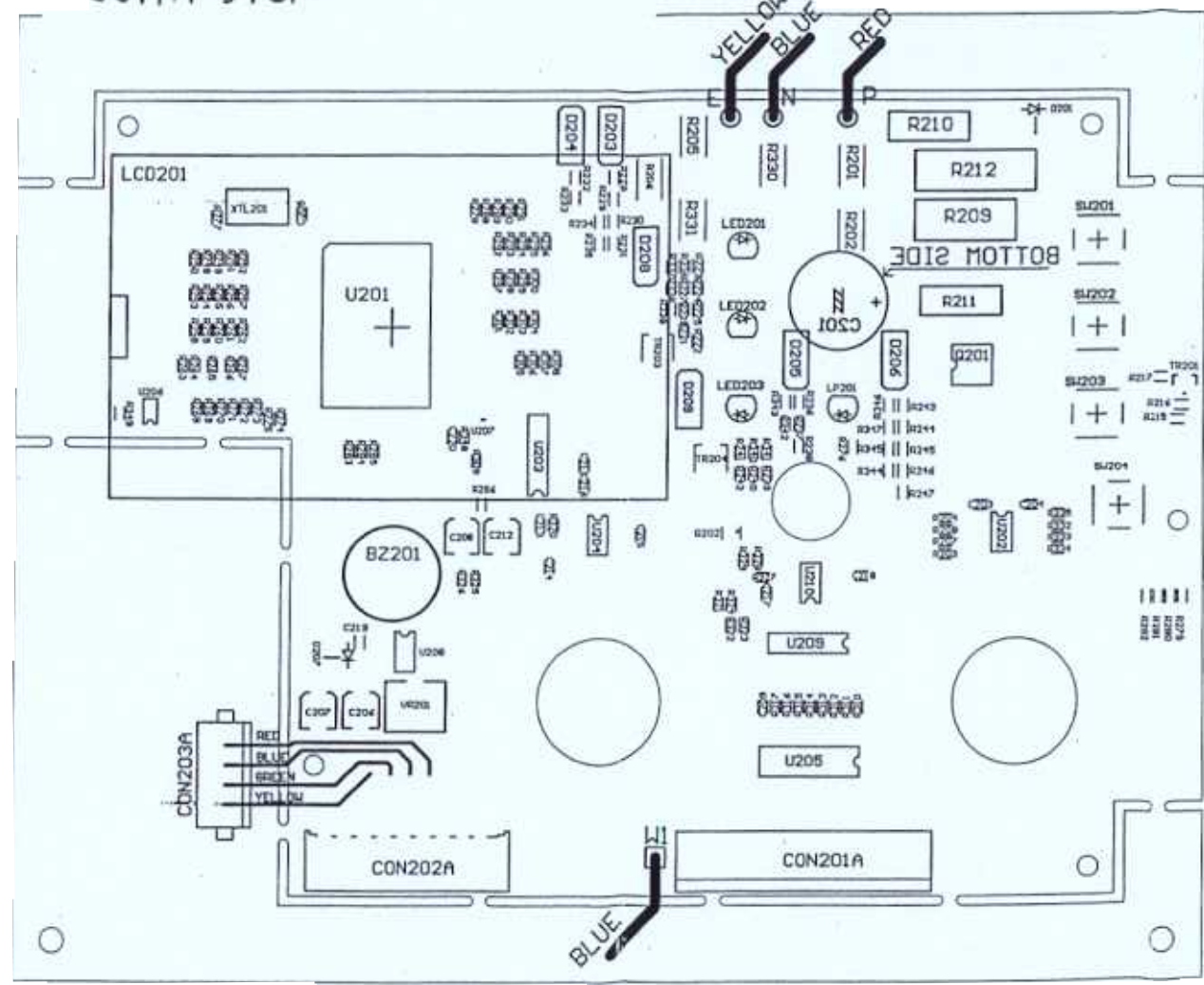
No	Part Type	Designator
1	B2B-XH-A	BT1
2	MCH185C103KK	C101
3	OPEN	C102
4	LMK107BJ474KYD	C103
5	LMK107BJ474KYD	C104
6	MCH185C102KK	C105
7	MCH182FN104ZK	C106
8	MCH185C103KK	C107
9	MCH182FN104ZK	C108
10	電解YK1000uF16VTP	C109
11	MCH185C103KK	C110
12	OPEN	C111
13	LMK107BJ474KYD	C112
14	MMD22J473K	C113
15	MMD22J473K	C114
16	DE1510B472K2K	C115
17	MCH182FN104ZK	C116
18	MCH182FN104ZK	C117
19	MCH182FN104ZK	C118
20	MCH182FN104ZK	C119
21	50SMC105JSTTV	C120
22	MCH182FN104ZK	C121
23	MCH182FN104ZK	C122
24	MCH185C222KK	C123
25	MCH182FN104ZK	C124
26	MV10VC220M H63	C125
27	MV16VC47MF55	C126
28	MV16VC47MF55	C127
29	MCH182FN104ZK	C128
30	MCH182FN104ZK	C129
31	MCH182FN104ZK	C130
32	MCH182FN104ZK	C131
33	MV16VC10MB55	C132
34	MCH182FN104ZK	C133
35	18FE-BT	CON102
36	B4P-SHF-1AA	CON103
37	B4P-SHF-1AA	CON105
38	B4P-SHF-1AA	CON106
39	60117イヤークネス	CON107
40	コネクター-M4120A	CON108
41	U05TH44	D101
42	U05TH44	D102
43	PTZ5.1A	D103
44	U05TH44	D104
45	UDZ2.4B	D105
46	SM4007A-T	D106
47	SM4007A-T	D107
48	SM4007A-T	D108
49	SM4007A-T	D109
50	PTZ5.1A	D110

No	Part Type	Designator
51	DA204U	D111
52	DA204U	D112
53	DA204U	D113
54	DA204U	D114
55	UDZ2.4B	D115
56	UDZ2.4B	D116
57	2SA1162Y/GR	Q101
58	2SC1623	Q102
59	2SA1162Y/GR	Q103
60	2SK1772	Q104
61	2SA1162Y/GR	Q105
62	2SA1162Y/GR	Q106
63	2SC1623	Q107
64	2SB962	Q108
65	2SK1772	Q109
66	2SJ197	Q110
67	2SJ197	Q111
68	SSM6N05FU	Q112
69	MCR03EZJH104	R101
70	MCR03EZJH103	R102
71	MCR03EZJH103	R103
72	MCR03EZJH104	R104
73	MCR03EZJH103	R105
74	MCR03EZJH104	R106
75	MCR03EZJH470	R107
76	MCR03EZHF3002	R108
77	MCR03EZHF1002	R109
78	MCR03EZJH104	R110
79	MCR03EZHF1002	R111
80	MCR03EZJH103	R112
81	MCR03EZJH101	R113
82	MCR03EZHF1001	R114
83	MCR03EZHF1202	R115
84	MCR03EZHF1962	R117
85	MCR03EZHF6202	R118
86	MCR03EZHF2402	R122
87	RK73H2BTDF2.2M	R123
88	RK73H2BTDF2.2M	R124
89	RK73H2BTDF2.2M	R125
90	RK73H2BTDF2.2M	R126
91	RK73H2BTDF2.2M	R127
92	SPR3 100kJ	R128
93	SPR3 100kJ	R129
94	RK73H2BTDF2.2M	R130
95	RK73H2BTDF2.2M	R131
96	RK73H2BTDF2.2M	R132
97	RK73H2BTDF2.2M	R133
98	RK73H2BTDF2.2M	R134
99	RK73H2BTDF2.2M	R135
100	MCR03EZHF1002	R136

nent layout

	TOP SILKSCREEN	KEEP OUT

6011A V13P



07-1330

MODEL 6011A/KTS1620A
PCB No 50-1484B
CP No 11618

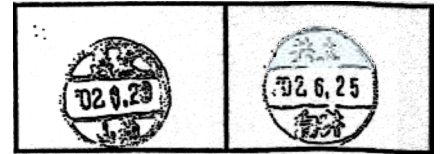
製作
図面

M60 1A Disp Pcb

PCB

1484B

Drawing No:00-2119 Parts list



No	Part Type	Designator
1	CD11PA-XZ	BZ201
2	450YK2R2 TP	C201
3	MCH185C102KK	C203
4	MCH182FN104ZK	C204
5	MCH182FN104ZK	C205
6	MV16VC10MB55	C206
7	MV50VC1MB55	C207
8	MV50VC1MB55	C208
9	MCH182FN104ZK	C209
10	MCH182FN104ZK	C211
11	MV50VC1MB55	C212
12	MCH182FN104ZK	C213
13	MCH182FN104ZK	C214
14	MCH182FN104ZK	C215
15	MCH182FN104ZK	C216
16	MCH182FN104ZK	C217
17	MCH182FN104ZK	C218
18	MCH182FN104ZK	C219
19	OPEN	C220
20	SM4007A-T	D201
21	SM4007A-T	D203
22	SM4007A-T	D204
23	SM4007A-T	D205
24	SM4007A-T	D206
25	RLS4448	D207
26	SM4007A-T	D208
27	SM4007A-T	D209
28	コネクタ-6010A(1)	JP201
29	23FE-ST-VK-N	JP202
30	18FE-ST	JP203
31	コネクタ-M4120A(1)	JP204
32	6010A LCD	LCD201
33	TLSU125	LED201
34	TLGE125	LED202
35	TLGE125	LED203
36	TLSU125	LP201
37	TLP227G	Q201
38	SSM6N05FU	Q202
39	RK73H2HF2.7M	R201
40	RK73H2HF2.7M	R202
41	MCR03EZHJ106	R203
42	MCR03EZHJ103	R204

No	Part Type	Designator
43	RK73H2HF2.7M	R205
44	RK73H2HF2.7M	R206
45	MCR03EZHJ303	R207
46	MCR03EZHJ303	R208
47	SPR2W30kJ	R209
48	SPR1W2kJ	R210
49	SPR1/2W15kJ	R211
50	SPR3W 200kJ	R212
51	MCR03EZHJ303	R215
52	MCR03EZHJ104	R216
53	MCR03EZHJ681	R217
54	MCR03EZHJ244	R221
55	MCR03EZHJ244	R222
56	MCR03EZHJ562	R223
57	MCR03EZHJ562	R224
58	MCR03EZHJ562	R225
59	MCR03EZHJ562	R226
60	MCR03EZHJ562	R227
61	MCR03EZHF3003	R228
62	MCR03EZHF3003	R229
63	MCR03EZHF3003	R230
64	MCR03EZHF3003	R231
65	MCR03EZHJ514	R232
66	MCR03EZHJ514	R233
67	MCR03EZHJ514	R234
68	MCR03EZHJ514	R235
69	MCR03EZHJ562	R236
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78	MCR03EZHJ562	R245
79	MCR03EZHJ562	R246
80	MCR03EZHJ562	R247
81	MCR03EZHJ224	R248
82	MCR03EZHJ224	R249
83	MCR03EZHJ224	R250
84	MCR03EZHJ103	R251

No	Part Type	Designator
85	MCR03EZHZJ224	R252
86	MCR03EZHZJ224	R253
87	MCR03EZHZJ224	R254
88	MCR03EZHZJ224	R255
89	MCR03EZHZJ224	R256
90	MCR03EZHZJ224	R257
91	MCR03EZHZJ103	R258
92	MCR03EZHZJ103	R259
93	MCR03EZHZJ472	R260
94	MCR03EZHZJ224	R261
95	MCR03EZHZJ472	R262
96	MCR03EZHZJ224	R263
97	MCR03EZHZJ224	R264
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101	MCR03EZHZJ224	R268
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103	MCR03EZHZJ224	R270
104	MCR03EZHZJ472	R271
105	MCR03EZHZJ224	R272
106	MCR03EZHZJ224	R273
107	MCR03EZHZJ224	R274
108	MCR03EZHZJ224	R275
109	MCR03EZHZJ102	R276
110	MCR03EZHZJ470	R277
111	OPEN	R278
112	MCR03EZHZJ224	R279
113	MCR03EZHZJ224	R280
114	MCR03EZHZJ224	R281
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116	MCR03EZHZJ224	R283
117	MCR03EZHZJ224	R284
118	MCR03EZHZJ224	R285
119	MCR03EZHZJ470	R286
120	OPEN	R288
121	MCR03EZHZJ224	R289
122	MCR03EZHZJ224	R290
123	MCR03EZHZJ224	R291
124	MCR03EZHZJ224	R292
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126	MCR03EZHZJ224	R294
127	MCR03EZHZJ224	R295
128	MCR03EZHZJ224	R296
129	MCR03EZHZJ224	R297

No	Part Type	Designator
130	MCR03EZHZJ224	R298
131	MCR03EZHZJ472	R299
132	MCR03EZHZJ472	R300
133	MCR03EZHZJ224	R301
134	MCR03EZHZJ224	R302
139	MCR03EZHZJ224	R307
140	MCR03EZHZJ224	R308
141	MCR03EZHF2401	R309
142	MCR03EZHZJ224	R310
143	MCR03EZHZJ224	R311
144	MCR03EZHZJ224	R312
145	MCR03EZHZJ224	R313
146	MCR03EZHZJ224	R314
147	MCR03EZHZJ224	R315
148	MCR03EZHZJ224	R316
149	MCR03EZHZJ224	R317
150	MCR03EZHF1501	R320
151	MCR03EZHF3003	R321
152	MCR03EZHF1503	R322
153	MCR03EZHF1402	R323
154	MCR03EZHF1333	R324
155	MCR03EZHZJ224	R325
156	MCR03EZHZJ224	R326
157	MCR03EZHF1003	R327
158	MCR03EZHF1003	R328
159	MCR03EZHF1692	R329
160	RK73H2HF2.7M	R330
161	RK73H2HF2.2M	R331
162	MCR03EZHZJ304	R332
163	MCR03EZHZJ224	R333
164	MCR03EZHF2402	R334
165	open	R335
166	MCR03EZHZJ562	R336
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175	MCR03EZHZJ562	R345
176	MCR03EZHZJ562	R346
177	MCR03EZHZJ562	R347
178	OPEN	R348

